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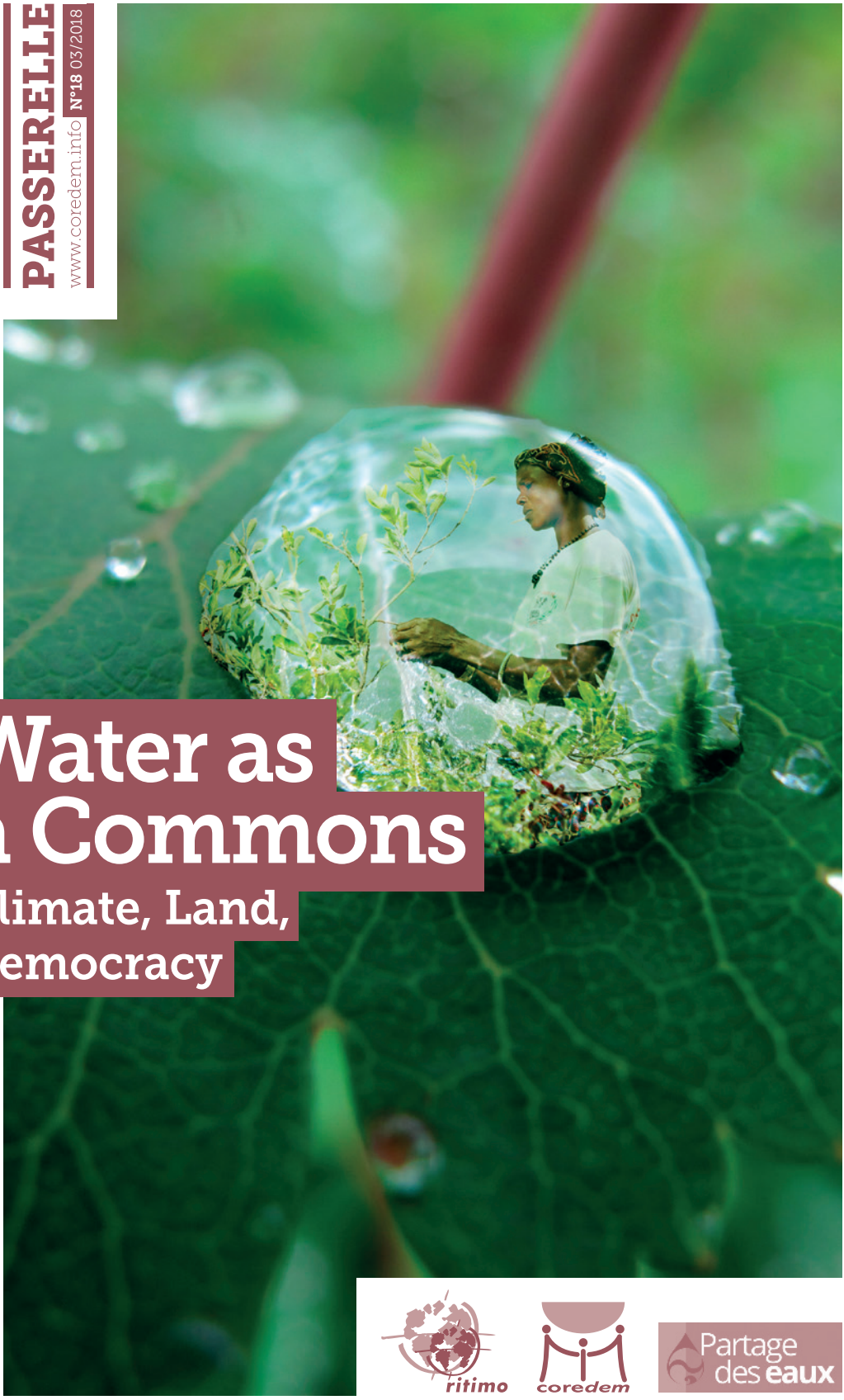

Water as a Commons

Climate, Land, Democracy

ritimo
coredem
Partage des eaux

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The Passerelle Collection

The Passerelle Collection, realised in the framework of the Coredem initiative (Communauté des sites de ressources documentaires pour une démocratie mondiale– Community of Sites of Documentary Resources for a Global Democracy), aims at presenting current topics through analyses, proposals and experiences based both on field work and research. Each issue is an attempt to weave together various contributions on a specific issue by civil society organisations, NGOs, social movements, media, trade unions, academics, etc.
The publication of new issues of Passerelle is often associated to public conferences, "Coredem's Wednesdays" which pursue a similar objective: creating space for dialogue, sharing and building common ground between the promoters of social change.

All issues are available online at: **www.coredem.info**

Coredem, a Collective Initiative

Coredem (Community of Sites of Documentary Resources for a Global Democracy) is a space for exchanging knowledge and practices by and for actors of social change. More than 30 activist organisations and networks share information and analysis online by pooling it thanks to the search engine Scrutari. Coredem is open to any organisation, network, social movement or media which
consider that the experiences, proposals and analysis they set forth are building blocks for fairer, more sustainable and more responsible societies.

Ritimo, the Publisher

The organisation Ritimo is in charge of Coredem and of publishing the Passerelle Collection.
Ritimo is a network for information and documentation on international solidarity and sustainable development. In 90 locations throughout France, Ritimo opens public information centres on global issues, organises civil society campaigns and develops awareness-raising and training sessions. Ritimo is actively involved in the production and dissemination of plural and critical information, by means of its website: **www.ritimo.org**

Olivier Petitjean

Olivier Petitjean is a journalist writing for the news website Basta! (bastamag.net) and the Multinationals Observatory (multinationales.org). With Ritimo, he participated in the creation of Partage des eaux (partagedeseaux.info), a website dedicated to the social, environmental and political issues around water across the world.

Introduction

THE PUBLISHERS

Water, as an issue, has many aspects. First, there are the hundreds of millions of men and women who lack reliable access to water and sanitation, despite decades of international programmes. There are also the increasingly dramatic episodes of drought or flooding, related to climate change but also to the deterioration of ecosystems. There are the multiple forms of commercial appropriation of water, such as the privatisation of urban services, the bottled-water industry, or the volume of water used in industrial farming for export. There are controversial infrastructure projects, such as large-scale dams. Finally, there is the question of who controls water resources, involving conflict between social groups and entire nations.

All these issues inspired Ritimo to create, in 2009, **Partage des eaux (partagedeseaux.info),** an informational website on sustainable water management. This site collects and synthesises information from NGOs, researchers, and the public on water-related issues throughout the world – emphasising our collective capacity to preserve and share water democratically, on both the local and the global level, providing we challenge commercial logic and dominant technologies. Building on work accomplished since 2009, this issue of the Passerelle collection sums up major water-related issues in a context of apparently contradictory imperatives: on the one hand, to preserve the planet's fragile equilibrium and contain global warming; on the other, ensuring adequate sustenance and a life worthy of the name for the world's population. In reality, as the articles collected here amply demonstrate, this contradiction exists only in the framework of the particular development models currently prevalent throughout the world. Restoring or creating a new culture and a new management for water (and, indissociably, the earth itself) could, conversely, allow us to meet ecological imperatives while at the same time ensuring a "good life", in big cities as well as rural regions, in the north and the south, throughout our planet.

To outline these new directions, Ritimo has partnered with France Libertés and Coordination Eau Île-de-France, two NGOs active in defending the right

to water and its status as a common good, both in France and elsewhere, and which share Ritimo's objectives of producing and disseminating information on water to support or encourage all who are involved or wish to become involved in implementing this new democratic culture of water.

Passerelle, the product of this collaboration, has three foci: the rediscovery of and respect for the close interactions between water, earth, and climate; the emerging demand for a right to water as a way of addressing the wider issues associated with this resource; and, finally, encompassing the previous points, reinventing the management of water as a common good, at once local and global.

Contents

Preface: Manifesto for Water!

ANNE LE STRAT, CONSULTANT, FORMER PRESIDENT OF EAU DE PARIS, CO-FOUNDER OF AQUA PUBLICA EUROPEA

The world has entered a new era in which it confronts the vulnerability of its ecosystems and rising tensions regarding its natural resources. For the first time on this scale, the conditions of existence itself are under threat. Is it necessary to remind anyone that water, our first vital resource, underlies all life on earth? Indispensable to the living world, it determines all human activities, from our daily lives to our economies, from our homes to geopolitics.

It is also the first resource affected by climate change. There is no doubt that global warming as a result of greenhouse gases has an impact on water resources, although scientists differ as to its magnitude. The last IPCC Assessment Report,[1] like previous reports, describes disturbing hydrological scenarios, highlighting the increased risk of an abrupt change in the composition, structure, and function of marine, terrestrial, and freshwater ecosystems, including those of wetlands. Significant increase in ocean acidification is accompanied by a reduction in marine biodiversity. More generally, many terrestrial, freshwater, and marine species are undergoing a modification of their geographic distribution and activity. The impact on precipitation is not and will not be uniform, but will aggravate current global disparities with a great probability that precipitation will be reduced in dry regions and increased in wetter regions.

Throughout our planet, the reality of climate change is already observable, particularly the profound modification of hydrological systems, affecting water resources in terms of both quantity and quality. From California to Bangladesh, many populations are experiencing extreme phenomena such as heatwaves, droughts, floods, and cyclones. Cape Town in South Africa, as of early 2018,

[1] Intergovernmental Panel on Climate Change, Fifth Assessment Report, adopted 1 November 2014, in Copenhagen.

is undergoing its worst water shortage in over a century. More and more, our societies and ecosystems are severely exposed to climate variability and found extremely vulnerable.

In this new climatic context, human constraints on water resources are more and more stringent. The demand for water has multiplied more than sevenfold over the last century, due to increased population, water-intensive farming, and galloping urbanisation. Over the course of the 20th century, the world's area of irrigated land has multiplied by five, representing approximately 70% of total water extraction. In addition to this quantitative pressure, the quality of water is deteriorating, for both surface and groundwater. Agriculture, the most important consumer of water, is also one of its main polluters. Even today, despite the UN's Sustainable Development Goals, basic human needs are not met: nearly one person out of three does not have assured access to drinking water and two out of three lack assured access to sanitation facilities.[2]

Under these circumstances, climate change can only aggravate social, environmental, and territorial inequality. It destabilises living conditions in many areas, some of which might become uninhabitable. It is a particular threat to food security, many studies showing that the negative impacts of climate change on food production are greater than the positive impacts. Climate hazard leads to ever-increasing restriction on water use. Usage conflicts multiply, with agriculture, industry, and local populations facing off over hydraulic resources.

The paradox is that this empirical fact has not led to responsible action regarding these increased risks and needs. Worse: the human activities that are devastating climate, natural resources, and, consequently, humanity itself are only increasing. Deforestation continues to spread, extraction industries prosper, waste and pillage of natural resources grows wider. To the climate impacts due to anthropic activities are added the direct impacts of human mismanagement of water resources. Although socio-economic and political contexts differ, mismanagement in both urban and rural zones is widespread; several examples will be examined in this Passerelle. More and more megalopolises are facing water-related crises; rural populations no longer have access to the hydraulic resources they need. Often the result of public actors' withdrawing in favour of private interests, these tendencies reflect the spirit of today's capitalism, caught up in a financial race, in a logic of commercialisation of every aspect of life, and in pursuit of a breathless, unsustainable ideal of growth. But there exist, throughout the world, examples of successful civic and political movements supporting another model of water management, with, in counterpoint, another model of society. This Passerelle bears witness to these movements, offering a new analytical framework that puts the issue of water at the heart of the ecological transition which our societies must undertake.

[2] Drinking water refers to safe drinking water drawn from a local source, available in case of need, and free of contamination. Sanitation facilities allow human waste to be treated and eliminated safely.

Water resources must not, therefore, be viewed simply as a problem to be resolved, a potential crisis point, but as an opportunity to think differently about our activities overall. We are facing a crisis point in our civilisation; we must break with our current ways of life, with our habits of consumption, production, mobility, etc. More globally, we must break with our way of thinking about our relationship with the living world, with the totality of the ecosystems with which we are indissociably linked. We must devise another model of society, capable of responding to ongoing climate upheaval, rarefaction of natural resources, and accelerated decline of biodiversity. Water, together with its various uses, occupies a central place in this redefinition.

In the face of these new challenges, we must renew public policy, create tools to reinforce the resilience of territories, decentralise decision-making processes. This involves increased intersectorality between issues of water, energy, land-use, food, city planning, biodiversity, etc. Examples illustrating this new approach are many: new environmental farming practices, ecological city planning, and democratic, coordinated water management ... Alternatives exist – they are happening throughout the world. They are often limited in scope by lack of means, but above all by lack of political commitment and conflict with powerful lobbies, the guardians of well-established private interests.

We must, in direct opposition to current tendencies, reverse the power differential that increasingly favours multinational corporations over governments and citizens. What is happening on the ground? Finance has replaced industry; profits flow to big corporations; natural resources are plundered rather than preserved. We need more regulation and public management, and more grassroots participation in the decision-making process. “Public” is used here in its widest sense: collectives of users and inhabitants, local communities, or cities, as well as national governments. Public management is not intrinsically positive; there must also be checks and balances, particularly those emanating from the citizenry. But water must be managed as a common, not a commercial good; for the long-term, not short-term, market-indexed profitability; holistically, taking into account regions and ecosystems, not technologically, with an orientation towards major infrastructures; transversally and in a decentralised manner, not vertically and technocratically. We must respect the lifecycle of water, restoring the connections between populations, regions, and their natural environments. The idea of the “human right to water”, recognised by the United Nations in 2010, must be embodied on the ground, becoming a tool for a greater democratisation of water, a framework for sustainable, responsible management, in the interest of peoples, regions … and water!

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WATER IS CLIMATE, AND CLIMATE IS WATER

A Blue and Just Future Is Possible

MAUD BARLOW

The most dramatic impacts of climate change will be felt through water – either directly through extreme weather events such as droughts and flooding, or indirectly, with the influx of climate refugees in megacities and slums where they lack access to water and sanitation. For Canadian activist and expert Maud Barlow, poor water management and privatisation contribute to these problems. On the other hand, a new water culture based on the human right to water can bring real solutions.

The challenge is stark. Peri-urban slums ring most of the developing world's megacities where climate and food refugees are arriving in relentless numbers. Unable to access their traditional sources of water because they have been poisoned, overexploited or priced beyond reach, many must pay exorbitant prices to local water dealers or rely on drinking water contaminated with their own waste.

UN-Habitat reports that by 2030, more than half the populations of large urban centres will be slum dwellers and the US National Academy of Scientists says that by 2050, more than one billion of these urban slum dwellers will only have daily access to enough water to fill a small bathtub.

Hardest hit cities will include Beijing, New Delhi, Mumbai, Kolkata, Manila, Mexico City, Caracas, Lagos, Abidjan, Tehran, and Johannesburg. Today, greater São Paulo, with a population of almost 20 million people, is literally running out of water.

This coming human crisis is mirrored and made worse by an ecological crisis. The planet is running out of clean water. We are exploiting our rivers to death and most major rivers no longer reach the sea. Since 1990, over half the major rivers in China have disappeared.

As well, we are over-pumping groundwater so relentlessly that aquifers are not being replenished. Using new satellite technology, NASA reports that a third of the planet's 37 major aquifers are being sucked dry. The Arabian Aquifer System, a key water source for 60 million people is the world's most overstressed. Other threatened aquifers are the Indus Basin aquifer in northwestern India and Pakistan and the Central Valley aquifer in California.

Dramatic action is needed to deal with the twin ecological and human water crises coming at us full speed. I pose to you today three hard facts that I believe if we do not face, we will not be successful in solving these crises.

First, the human crisis cannot be solved without dealing with the ecological crisis and that means re-imagining our understanding of climate change. Climate chaos is not just a result of runaway fossil fuel emissions. We only have the problem half identified.

Major bodies of water have been destroyed from over extraction and water diversion, not climate change as we usually describe it. The destruction of watersheds and water–retentive land is causing rapidly growing desertification, which in turn, warms the planet.

As well, the razing of forests devastates hydrologic cycles. The crisis in Sao Paulo is not due to greenhouse gas emissions but to the destruction of the Amazon, the biotic pump that creates "flying rivers" that carry rain thousands of kilometres and acts as a air conditioner, cooling the atmosphere. Scientists say the razing of the Amazon may be partially responsible for drought as far away as California and Texas.

And the solution to climate chaos lies not just with reducing our use of fossil fuels but with protection and restoration of watersheds, thereby returning local water cycles to health, the reclamation of carbon to heal and regenerate soil and the protection and re-building of forests. Miraculous projects around the world are greening desserts, restoring watersheds and aquifers and re-building healthy soil, thereby creating biodiversity for a living planet.

Second, the human right to water and sanitation and protection of the most vulnerable must be put at the heart of all plans dealing with water.

Five and a half years ago, the United Nations General Assembly voted to adopt a resolution guaranteeing the human rights to water and sanitation. In doing so our human family took an evolutionary step forward. We said that it is not acceptable to have to watch your child die of water-borne disease because you cannot afford to buy water.

PYLM / FLICKR (CC BY - NC)

These new rights conferred on all governments the obligations to come up with a plan to provide clean water and sanitation to their people; to prevent third party destruction of their local sources of water; and to put the most vulnerable at the heart of all water policy.

This means that governments should not be permitting the destruction of water sources by mining companies. They should not allow millions to be displaced from their land to make way for corporate land grabs. They are required to put people and communities ahead of economic interests in allocating water.

And they need to invest in safe, accessible public water systems and stop the profit motive from interfering with the human right to water. Two hundred and thirty-five cities around the world, including Paris, have ended their love affair with privatisation and brought their municipal water services back under public control. This has provided funds to fight pollution and ensure more equitable distribution of water.

Most essentially, the human right to water is an issue of justice, not charity. It requires a challenge to the current power structures that support unequal access to the world's endangered water supplies.

So that leads me to my third hard fact, and that is that the dominant model of development followed by most of our leaders and international institutions is not only a huge part of the problem but it is getting in the way of a solution.

We live in a world that enshrines the inalienable right to accumulate more and more private property and wealth through an increasingly deregulated global market. In this world, the gap between rich and poor grows steadily – between and within countries. Last month it became official: the 1% finally owns 50% of everything.

In this world, millions of indigenous and rural small farmers are displaced by foreign investors in massive land and water grabs. Millions more are displaced

to make way for free trade zones, developers, forced urbanisation, large scale mining operations, mega dams and tourist resorts. With their homes gone, they swell the slums of burgeoning cities.

In this world, governments initiate aggressive policies to privatise water resources in order to entice foreign capital. Too often, they privilege economic users for dwindling water sources over communities, literally making life and death decisions for their people.

In this world, many governments – North and South – are also slashing their environmental and water protection laws to please global capital. They sign trade and investment treaties such as CETA, TTIP and TPP that give transnational corporations the right to sue governments for any new measures to protect their water or the human rights of their people, thus locking in the lowest common standards.

In this world, water is seen as a resource for industrial development and so we not only dump our effluents into water, we drain watersheds to move water to where it is convenient for us. An advisor to President Roosevelt promoted the building of mega dams, saying that the conquest of nature would not be complete until the waters "on, under and above" the surface area brought under complete human control.

It is not a large step then to seeing water as a commodity being bought, hoarded, sold and traded on the open market. Or used to promote private water utilities and services in poor countries, as the World Bank, the World Water Council and the 2030 Water Resources Group do. Or, through water pollution trading, which allows big polluters to buy their way out of regulatory compliance.

How do we start to talk about the crisis of water and megacities? With a critical examination of these and other policies that favour global markets over the lives of people and the health of ecosystems. And by confronting the tyranny of the 1% with the creation of a just global economy.

We can start with a new water ethic. Rather than seeing water as a resource for profit, we need to understand that it is the essential element in all living ecosystems. All policies and practices must be planned with the preservation of water at their core. Not only do we have to reject the market model for our water future, we must put ourselves at the service of undoing what we have done to the natural world and hope it is not too late.

Our current legal systems for protecting the environment are not working because they were not designed to do so. They view nature and water as our property. We need new universal laws that respect the integrity of ecosystems and allow other species than our own to fulfil their evolutionary role on Earth.

What would food production look like if we valued water? I can assure you it would not be a chemical-intensive, industrial-based system designed for ever-greater exports but would favour local, organic and sustainable farming.

Would we dare frack for gas knowing that we are destroying huge amounts of groundwater or move dirty oil laced with chemicals on, under and around our precious waterways?

What would trade agreements look like if they had to take into account the damage done to water of ever more relentless destruction of watersheds to meet the growing demand of consumers or the vast amounts of virtual water being exported in the form of commodities?

We can start right here at COP21! The European Parliament has adopted in its official negotiating position, a carve-out to protect a climate agreement from corporate challenges. The concern is that under ISDS, foreign corporations could sue governments trying to introduce measures to curb greenhouse gas emissions and protect their water sources once back home if these measures threaten the corporate bottom line. Introduced by Gus Van Harten, a Canadian legal scholar, this carve out could become a model for other environmental and human rights treaties around the world.

In closing, may I dream a little? The distinguished American anthropologist and writer David Harvey calls us to reimagine cities by asserting our right to change them after our "heart's desire." Thirty years of market capitalism and economic globalisation, promoting the notion of scarcity, have created ghettoised cities, homelessness, deep inequality and desperation, he says.

But a new right – the "Right to the City" – could create a new urban commons, an inclusive public sphere of active democratic participation and a roll back of the relentless privatisation of public spaces we have witnessed.

Imagine a city where all who are there want to be there and are not dispossessed of their rural lands and livelihood. Imagine caring for our water as a fiercely managed public trust based on the principles of justice and sustainability. Imagine a world in which water becomes nature's gift to teach us how to live in peace with one another and dwell more lightly on this lovely planet.

It is all possible. A blue and just future is possible.

• • •

Keynote speech from the International Conference on Water, Megacities and Global Change, UNESCO Headquarters, Paris, December 1, 2015

Climate Change Impacts First Experienced Through Water

As we know, the impacts of climate change are now being felt by many communities throughout the world, in the form of an increase in frequency and intensity of extreme weather – droughts and water shortages, glacier melt, drying lakes, storms, precipitation, and flooding. This list illustrates a fundamental reality: climate change impacts are felt first in and through water, whether absent or overabundant.

These impacts differ depending on global region. Some regions, like the Andes or the Himalayas, will fully experience the consequences of glacier melt. Others, like Bangladesh or the Nile Delta, will be affected by rising sea levels and saltwater intrusion in the aquifer. Some, like the Southwestern United States or the Mediterranean Basin, will become drier; others will see increased frequency and intensity of precipitation.

Beyond a doubt, however, Southern countries will suffer most from these impacts, for reasons both climatic and geographic, due to their greater dependency on climate and water, and finally because of widespread poverty and lack of public infrastructure. Even in countries accustomed to water scarcity, like the Arab world, climate change combines with other political, environmental, and social factors to disrupt their fragile equilibrium, with countless repercussions on their populations' health and wellbeing.

The issue of water is also felt in the direct impacts of climate change in Southern countries. Hundreds of thousands of persons, displaced for climatic or other reasons (as in the case of Syria today, and Darfur previously, it is sometimes difficult to establish a clear difference between climatic and other factors), swell the population of refugee camps and the shantytowns of Southern megalopolises, or, in certain cases, attempt desperately to emigrate towards the West. Often these displaced people have no access to clean water and sanitation.

Replenishing the Earth: the Way to Live Well and Save the Climate

DANIEL HOFNUNG

Climate change is only the most obvious manifestation of the havoc wreaked on the planet and the biosphere by humans. There are also effects linked to soil degradation and disrupted water cycles, which have experienced a dramatic acceleration due to the expansion of industrial agriculture. While these phenomena often exacerbate the impacts of climate change, they also offer clues as to how we might take action.

Humanity, with its massive consumption of fossil fuels, is changing the composition of the Earth's atmosphere. There has been a wealth of evidence, as demonstrated in international conferences on climate change, about the resulting risks to our ecosystems and to life on our planet in general.

Humanity is impacting on the planet in other ways, which are just as problematic.

Our current civilisation, following on from the industrial revolution, is characterised by the large-scale predation of the earth's resources, raw materials and fuels. In addition, a third of the earth's forest area has been cleared to make room for crops and livestock, another ongoing, rapidly expanding process that dates back to the Neolithic revolution and the invention of farming. Our environment has been profoundly altered.

Consider the Middle East: the so-called "Fertile Crescent" of former Mesopotamia is now largely a desert. The ancient lands of Maurusia (Algeria and Morocco), described in the first century by Strabo as "a fertile country, except a small de-

PIERRE MARCEL / FLICKR (CC BY - NC)

sert part, and supplied with both lakes and rivers", are now dried out. Once the granary of the Roman Empire, this land is now part desert.

The gradual change in the climate and landscape is due to soil salinisation caused by irrigation and overgrazing, resulting in gully erosion of areas with poor vegetation cover.

And this was in a time of traditional farming practices, before the Agricultural Revolution which took place over the second half of the twentieth century, characterised by mechanised agriculture and intensive crop farming. Hybrid seeds, pesticide use and intensive tillage has now become the norm. While traditional agriculture worked with nature and practised crop rotation, intercropping and used manure as fertiliser, industrial agriculture has attempted to take nature's place.

Replacing nature's processes with artificial ones disrupts ecosystems and increases chemical inputs. In addition to the health impacts on farmers and their neighbours, pesticide use also affects the natural life cycle of the soil. Tilling,

particularly if it is intensive, is another contributing factor, and can compact the soil, along with the use of heavy machinery and tools. Another effect is that earthworms, essential for loosening the soil, increasing soil permeability and redistributing nutrients, completely disappear.

The land most affected by these practices are undoubtedly vineyards. In the southeast of France, it is estimated that 90% of living organisms (earthworms, insects, arachnids, bacteria and fungi) have disappeared. The soil surface becomes hard and "encrusted", rainwater doesn't absorb into the soil and the water tables are inadequately recharged. If the soil is bare – which is often the case after a harvest – humus is swept off by surface runoff caused by heavy rain.

Good soil, on the other hand, can absorb 160 mm of rainwater per hour, i.e., the amount produced by a big storm,[1] thanks to the tunnelling work done by earthworms. Without living organisms, however, it loses this capacity. In fifty years, the number of earthworms has dropped from two tons per hectare to less than 100 kg per hectare.[2] This is the result of industrial agriculture, so it is no surprise that there is flooding in times of heavy rain.

Fungicides also kill a number of fungi whose filaments stick to plant roots and plunge deep into the earth. In dry periods, these filaments can carry water up from the earth to the roots.[3]

Soil degradation also has other consequences: reduced organic matter in the soil (the amount of organic matter in European soil has halved since 1950[4]), resulting in a lower carbon content – because the soil's biological life, through the decomposition of plant life on the soil surface, is what feeds it carbon. And this carbon enables the soil to store large amounts of water: it is estimated that when there is 1% more carbon in the soil, it can store an extra 190,000 litres of water per hectare.[5]

If the earth can no longer store water, irrigation becomes increasingly necessary, drawing from surface water and groundwater resources instead of relying on the natural replenishment process. We don't do as good a job as the rain does when it penetrates the soil, and we do it by drawing on resources that are not necessarily renewable. In both agriculture and in energy, our world has become that of the non-renewable. The fossil water that we are using sometimes comes from thousand-year-old aquifers. We have recognised the need to stop using fossil fuels in the energy sector; we now need to apply the same principle to agriculture and stop using fossil water.

[1] Jean-Paul Thorez, *Le guide malin de l'eau au jardin*, éditions Terre vivante, 2005.
[2] Lydia et Claude Bourguignon, *Manifeste pour une agriculture durable*, Actes Sud, 2017.
[3] Judith D. Schwartz, *Water in Plain Sight*, St Martin's Press, 2016.
[4] *Manifeste pour une agriculture durable*, ibidem.
[5] https://blog.nationalgeographic.org/2016/12/07/water-in-plain-sight/.

Regenerating the soil by working in harmony with nature

Soil carbon sequestration – or the opposite, the release of carbon through oxidation on bare soil – also plays a major role in the presence of carbon dioxide in the atmosphere.

Increasing carbon storage in the soil by 4‰ would be enough to store all the carbon dioxide emitted into the atmosphere over a year. This was the idea behind the "4 per 1000" initiative, launched around the same time as COP21.[6] If the aim is to avoid reducing fossil fuels by using the earth merely as a carbon sink, it is clearly a convenient way for governments to evade reining in fossil fuel lobbies. However, if the goal is rather to move towards a new agricultural revolution, which puts chemicals behind us, and which focuses on working in harmony with nature in order to produce food that is healthy and is entirely free of chemicals and GMOs, this represents the path of the future.

If we were to take this approach across the globe, along with a reduction in greenhouse gas emissions, we could open up the possibility of taking action against the inertia of the climate system (whereby the planet keeps warming even after greenhouse gas emissions stop increasing), with even the prospect of bringing emissions back to pre-industrial levels.[7] This represents a radically different approach to the question of what to do about climate change!

In addition, it represents an entirely ecological alternative to the more technical carbon capture and storage solutions (storage in former mines, for example) discussed at climate conferences. This is an inexpensive alternative that restores healthy soil, thereby ensuring quality food produce. The only requirement is giving up industrial agriculture and replacing it with organic farming, or any kind of agricultural practice that restores and respects the earth, and there is no shortage of those: agroforestry, silvopasture, small-scale farming, conservation agriculture,[8] sustainable agriculture, permaculture, Holistic Planned Grazing, cover crops, no-till farming, rotational crops, to name just a few.

We need to learn to work with the natural world, not seek to replace it. With a little assistance and direction, natural systems are entirely capable of doing the following:

- Providing a good part of the minerals that plants need (this is the work of certain worms, which break down rocks under arable land and draw up minerals).

- Giving plants nitrogen: fungi, which are symbiotically associated to plant roots, capture nitrogen from the air and make it assimilable by the plant; this

[6] http://agriculture.gouv.fr/4-pour-1000-et-si-la-solution-climat-passait-par-les-sols-0.
[7] https://bio4climate.org.
[8] Although this method involves the sometimes intensive use of chemical inputs, if natural methods are unsuccessful.

is what happens when legumes (peas, faba beans, vetch, alfalfa, soybeans, etc.) are grown with or in rotation with cereals. They directly provide assimilable nitrogen, without there being any emission of nitrogen peroxide (a powerful greenhouse gas) due to unabsorbed nitrogen excess or nitrate pollution of groundwater.

- Providing them with water (a soil rich in carbon naturally stores it). The fungi's mycorrhiza can access water that the roots cannot.

"Desert or Paradise"?[9] It is up to us to choose which one we want. By developing ecological farming practices that renew our soils, which the current system has compromised, we can breathe new life into them, we can restore our environment and we can help our regions, sterilised by agribusiness, to become fertile and thrive again. Many examples exist from all over the world which serve to illustrate that soil can be regenerated and the environment transformed; all we have to do is break away from the current system.

Giving water back to the earth

The decline in the soil's capacity to absorb water is just one aspect of a disrupted water cycle. Over-pumping of groundwater is another. Cotton farming in tropical regions or industrial crops such as corn have led to low groundwater levels. Seed companies such as Monsanto and Syngenta eliminate local varieties in favour of irrigation-greedy varieties. The outcome is agricultural practices that completely disregard the natural conditions and the environment.

Another issue is irrigation canals using surface water (such as water from the Colorado river in California, so that it barely reaches the sea anymore) or large dams which significantly disrupt the water cycle and block sediments, causing them to gradually build up, depriving farmland of the silt that once ensured the soil's fertility, and making chemical inputs necessary.

Today's industrial agriculture has created its own needs: water-intensive corn crops designed to feed livestock that are shut in barns and don't see a blade of grass anymore; an increasing need for irrigation due to the fact that the earth has lost its capacity to store water; selected uniform plant varieties that require more water than local varieties. Agricultural specialisation in certain regions results in water polluted by nitrate fertilisers in one region, and nitrate pollution from animal waste in another. Yet, this animal waste could be used to nourish the soil as it was for centuries before agricultural chemicals came along, when the various agricultural activities were conducted at the same place.

[9] *Desert or Paradise* is a book by Sepp Holzer, a teacher of permaculture in Austria and Europe.

The district of Alwar, in India (Rajasthan) is a perfect example of both the flaws in the current system and the potential to amend them by taking a different approach to farming. This area, which has an average rainfall but most of which occurs during the monsoon season, had become a semi-desert: its forests were cut down at the time of India's independence and then again with the "Green Revolution", irrigated cotton crops had sucked the water tables dry and these had not been replenished by way of traditional practices, the "johads" had been abandoned – small earthen tanks located at the bottom of slopes which collected monsoon water and infiltrated it into the earth. After forty years the local people were suffering from malnutrition and there was a massive rural exodus. An old "wise man" and farmer from the village alerted Rajendra Singh, a young volunteer from the city and this resulted in the revival and creation of 10,000 johads.

Twenty-five years (1985) after the Tarun Bharat Sangh organisation was established, the water tables have been recharged. Seven rivers that had completely dried up have begun to flow again, the region is thriving, there is extensive vegetation and the locals that once left have returned. One of the most interesting aspects of this example is that this was all self-managed, because the local authorities that had initiated the "green revolution" initially opposed the process. It was managed without their input, by way of village assemblies (*Gram Sabha*), which continue today. No chemical fertilisers are used: the farmers work with nature and use only compost. Fish have returned to the rivers. Although people from this area are vegetarians, they recognise the importance of biodiversity.[10]

Water management is also knowing how to manage flooding. A very interesting experiment was carried out in Slovakia by "L'udia a voda" and Michal Kravcík, after major flooding in 2010. As part of a national programme (which unfortunately only lasted a year and a half) workers from the community used basic resources found locally (bundles of sticks, trunks and sometimes barricades made of earth or stones) to create small constructions designed to slow the water flow during storms – an inexpensive alternative to concrete structures. These creations managed to slow the water flow and were successful in getting the water to soak into the earth during similar rainfall levels to that experienced in 2010, preventing flooding. And the earth has been replenished with water.[11]

Forests

Of all natural systems, forests are that which we have lost the most of. And yet they are indispensable for the climate. Forests release moisture into the atmosphere through evapotranspiration. A study with molecular markers showed that the amount of water vapour released by the Amazon Rainforest forest exceeds that of the Amazon river, the largest on the planet. This creates "flying rivers"

[10] Bénédicte Mannier, *Un million de révolutions tranquilles*, Les Liens qui Libèrent, 2012.
[11] http://ludiaavoda.sk/data/files/44_kravcik-after-us-the-desert-and-the-deluge.pdf.

which play a key role in the moisture and rainfall over the entire areas east of the Andes.[12] Deforestation – mostly slash and burn practices for livestock farming (fields, soybean or corn crops to feed livestock) has resulted in the partial loss of the rainforest and has already resulted in major droughts: São Paulo experienced water shortages during the dry season over three consecutive years (2012-2014) (see *infra* in this issue of *Passerelle*). In Southeast Asia, deadly landslides are linked to the disappearance of forests that retain soil and prevent runoff.

The forest also play a vital role in regulating the climate, lowering extreme temperatures through evaporation, of particular importance during this period of climate change. Unfortunately, deforestation is not only continuing but, in certain countries, is even accelerating. According to the FAO, 80,000 km² of forests disappear each year (including reforestation), i.e., an area the size of Austria. The biggest driver of deforestation is agriculture (soybean or corn crops for livestock and sugarcane for biofuels) and livestock farming. In Asia, it is mostly oil palms that are planted. The logic behind all these crops is the same: to enable private companies to increase their profit margin. Cities

The exponential growth of cities went hand in hand with the agricultural revolution that followed World War II. There was a dramatic drop in farmers, including in emerging countries, a profession that was previously held by the majority of the population. Megacities developed, soils were sealed and rainwater was drained back to rivers and the sea. There was often little vegetation and with the hot summer months came the effect of the "urban heat island". Life became difficult. The earth became nothing but a lifeless prop. The effect of runoff on impervious surfaces sometimes had disastrous consequences. Humans had changed everything, but they had no idea what they were doing.

Can another kind of city be created?

Certain cities (London, Berlin, Montreal, New York, to name a few) have managed to conserve large parks, but this is not enough. The whole city needs canopy tree cover to retain moisture and coolness in the atmosphere. There are experiments in creating "green cities" with increasing attention being paid to the need to infiltrate water on plots, and in some cities this is even a requirement. We are seeing the gradual appearance of cities that are making room for nature, for water, living soils and trees.[13]

Urban and suburban agriculture can play a role in this respect. Market gardens and farms were common in cities up until recently. We are seeing a resurgence in community gardens in many cities as well as allotments (which developed

[12] Antonio Donato Nobre, "The future climate of Amazonia", 2014, https://fr.scribd.com/document/329136378/The-Future-Climate-of-Amazonia-Report.
[13] https://www.france-libertes.org/fr/publication/gestion-des-eaux-pluviales-en-milieu-urbain/.

after World War II).The collection, composting and use of organic waste for agricultural purposes is a step towards a different kind of city, one that works in harmony with nature. In Havana, there was a massive surge in urban agriculture after the collapse of the socialist camp, when there was a shortage in oil and fertiliser. Today Cuba produces more than 70% of its fruit and vegetables, most of which are organic and grown locally.

The transition

The current system is full of dead ends:

- **Air**: increased greenhouse gases, the imminent depletion of fossil fuels, pollution from the oil industry (fine particles, nitrogen oxides, dioxins) and the farming industry (chemical inputs, endocrine disrupters).

- **Earth**: the loss of all life from the soil, with the result of reduced crop yields. Increasing areas of land are becoming sterile and unsuitable for agricultural use.

- **Water**: we are pumping ground water at a faster rate than it can be replenished. Over-pumping also affects surface water, disrupting the watershed cycles . Runoff on soil compacted by industrial farming practices disrupts natural cycles. The "hot plate" effect diverts rainfall from areas where evapotranspiration is reduced. The earth is drying out in rural areas while cities are covered in impervious surfaces, and rainwater is drained away.

We need to change our approach. Transitioning towards a new system requires focussing on three pillars:

1. **Air**: The solution is obvious. It has been largely recognised that we need to give up fossil fuels and shift towards renewables and reduce our energy consumption, even though there has been no agreement on how and when this should happen.

2. **Earth**: How can we hope to keep living if we sterilise our soils? The European initiative "Save Our Soils" has called on the European Commission to address this question.[14] The United Nations Special Rapporteur on the right to food Hilal Elver, has stated that we need to shift away from industrial agricultural practices, as have Olivier de Schutter and Jean Ziegler before her. A new agricultural model must replace the current one and we need to regenerate degraded soil. We need to protect and develop forests, recognising them as the valuable home to biodiversity they are. If we work with nature and natural processes, animals and fully respect Mother Earth, she may give birth to a profoundly different world.

[14] https://www.people4soil.eu/fr.

3. **Water**: How can we live on a planet by turning it into a desert? This question relates to both soils and the climate. We need to change the way we manage water. Rainwater should not be regarded as something annoying that has to drained away but as a precious resource that should be used to nourish the soil and the plants, and should be left to fall where it falls. We need to rethink "protective" constructions and remove dikes and dams (except in rare cases). We need to restore meanders, backwaters, floodplains, wetlands, riparian forests, so the river environments can function naturally. We need to create small-scale stormwater retention systems which manage flooding while infiltrating water. We need to view our relationship with water by way of a "new water paradigm",[15] based on the central role of the water cycle, particularly on the local level, and its effect on the climate. We must "give water back to the Earth in order to restore the climate."

[15] www.waterparadigm.org downloadable, p. 72-73.

What Can a Tree Do?

JAN POKORNÝ

What if, without us being aware of it, we already had at our disposal the technological solution to climate change and its impacts?

In connection with global climate change that manifests itself through extreme oscillations in temperature, alternating periods of flood and drought, people are discussing ways of possible climate change mitigation. We ask for an air-conditioning device that is generally accessible and can work almost anywhere in the world.

Since this is a truly global problem, maybe the UN should issue the following invitation to tender:

We are looking for an air-conditioning device to be used world-wide that meets the following conditions:

- It is made of durable and fully-recyclable material produced using only solar, strictly no fossil or nuclear, energy. Thus its production contributes to decreasing greenhouse gases levels in the atmosphere, especially carbon dioxide. All the elements of the device are bio-degradable.

- Instead of releasing carbon dioxide it releases a gas that other organisms can use to breathe (ideally oxygen). On the contrary carbon dioxide should be used up in the construction process of the device.

- The device is independent of any man-made energy supply and depends solely on the sun.

- The device should work in complete silence and produce no exhausts or waste. Moreover it should absorb carbon dioxide, dust and noise. It should improve water and air quality.

- The device should run for a period exceeding a human lifetime. Throughout the whole working period the device should stand up to different weather conditions requiring only minimum and cost-free maintenance.

- It should give shade in summer time and cool the air actively while increasing humidity. In addition it should emit pleasant fragrances in an adequate quantity.

- The device should be available in different models suitable for different climates and must be usable in the tropics, moderate zones and elsewhere. In winter times it could decrease its shade area to let more sunrays through.

- A key condition is its automatic self-regulation with sensors regulating the capacity of solar radiation from zero to 10 or 20 kW. Special attention needs to be paid to the placement and number of regulatory elements to ensure even air-conditioning and to prevent any temperature excesses. The density of sensors should be 10 -100 per mm2. The device should have a higher capacity in comparison with more usual and more expensive air-conditioning devices that run on electricity.

- Installation and maintenance costs should not exceed 4 Euro a year. The device should require no daily maintenance and its yearly maintenance is not difficult either.

- Since it should operate exclusively on solar energy, its running costs equal zero.

- The device should have a natural and elegant appearance, it should attract birds for nesting and provide food to insects, it should dissipate people's physical and mental tiredness and it should breathe, rustle and release substances with soothing effects.

Well, has the advertiser gone crazy? No! We all know such a device and it is easily accessible. **It is a tree**! A tree supplied by water. Take a look for yourself:

A tree with a crown of 5 m in diameter covers an area of cca 20 m2. On a sunny day, at least 150 kWh of solar energy fall on the crown. What happens with this energy? 1% is used for photosynthesis, 10% is reflected in the form of light energy, 5 – 10% is released as heat and the same percentage is used for heating up the soil. The largest percentage enters the process of transpiration whereby water vapour is released from the tree. If a tree has a sufficient water supply, it can evaporate more than 100 litres of water a day. In order to evaporate 100 litres of water, approximately 70 kWh (250 MJ) of solar energy is needed. This energy is absorbed in water vapour and is released again during the process of condensation to liquid water. In order for 1 litre of water to be evaporated, 2,5 MJ (0,7 kWh) is needed – this is the latent heat needed for phase transition between the liquid and gaseous states.

IGGYSHOOT / FLICKR (CC BY - NC)

On a normal sunny day, a tree transpires around 100 litres of water, thus cooling its environment by cca 70 kWh; during a ten-hour period the tree cools its environment with a 7 kWh power output. Just for comparison, an air-conditioning system in a five star hotel has power of 2 kWh, usual fridges and freezers even more than ten times smaller. Moreover, an A/C system, a fridge or a freezer heat up its surroundings with the same capacity with which they cool down the area within. The water vapour released from our tree heats up cool places on which it condenses.

Still more extraordinary is the regulatory capacity of a tree and the fate of the solar energy absorbed in the water vapour. A leaf has a number of pores (stomata) through which water passes and which regulate the speed in which water evaporates (or cools) depending on the total amount of water available and intensity of solar radiation. 1 mm^2 of a leaf's surface contains about 50 – 100 stomata, each reacts to the temperature and air humidity of its immediate surroundings and opens or closes accordingly. Each tree therefore contains tens of millions of stomata – effective regulatory valves with temperature and humidity sensors. Can you imagine the amount of cables, wires, and sophisticated technology we would need to construct such a device?

The vapour rising from the tree contains absorbed solar energy and as it travels through the countryside it condenses on cooler places and thus releases latent heat. In this way solar energy flows through space and equalizes temperature differences. Depending on physical conditions, water vapour can condensate in the morning as dew or soft morning rains and through exchanging the latent

heat it warms up the environment. Solar energy thus travels not only in space, but also in time.

After this brief review of elementary physics we can understand better the difference between the shade of a tree and of the shade of a parasol or a roof. The difference is great. A parasol reflects sun's rays only passively (depending on the colour of its surface), a tree transforms them actively into coolness and humidity. The only thing the tree needs in order to work well is occasional watering. Moreover a deciduous tree growing in front of a window sheds its leaves before winter and more rays reach our window and warm up the building passively.

A tree cleans water, first by the process of distillation through stomata, second by its roots which take nutrients from the soil and support lower organisms that take other substances from water.

Through management of water and plants we influence the climate of our garden and its immediate surroundings. Through artificial drainage and elimination of green spaces on large areas, especially in cities or in fields, people create desert climate that cannot be compensated by any technological device. This is caused by the fact that on surfaces without vegetation most of the solar radiation is transformed into heat that warms up and dries its surroundings. Solar radiation reaching a small garden of 300 m2 on a summer day has the power of cca 300 kW, in total about 1500 to 1700 kWh of solar energy a day. On dry surfaces without vegetation, the same amount of energy is reflected as heat. However if the surface is covered with vegetation and supplied with water, more than a half of the solar energy is absorbed in water vapour and our watered garden with trees and other plants cools itself and its surrounding down by 100 kWh. It does so noiselessly, inconspicuously, accompanied by birdsong, scent of flowers and ripening fruits. If we were to pay only for the energy used for running of a comparable device, it would cost us about 150 – 300 Euro a day!

We have at hand a useful air-conditioning apparatus in many different forms – be it spruce, oak, birch, apple tree, eucalyptus, baobab, sequoia, or trees of tropical rain forests covered by epiphytes and lianas - that can mitigate global climate change and help us fight global warming.

For each molecule of carbon dioxide absorbed by a tree or other green plants one molecule of oxygen is released into the air. Trees moreover release other organic substances into the air, e.g. terpenes that are beneficial to people's psyche and can act as antidepressants.

Water and Energy: Close Interrelation at the Heart of the Climate Issue

ALPHA DU CENTAURE / FLICKR (CC BY - NC)

With our growing awareness of climate change, the reciprocal relationship between the energy and water sectors attracts increasing attention.

On one hand, energy production requires, to varying degrees, often significant quantities of water – for electricity generation, growing organic energy sources (wood, biofuels), refining fuels, cooling … This is obviously true for hydroelectric dams, but also for plants producing electricity from fossil or nuclear sources. And this is equally the case for certain renewable energies, especially "green" energy sources promoted as potential alternatives to hydrocarbons, like biofuels or biomass. Consequently, the production of energy is extremely dependent on water resources, and can be put at risk in a context of climate change that makes water rarer in certain regions and increasingly abundant in others.

Conversely, the water sector itself can be a major energy consumer, for treatment and above all for transport. Transporting water over long distances represents the greatest use of energy in California. The water-saving policies implemented in this state following recent years of drought have reduced its greenhouse gas emissions considerably. Large hydroelectric dams are direct sources of atmospheric emission of methane, a greenhouse gas more powerful in the short term than CO2, due to rotting plant matter in their reservoirs.

To underline this close interdependence, we often speak today of the water-energy nexus: any energy policy that does not take the water issue sufficiently into account is doomed to failure, particularly if expanded to global scale. And vice versa.

The Critical Importance of Water in Climate Policies

JEAN-CLAUDE OLIVA

For a long time, international climate conferences neglected the issue of water, a serious oversight, according to Jean-Claude Oliva, given that adequate water conservation and water cycle management could contribute to reducing greenhouse gases and make us more resilient to climate change. Such was the lesson that emerged at an international meeting held in Dharwad, India in 2016.

The 2016 round of climate negotiations, COP22, held in Marrakech, Morocco, a country under constant water stress, was the first to tackle the water issue. Both the causes and the consequences of climate change are directly linked to water. The consequences are well known: droughts, desertification, floods and other extreme weather events, all of which are linked to either too much or not enough water. There is less consensus, however, as to the causes: water cycle management is rarely considered to be a cause of climate change and yet deforestation, urbanisation, over-pumping of water tables for industrial or energy purposes and industrial agriculture all play a role in drying out and depleting soils and disrupting the local water cycle – not to mention their impact on local populations, especially indigenous communities. Protecting and restoring the water cycle are key in taking action against climate change, and it is something that both citizens and local authorities can do.

A new approach focussed on water and agriculture is emerging in light of these findings. These two sectors are the most affected by climate change, but they are also central to the solution. Scientists, farmers, public authorities and activists from twenty countries around the world (including the US, China and Iran) met last October for the Global Water Meet 2016, held in India. It was organised by the Dharwad University of Agricultural Sciences, and initiated by Rajendra Singh, awarded the Stockholm Water Prize in 2015, and known as the "water man" in India. The Slovak hydrologist Michal Kravcik, chairman of the NGO

CONROY WIDMER / FLICKR (CC BY-SA 2.0)

People and Water, and advocate of a "new paradigm" based on restoring local water cycles, also attended the meeting. People working on water issues and ecological agriculture all came together to discuss and address climate change. A new angle on the idea of adapting to and mitigating climate change emerged, one which was very different to that discussed in official circles; these raised a lot of hopes and some very important and interesting ideas were voiced. An ambitious platform was adopted, the Dharwad Declaration, which is outlined below.

It is communities that should be given priority in climate change negotiations. Up to now, climate change has been treated as mainly a technical and "political" issue. Adaptation and mitigation measures need to be rooted in the needs and aspirations of local communities, and respect their dignity and their right to development.

The first goal is water security: water is the climate and the climate is water. There is no life without water: The Dharwad Declaration calls for decentralised community-managed solutions to protect, manage and replenish both ground water and surface bodies of water.

The actions undertaken by Rajendra Singh and his organisation Tarun Bharat Sangh in Rajasthan over the last thirty years are a great example of this approach. Over an area of 10,000 km2 thousands of small earthen tanks (*johads*) that collect rainwater during the monsoon and infiltrate it into the earth have recharged groundwater levels, brought back a river that had dried up, made it possible to grow things again and brought back locals that had left the villages. This experiment was based on reviving traditional techniques as well as the

input of experts and current research (engineers, agronomists, hydrologists) and the active participation of the communities concerned.

In Morocco, the *khettaras* (known as the *qanat* in other countries) constitute a sustainable and reversible technique for obtaining water for irrigation purposes in the desert. This is a system that deserves to be reinstated, protected and developed in order to tackle the challenges of climate change. This system is linked to both society and time revolving around the sharing of water. They are the result of work put in by generation after generation and represent a major investment on behalf of the communities. The Moroccan people can be proud of the water commons that they have created and maintained throughout the centuries. Both Moroccan public authorities and those from other countries should fully explore the possibilities of this technique, and protect and develop it, recognising it as a remarkable solution to the threats of climate change.

The second objective is agricultural sustainability: our approach to agriculture is key to ensuring food security and good nutrition. The Dharwad Declaration recommends ecological agriculture as a key approach to strengthening resilience, mitigating and adapting to climate change, again based on the wisdom of local communities, traditional knowledge and local solutions. There is an urgent need to boost public investment in both policies and local solutions.The third objective is environmental and ecological sustainability: the climate, the water, the air, the earth, the plants and trees and all natural resources are intrinsically connected and work together to preserve life on Earth. In this regard, protecting and restoring the water cycle is of fundamental importance in tackling climate change.

Lastly, the Dharwad Declaration suggests holding a world forum in order to devise a global action plan for restoring natural water cycles and building climate resilience, and to spread the ideas and message of the 2016 water meeting further.

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This article was published in late 2016, following the Dharwad meeting, and published as an opinion piece on the Reporterre website.

02

FRONT LINES

"And then one day, the taps just ran dry": A Close Call for São Paulo's Eleven Million Residents

RACHEL KNAEBEL

The megacity of São Paulo and its surrounding area experienced an unprecedented water shortage in 2014, with water rationing and shut-offs just as Brazil was reaching the height of summer. The return of the rain has not, however, staved off the underlying issues: deforestation of the Amazon Rainforest which is altering the weather patterns; the appalling way in which the water board is managing the region's natural resources, putting the profits of its shareholders first; and slack politicians unwilling to invest in infrastructure or to support promising local alternatives.

"And then one day, the taps just ran dry," remembers a São Paulo couple in their seventies. Even in Vila Madalena, one of the relatively wealthy suburbs of São Paulo, not a drop of water would come out of the taps. "So everyone in the apartment complex chipped in and we got water delivered every couple of days. We payed for it out of our own pocket. Then the water returned but there was rationing; there was no water in the evenings or at night-time." That was less than four years ago. Brazil was hosting the World Cup and it was a big election year with the presidential elections as well as elections for the House of Representatives, the Senate, the Governors and State assemblies. In 2014, the biggest city in Brazil and its 11 million residents, as well as the surrounding area, experienced an unprecedented water crisis, which just about ended in disaster.

After almost two years with no rain, the reserves that supply São Paulo with running water were empty. The regional water board's response was to introduce water rationing and shut off the water supply, but this was done with little transparency. With no emergency water supplies in their homes, or the means to have water delivered, it was the poor that the crisis hit the hardest.

VI NEVES / FLICKR (CC BY 2.0)

Poor neighbourhoods bear the brunt of the crisis

"Although everyone was affected by water rationing and shut-offs, the crisis was much worse in the suburbs. In remote areas, people sometimes went forty hours without running water, and the water was only back to normal two or three days a week," states Marussia Whately, water management specialist and coordinator of the Water Alliance, a group of environmental organisations set up in 2014 to address the crisis.

"In the remote eastern suburbs of São Paulo, there were already rationings the year before," adds Gabriel, a MAB (Movement of People Affected by Dams) activist. These are the city's poorest neighbourhoods. Further inland, in the city of Itu, where the water shut-offs lasted several weeks, things even turned violent. "The rainfall levels had been abnormal since 2011," adds Marussia Whately. "Three years later with the elections and the World Cup, the state governor's initial reaction was denial. The last remaining reserves were used up in December 2014 and January 2015, and it rained in February. Things settled down then, and the Sabesp (the regional water board) carried out emergency repairs on the network. In 2016, rainfall levels were back to normal and everyone forgot about the problem." Yet there is still the risk that the whole water system could collapse at any time.

A close call for 21 million

At the height of the crisis, the Water Alliance set up an application enabling people to report water shut-offs. It also published a survival guide, explaining how keep clean without water, using disinfectant and cologne, as well as tips on how reuse water from the shower and the washing machine. The guide also

stressed how important it was not to flush the toilet! It advised setting up a compostable toilet and discarding of toilet paper in the rubbish bin.

The idea that a city with as many people in it as Belgium (11 million or 21 million including the wider urban area) could be without running water, without toilets or showers, was absolutely unthinkable. "I couldn't sleep," recalls Marzeni Pereira da Silva, former staff member of Sabesp. "What on earth would we have done with 21 million people with no water? If it hadn't rained, the reserves probably would have dried up completely by mid-March." It was a close call.

Since it's started raining again, the reservoirs – a network of rivers, artificial lakes and canals built in the 1940s – are in much better shape. The Cantareira water supply system – one of the region's biggest – is 41% full, compared to only 29% in 2013.

Deforestation of the Amazon Rainforest a major cause of drought

Yet this doesn't mean another crisis won't hit the city in the years to come. The 2013-2015 drought was not merely due to a meteorological whim. A report published by the Brazilian research institute Centro de Ciência do Sistema Terrestre in 2014 highlights the widespread deforestation of the Amazon Rainforest, located in northern Brazil, as a key factor in the amount of rainfall in the south. "The Amazon Rainforest is a real water pump, releasing gallons of water vapour into the air," notes the report, entitled The Future Climate of Amazonia (O Futuro Climático da Amazônia).

These airstreams are absorbed by the clouds and released in the form of rain over the southern part of the country. "This explains why the southern areas of South America as far as the East Andes are not a desert region as areas at the same latitude in other continents are, like the Australian desert. Yet the Amazon Rainforest is subject to increasing stress and degradation. Over the last few decades, "nearly 763 000 km2 of the Amazon Rainforest has been destroyed," details the report. "That's the equivalent of 184 million football fields, or three times the surface area of the state of São Paulo." And deforestation is not about to stop anytime soon. In August 2017, the ultraconservative government currently in power once again opened up a large area of the Amazon Rainforest (which had previously been protected) to development.

Poor resource management

It is not just deforestation that's the problem. There has also been criticism of the regional water board Sabesp since the crisis. In São Paulo, the Pinheiros in the West and the Tietê, among others, are the main rivers that supply the sys-

tem. Running between slip roads and urban highways, these two rivers have become almost non-existent. Without any proper banks, they are inaccessible to pedestrians. It is only the nauseating smell that indicates they are there at all. In places, sewage pipes empty directly into the rivers.

"All of São Paulo's rivers are polluted with sewage. Even the big Billings reservoir is polluted. We can't use it," states the Water Alliance coordinator Marussia Whately. "The water crisis is due to a number of factors: a water shortage in the region, rapid urban development and a lack of public policies. When the drought began they decided to do … absolutely nothing; they didn't bother making any investments. Even when the water shortage was over, the policy was to supply the city with water from the reservoirs alone, whereas it would have been possible to reuse rain water for example – not necessarily as drinking water but for other purposes."

"We would have more water resources available if more wastewater were treated," adds Edson Aparecida, Sabesp employee and activist at the Water Committee (Coletivo de Luta pela Água), another movement that began during the crisis and which brings together various popular groups, trade unions, and right to housing activists. "The reluctance to invest in wastewater treatment is a major problem. Every technician working at Sabesp was aware that such a water crisis could happen. As early as 2004, when the federal state renewed its permit to collect water from the region's rivers, it was spelled out that the Sabesp should reduce its dependence on the Cantareira supply system, which would be unable to meet an increase in demand, and explore alternative solutions. But the regional government did nothing." Marussia Whately feels that "the state government was more interested in paying dividends to its shareholders than carrying out the work that needed to be done."

€189 million in dividends paid out after the drought

The regional water management utility is already partly privatised. The São Paulo state government only owns 50.3% of its capital. 19.8% is traded on the New York Stock Exchange, and 29.9 % on the São Paulo stock exchange. The state governor Geraldo Alckmin even has plans to privatise an even greater share of the company, by assigning its management to a holding company. He has stated that, for now, the state would remain a majority shareholder.

"The main private shareholders are pension funds and major Brazilian investment banks," says Amauri Pollachi, from the Sabesp's association of academics. "Their vision is purely financial, so consequently the Sabesp only does basic maintenance work on the network, not bothering with the more complex, more expensive work needed," he says. In 2016, one year after the water shortage, the Sabesp's turnover was R$14 billion (3.5 billion euros), with a profit of close to R$3 billion – more than 750 million euros!

"According to the Brazilian law on public limited companies, at least 25% of a company's earnings must be distributed as dividends to shareholders. So, out of R$3 billion in profits in 2016, Sabesp distributed R$750 million in dividends," says Amauri Pollachi. That is the equivalent of 189 million euros.

Half of this sum went to the São Paulo state government, which is under no obligation to reinvest the money in water resource management, and can simply add it to its revenue. The other half, 94.5 million euros, was pocketed by private shareholders of the New York and São Paulo stock exchange – when less than two years earlier, the city's (and a section of the state's) residents were left with little or no access to running water and the potential collapse of the total supply system loomed alarmingly close.

Preferential rates for water-intensive corporations

The water board pays more attention to the interests of big business than to the residents of São Paulo. In April 2017, the Brazilian independent news site Agência Pública revealed that the water rates of 28 corporations based in São Paulo, including Volkswagen, Ford and Nestlé, were less than those of São Paulo's residents, even after the water shortage.

These companies are granted cheaper rates not because they make any effort to conserve water, but rather because they consume so much of it. More than 450 water-intensive companies continue to benefit from cheaper rates than those normally charged to business customers. The Agência Pública published this data just after the director of Sabesp announced a new hike on water rates for individual customers.

In a recent article in *The Guardian*, the current director of the São Paulo water board Jerson Kelman, himself cited deforestation of the Amazon Forest as the main cause of the 2014 water shortage, and boasted major new infrastructure projects currently underway aimed at reducing water loss and overhauling the water supply network.

The potential of rainwater harvesting

According to Edson Aparecida and Amauri Pollachi, however, these projects, are not enough. "We have, at the Water Committee, put forward proposals, one of which requested the government to install cisterns on public buildings, schools and even shopping centres to collect rainwater. This water could be used to clean the streets at the very least."

The Water Alliance, backed by left-wing city councillors, meanwhile, has made progress in developing a local bill on improved water management and water

security in São Paulo city. The bill seeks to establish a municipal policy on the use of rainwater for non-drinking purposes and revitalise the city's natural springs, streams and rivers. The bill was adopted at its first reading in mid-December.

The water shortage also forced residents to be resourceful and find their own solutions, which has lowered consumption over the long term. A cafeteria located in the city centre still uses the run-off water collected from its washbasin. "During the shortage, we collected water from the washing machine and shower and used it to flush the toilet," explain a couple from the Villa Madalena neighbourhood. "We're not doing that anymore, but with everyone from the apartment complex (16 apartments), we had a well installed to collect rainwater, which we use to clean the collective areas of the complex. It took two months – we had to get tests done, get a permit, and pay for it all, but we still have the well today. The gas station across the road has the same thing and uses the water to wash cars."
Budding micro-alternatives

Alternatives are emerging in poor suburbs as well. In the neighbourhood of São Miguel, in the far east of the city, water from a natural spring runs down a hill located under the suburban train line. It is now used to wash locals' cars. A pipe system and taps have been installed on the side of the road to make it easier to use the water. "During the water shortage, the locals came here to get water," says Regiane Nigro, director of an urban agro-ecology organisation. She set up an alternative system to treat the wastewater of a favela that is home to 700 people just a few kilometres away, and which has just been legalised.

The little brick houses have been built on the steep side of the hill which leads down to a small river covered with greenery. "A social housing company has negotiated with the land-owner in order to ensure a more stable situation for the people that live there. They now pay rent, have official addresses and no longer risk being evicted. The Sabesp also began supplying them with running water. However, it refused to connect them to the wastewater treatment network," she says. At the moment, the drains run into a channel alongside the houses and flow straight into the river. Regiane Nigro is looking to install a wastewater treatment system using plant filters or a biodigester. But she needs resources to do this – which neither Sabesp nor the state of São Paulo wish to provide.

Meanwhile, the regional government is putting its money into paying for ad space on the private radio station CBN, boasting its exemplary handling of the 2014 water shortage. "What we did for São Paulo, we can do for the whole of Brazil," says the ad. It has been announced that the state governor Geraldo Alckmin, who received criticism for his handling of the water crisis, failing to take action for months on end in 2014, will be a candidate for the 2018 Brazilian presidential election due to take place at the end of the year.

Between Droughts and Flooding: Dispatches from India

SUNITA NARAIN

The Indian subcontinent, which has always been dependent on monsoon cycles, has seen a succession of dry episodes and deadly flooding in recent years. Global warming is a contributing factor to the increased severity and frequency of such events, but poor water management – particularly the destruction of natural or artificial water bodies that held rainwater – has made things worse.

September 2014

The floodwaters devastating large parts of the Himalayan state of Jammu and Kashmir caught the people and the government unawares, it is said. But why should this be so? We know every year, like clockwork, India grapples with months of crippling water shortage and drought and then months of devastating floods. This year offers no respite from this annual cycle but something new and strange is afoot. Each year, the floods are growing in intensity. Each year, the rain events get more variable and extreme. Each year, economic damage increases and development gains are lost in one season of flood or severe drought.

Scientists now say conclusively that there is a difference between natural variability of weather and climate change, a pattern brought about by human emissions that is heating up the atmosphere faster than normal. Scientists who study the monsoons tell us that they are beginning to make that distinction between normal monsoon and what is now showing up in abnormal extreme rain events. Remember, the monsoons are known to be capricious and confounding. Even then scientists can see the change.

AXEL DRAINVILLE / FLICKR (CC BY - NC)

This is further complicated by the fact that multiple factors affect weather and another set of factors affects its severity and impact. In other words, the causes of devastation following extreme events—like droughts or floods— are often complicated and involve mismanagement of resources and poor planning.

The Jammu and Kashmir floods are because of unusually high rainfall. This is only part of the problem. It is also clear we have destroyed drainage in floodplains everywhere through utter mismanagement. We build embankments believing we can control the river only to find the protection broken. Worse, we build habitations in floodplains. Urban India is mindless about drainage. Storm water drains are either clogged or just do not exist. Our lakes and ponds have been eaten away by real estate—land is what a city values, not water. In all this what happens when extreme rainfall events happen? The city drowns.

It is no different in Jammu and Kashmir. The traditional system of flood management was to channelise the water from the Himalayas into lakes and water channels. Dal and Nageen lakes in Srinagar are not just its beauty spots, but the sponge. The water from the massive catchment comes into the lakes, which are interconnected.

More importantly, each lake has its flood discharge channel which drains the spillover. But over time, we have forgotten the art of drainage. We only see land for buildings, not for water. The attitude is it will rain for only a few days, so why "waste" land to manage that water. This is what has happened in Srinagar. Residential buildings have come up in the low-lying areas of the city, flood channels have been encroached upon or neglected.

Now when it rains heavily–and with greater frequency and intensity because of climate change–the water has nowhere to go. Flood and devastation are inevitable. All this makes for a double whammy. On the one hand, we are mismanaging our water resources, thus, intensifying floods and droughts. On the other hand, climate change is increasing the frequency of extreme weather events, making the country even more vulnerable.

Indians know that the monsoon is their real finance minister. Clearly, the opportunity is to make sure that every drop of rain is harvested and used in the prolonged dry season. But this rain will come in the form of more ferocious events. We must prepare for that. Holding and channelising rain must become the nation's mission. It is our only way to the future.

This means every water body, every channel and every catchment has to be safeguarded. These are the temples of modern India. Built to worship rain.

May 2016

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Jhabua, late 1980s. This tribal, hilly district of Madhya Pradesh resembled moonscape. All around me were bare brown hills. There was no water. No work. Only despair. I still remember the sight of people crouched on a dusty roadside, breaking stones. This was what drought relief was all about—work in the scorching sun to repair roads that got damaged each year or dig pits for trees that did not survive or build walls that went nowhere. It was unproductive work. But it was all that people had to survive the cursed time. It was also clear that the impact of drought was pervasive and long-term. It destroyed the livestock economy and sent people down the spiral of debt. One severe drought would set back development work for years.

The country is once again reeling from crippling drought. But this drought is different. In the 1990s, it was the drought of a poor India. This 2016 drought is of richer and more water-guzzling India. This classless drought makes for a crisis that is more severe and calls for solutions that are more complex. The severity and intensity of drought is not about lack of rainfall; it is about the lack of planning and foresight, and criminal neglect. Drought is human-made. Let's be clear about this.

In June 1992, Down To Earth published an article by editor Anil Agarwal and colleagues on the state of drought. Their analysis was that while large parts of India were under the grip of drought, by official meteorological accounts it was a near-normal year. He went on to argue that drought would be here to stay unless we learnt again the millennium-old art of managing raindrops. Harvesting water in millions of water bodies and using it to recharge groundwater was critical. In the late 1990s, when drought reared its ugly head again, Down To Earth explored how villages had beaten the odds by managing their water sagaciously. It was a lesson taken by political leaders as they then launched water-harvesting programmes in their states.

However, this effort to rebuild water security was wasted in the following decade despite the opportunity to get it right. There was rain—years of deficiency were fewer—and there were government programmes designed to build water structures. Under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) millions of check dams, ponds and other structures were constructed. But as the

intention was not to overcome drought, but only to provide employment, the impact of this labour has not shown up in the country's water reserves. The structures were not designed to hold water. In most cases they were holes in the ground that quickly filled up with soil by the next season.

But this is not the only reason for water desperation today. India has prospered over these decades. This means today there is more demand for water and less availability for saving.

Yet governments do not have a drought code that can handle this situation. In bad old times, when there was drought, the British-designed drought code would kick in. It meant that water for drinking would be requisitioned by the local administration; fodder for animals would be procured from long distances; livestock camps would be opened and food-for-work programmes would be started. The objective was to check misery and as far as possible stop distress migration to cities.

But this code is outdated. Water demand has increased manifold. Today, cities drag water from miles away for their consumption. Industries, including power plants, take what they can from where they can. The water they use is returned as sewage or wastewater.

Then farmers grow commercial crops, from sugarcane to banana. They dig deeper and deeper into the ground to pump water for irrigation. They have no way of telling when it will reach the point of no return. They learn this only when the tubewell runs dry.

This modern-day drought of rich India has to be combined with another development: climate change. The fact is that rain has become even more variable, unseasonal and extreme. This will only exacerbate the crisis. It is time we understood that since drought is human-made it can be reversed. But then we really need to get our act together.

First, we should do everything we can to augment water resources—catch every drop of water, store it and recharge groundwater. To do this we need to build millions of more structures, but this time based on water planning and not just employment. This means being deliberate and purposeful. It also means giving people the right to decide the location of the waterbody and to manage it for their needs. Today, invariably, the land on which the waterbody is built belongs to one department and the land from where the water will be harvested belongs to another. There is no synergy in this plan. There is no water that is harvested. The employment that will be provided during this drought must be used to build security against the next one.

Second, revise and update the drought code. It is not as if the richer parts of the world do not have droughts. Australia and California have gone through years of water scarcity. But their governments respond by shutting off all non-essential water use, from watering lawns to hosing down cars. This is what is needed in India.

Third, obsessively work to secure water in all times. This means insisting on water codes for everyday India. We need to reduce water usage in all sectors from agriculture to industry. This means benchmarking water use and setting targets for reduced consumption year on year. It would mean doing everything from introducing water-efficient fixtures to promoting water-frugal foods. It means making our war against drought permanent. Only then will drought not become permanent.

September 2016

Bihar chief minister, Nitish Kumar, whose state is submerged under water reportedly told the prime minister that he wants to cry. We should add our tears to his. This year's floods not only have the imprint of our gross and near criminal mismanagement, but also mark the beginning of the world risked because of climate change. This should worry us. In fact, scare us. We need to realise that we do not have the luxury of delayed action and petty party politics. In this climate-risked world, where we are hit by a double whammy, we need to ensure that not only do we get development right, but we also need to do this at a scale and speed we have never done before.

The 2016 floods are huge in its scale—virtually all parts of the country have been hit by devastation. And remember, it is not just about some water that enters homes. Floods claim lives, destroy property and crops. In this way, all the years of developmental efforts are lost in one stroke. It is also clear that we worry about floods only when it affects the urban population. Even during the deadly 2013 Uttarakhand floods, the tragedy reached our television screens only because of the large numbers of people who died or were trapped in the swirling waters. Floods do not, otherwise, get serious media coverage. We do not know how bad the situation is or how it is getting worse. Floods then have become part of the cycle of boredom; they will come every year. So, what is new?

What is new is that each year the intensity and size of floods are increasing. What is also new is that this year, floods are happening in the time of drought. What is also new is that this year, it is evident that floods are not because of "normal" or even "excess rainfall", but because of extreme and horrific rain events—rain that gushes down from the sky in record time to take over land and property.

In this issue of Down To Earth, my colleagues have carefully investigated this "newness" in floods. So, on the one hand, floods are destroying vast parts of the country because of how we have mismanaged our floodplains—willfully allowing encroachments on riverbeds, drains and storage lakes. Then we have built embankments and dams for flood protection that are making things worse. This is because by building embankments—walls to hold river water from spilling—the silt accumulates and raises the riverbed. Today when the river has water, it spreads over land, causing floods.

But on the other hand, there is also something new afoot. Extreme rain events. The India Meteorological Department (IMD) divides extreme rainfall events into two categories—rainfall of 124.5-244.4 mm in 24 hours is "very heavy" and rainfall more than that is "extremely heavy". In July alone, Assam recorded six "very heavy" rainfall days. In Madhya Pradesh's Burhanpur and Betul districts, in one day—on July 12—it rained to ruin completely. This is because rainfall was 1,000-1,200 per cent higher than "normal". On August 20, Bihar's 12 districts recorded "very heavy" or extreme rain events. In drought-hit Rajasthan, in just one day—on August 11—rainfall was 100 per cent above normal. In Pali and Sikar districts of the otherwise dry state, on that day, it rained so much that it broke all records—1,000 per cent above normal. The list goes on and on.

In each case what this has meant is as follows. One, the same region, in one stroke (literally) has gone from extreme and back-breaking drought to extreme and back-breaking flood. Two, in many cases, even when there is extreme flood in the state, the total rainfall received is below normal. In Assam, even when 90 per cent of the state is under water, the rainfall received was 25 per cent below normal. It is important to understand the "newness" in the growing numbers of "very heavy" rain events. The fact is that scientists have long warned that as the planet warms, not only will it rain more, but this rain will become more variable and more extreme. This is what we are beginning to see more and more.

My colleagues have also studied what scientists understand about the nature of clouds, and this points to yet another worrying discovery. It is possible that the air pollution that is choking us in our cities, is also disrupting the nature of cloud formation and leading to extreme rain events ('On clouds', Down To Earth, 16-31 August). The interaction between human-made aerosols—tiny organic and inorganic particles—and clouds is changing the nature of monsoon, say scientists. They find that these microscopic pollutants act as sites where water vapour condenses to form cloud droplets. The greater the number of aerosols, the higher the droplets. But then as nature's interactions also show, the result is not linear or simple. This interaction between aerosols and droplets that form clouds could lead to less rain; it could lead to extreme rain and it could lead to lightening that, in turn, kills and maims on the ground. Despite the uncertainties that exist, what is certain is that change is happening; fast and deadly. It is time we took note of this new extreme reality of floods.

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This article is a collection of three editorial pieces by Sunita Narain in Down to Earth magazine:
http://www.downtoearth.org.in/blog/indias-double-challenge-46272
http://www.downtoearth.org.in/blog/drought-but-why-53785
http://www.downtoearth.org.in/blog/the-new-extreme-reality-of-floods-55430

Water Desalination, a False Solution?

BUREAU OF RECLAMATION / FLICKR (CC BY-SA 2.0)

Water desalination is often seen as a silver bullet to address freshwater scarcity. Actually, wresting fresh water from brackish water or seawater is a long standing technique, especially in oil-rich, water-starved countries and emirates where the cost of this energy intensive process is not an issue. On top of being financially inaccessible, the technology is energy-intensive and creates new environmental problems of its own. Building expensive new desalination plants is too often a way to avoid addressing deeper, structural water management and governance problems.

In the context of climate change, water desalination is considered a very promising market by water multinationals. Several countries are making significant investments in desalination capacity, particularly oil-rich countries (Gulf countries, Algeria) or water-scarce richer countries such as the Southern United States (California, Texas, Florida), Australia, Spain or Israel. The cost of desalinated water remains very high, which makes the technology inaccessible to many countries that are either too poor, don't have access to cheap oil, or don't have access to the sea. In Saudi Arabia, a country which depends on desalination for 70% of its freshwater supply, this cost remains a state secret.

Every desalination unit needs usually an energy producing unit. The latter generates of course a great amount of GHG which are going to have an impact – actually a negative impact – on the climate and on the water cycle. Or, in most instances, desalination is made to counteract the water cycle and climatic change vagaries. One is caught here in a vicious cycle.

Then one has to face the brine issue. A desalination unit generates a lot of brine which is made of various salts, heavy metals, organic compounds… If you throw it back to the sea, you are going to put a great chemical imbalance on the seawater physical and chemical constitution and hence biodiversity will experience dire consequences. In some places, brine is injected in the underground but there are concerns about that operation because it is believed to ease or to catalyse earthquakes. It is for that reason that some desalination utilities were temporary closed in California.

The Effects of Climate Change and Their Impact on Glaciers and Water Resources in Peru

CÉSAR A. PORTOCARRERO RODRIGUEZ

Peru is amongst the countries most vulnerable to the negative impacts of climate change. The melting of Andean glaciers exposes the flaws in the country's water governance.

Paleoclimatic research has shown that the last great glaciation occured about 18,000 years ago, or more specifically, somewhere within the broader range of 16,000 to 23,000 years ago. This glacial expansion has important connotations for the history of humanity, particularly for the American continent. According to the theory offered by anthropologist Alex Hrdlicka — as well as to geographical, anthropological, historical and more evidence — the migration of Asian nomadic tribes led to the settlement of the Americas. This occured when the decline of the sea level during the cooling process allowed our ancestors to cross from Asia to the Americas via the Bering Strait, giving rise to the peopling of the American continent. The evidence of such a process is expressed in many ways; such as in physical resemblance between populations in both continents; similarities in skin pigmentation, eye colour, hair thickness and texture; the characteristic prominent cheekbones; shovel-shaped teeth; low pilosity; monolid eyes; or even the so-called Mongolian spots. In addition, when I was in Nepal myself assessing the hazard levels of certain lakes in the Himalayas, I was able to ascertain that certain Peruvian customs such as adding chili to meals, consuming soup-based dishes with potatoes and vegetables for breakfast, and particularly, the physical similarities between indigenous Peruvians and the Nepalese people, were enough to make me question why I was compelled to acquire a visa at the Kathmandu airport in order to enter the country, given that my very own features resembled those of

TWIGA269 FEMEN / FLICKR (CC BY - NC)

an ordinary Nepalese citizen. Similarly, on one instance along the route leading to Mount Everest, my guide permit was requested by the authorities under the assumption that I was myself, Nepalese.

This lenghty preamble serves to illustrate the close correlation between humankind, its evolution and climate. Several research studies included in *Megadrought and Collapse: From Early Agriculture to Angkor,*[1] clearly show the impact that climate has had on the rise and fall of different cultures throughout the world.

We are currently experiencing an interglacial period. This means glaciers are undergoing an extinction process due to cyclical climatic reasons; only this time exacerbated by human activity. Humanity, in its relentless pursuit of wealth and resources, has contributed to the progressive deterioration of the environment; one that is accompanied by unpredictable consequences from the social, political, economic, and environmental standpoints. Climatic factors have converged to exert an inexorable impact on "fresh water [which] is a finite and vulnerable resource, essential to sustain life, development and the environment", according to The Dublin Statement on Water and Sustainable Development, 1992.[2]

A Country With Fragile Glaciers

Peru boasts a wide variety of climatic conditions, which translates into biological

[1] WEISS, Harvey. Megadrought and Collapse: From Early Agriculture to Angkor. Oxford University Press, 2017.

[2] The Dublin Statement on Water and Sustainable Development was adopted at the closing of the International Conference on Water and the Environment (ICWE), which was held in the city of Dublin on 26-31 January 1992. It was a preliminary meeting for the United Nations Conference on Environment and Development (UNCED) that took place later that year in Rio de Janeiro, in June. 1992. The so-called Dublin Statement on Water and Sustainable Development was adopted at the closing session.

diversity. This is due to the country's coastline brushing against the Pacific Ocean, the Andes mountains as its backbone, and last but not least, the damp Amazonian plains. The latter geographical feature gives rise to humidity, which is then transported from East to West by the so-called trade winds, straight across the intertropical convergence zone. This humidity then transforms into rain, which supplies the country with a practical water resource, sufficient for many purposes.

At the same time, the high peaks of the Peruvian Andes are home to 71% of the world's tropical glaciers. These colossal ice masses had been fluctuating in terms of volume from time immemorial, hand-in-hand with the planet's changing climate patterns. Nevertheless, once the Little Ice Age came to an end around 1850, all these glaciers began to "retreat" — the term used to define their gradual melting process, one which has had an extremely poweful impact on Peruvian way of life. Firstly, it caused a decline in water resources, given that glaciers consist of a natural reservoir that provides water during the dry season. Secondly, this process has raised the risk levels of natural hazards, due to glaciers receding back to very steep rocky cliffs, along which they must glide to flow into lakes that form at the foot of glaciers.

These recent phenomena have led to natural disasters which have led to the loss of many lives, and the destruction of entire communities as well as of the infrastructure required for development. It was precisely due to the occurrence of these catastrophic phenomena, that glaciology took root in Peru. Statistics show that, particularly along the 19th century and in the early 20th century, violent ruptures of glacial lakes (commonly referred to as GLOFs - *Glacier lake outburst floods*) took place in the Cordillera Blanca, the Cordillera Huaytapallana, the Cordillera Urubamba, the Cordillera Vilcabamba and presumably across 19 other mountain ranges throughout the country. These destructive phenomena mainly affected the Cordillera Blanca, with the last and most notorious incident that took place in Tungay dating back to May 1970; in which a block of rock and ice measuing about 100 million cubic meters, wiped the entire town of Yungay completely off the map and caused widespread destruction downstream along the river-basin of the Río Santa, all the way down to its terminus in the Pacific Ocean.

Rapid Melting

In the first few decades of the 20th century, expeditions or research trips targeted specific locations across the Cordillera Blanca where catastrophic events had taken place.[3] It was only in the 1960s that glaciological research caught on when the Corporación Peruana del Santa[4] spearheaded an expedition composed of

[3] CAREY, Mark. In the Shadow of Melting Glaciers. Climate Change and Andean Society. Oxford University Press, 2010.

[4] Company that oversaw the construction of the Cañón del Pato hydroelectric plant, among others.

Swiss and French experts, led by Dr. Louis Lliboutry, to study glaciers and glacial lakes from a glaciar physics physics perspective, with the aim of performing disaster risk management. Based on the research performed by this expedition, projects that took into account two main goals —security and water use— were implemented. The first works carried out with these purposes in mind were the Parón and Cullicocha projects, whose main objectives could be narrowed down to i) provide safety to populations downstream and at the same time, ii) build a reservoir to be used during the dry season. Unfortunately, once the Parón project was completed in 1992, it was handed over to the owners of the Cañón del Pato hydroelectric plant. This corporation destined water resources almost exclusively to energy-producing purposes, neglecting the surrounding rural areas. In 2008, this unsustainable situation led to an uprising of the local people, which expelled the company managing it at the time —Duke Energy— from the Parón reservoir. Unfortunately, to date, there is still no resolution to this conflict.

As per the aforementioned, in the 1960s, glaciological research studies were launched. During this phase, the first-ever inventory of the glaciers and glacial lakes was created, and measurements of the glaciological parameters were performed — mainly along the Cordillera Blanca.

The first inventory of Peruvian glaciers was tallied by Alcides Ames M. in 1988, through much hard work in dedication. It was finally published in 1989. This inventory surveyed 18 different mountain ranges with glaciers throughout the Peruvian Andes. The effort determined that the total surface area covered by glaciers was of 2,041.82 km2 (Glacier Inventory of Peru, performed by Hidrandina, in 1989). According to this study, the Cordillera Blanca had the most glacierized areas in the country, peaking at 723.37 km2 of surface area covered by glaciers. All this information was compiled based on the original data obtained in 1970. Subsequently, Glaciology and Water Resources United —based in the city of Huaraz— has been regularly updating the aforementioned inventory[5] and the most recent estimates deem that the glacierized areas across the mountain ranges of Peru have reached a surface area of 1,298.59 km2 in 2017; with 527.62 km2 of these found solely in the Cordillera Blanca. This implies that between 1970 and 2014, glacierized areas have decreased by 37%; while in the Cordillera Blanca the reduction was of 27%.

The most reent information available denotes that the reduction of glacierized areas is of 42% nationwide, while reaching 38% across the Cordillera Blanca. Some mountain ranges throughout the country have lost between 70% and 90% of their glacierized areas, which has resulted in serious consequences for the surrounding communities.

[5] National Water Authority. Glacier Inventory of Peru, 2014 (in Spanish): https://ponce.sdsu.edu/INVENTARIO_GLACIARES_ANA.pdf

We often hear talk of "climate change" being upon us; similarly, Peru's inhabitants tend to be more specific and instead, refer to glaciers retreating. However, the reality is that climate change has been taking place for several decades at the global level. In Peru, some glaciers have almost completely disappeared; particularly across the Cordillera Chonta (located between departments of Huancayo and Huancavelica) and along the Cordillera Huanzo (located between the departments of Arequipa, Cusco and Ayacucho). In these areas, communities that have settled downstream along these watersheds due to lack of other water resources nearby, struggle to survive during the dry season; often, they have had to leave all agricultural activities behind and what little water is available during the season must be devoted to livestock farming. But, in order to make ends meet, they must sell off their livestock; which results in a gradual yet inevitable cycle of poverty that threatens their very food security. A study into the influence exerted by retreating glaciers on the flow of the Río Santa (the river which has historically had the steadiest annual flow rates of the entire Peruvian coast) titled "Glacier Recession and Water Resources in Peru's Cordillera Blanca",[6] mentions that "[t]he tropical glaciers of the Cordillera Blanca, Peru, are rapidly retreating, resulting in complex impacts on the hydrology of the upper Río Santa watershed. Our results suggest also that once the glaciers completely melt, annual discharge will be lower than present by 2–30% depending on the watershed. The retreat influence on discharge will be more pronounced during the dry season than at other periods of the year."

Socio-Environmental Impacts

It is clear that climate change is already behind the range of problems faced by modern Peruvian society. These extend far beyond the foremost issue —the change in the water cycle resulting from modified rain patterns— all the way to agriculture, food supply, biodiversity, the presence of opportunistic species, and health-related problems due to the increase of tropical diseases transmitted by mosquitoes, among others.

Climate change consists in a modification of the climate variability that people are accustomed to, and when this variability becomes permanent people adapt and perform their daily activities unhindered. In the case of Peru, the previous climate variability entailed a wet season between approximately December and April; featuring rain and mild temperatures during the southern hemisphere summer. The dry season or fall occurred between May and October; it was characterized by the absence of rain and cold temperatures during a few months. Currently, those conditions have changed, and in some instances it rains during the dry season and there is a noted lack of rain during the wet season. All this leads to famers becoming disorientated and confused; hence, food production has been heavily affected. Also, due to heightened temperatures, crops now

[6] BARAER, Michel et al. "Glacier Recession and Water Resources in Peru's Cordillera Blanca". Journal of Glaciology, Vol. 58, No. 207, 2012.

require being planted at higher altitudes; meaning that coffee, certain fruits, and cereals are now grown at greater heights; which has already negatively impacted agricultural producers.

A change in the hydrologic cycle and the groundwater regime, as well as the presence of mining and other water resource-draining activities, in conjunction with the distrust of the population given the absence of a proper supervisory and regulatory governmental bodies, have led to a truly worrying deterioration of the social peace. This situation has resulted in the death of several people who participated in demonstrations arising from conflicts related to water resources management. The following sentence championed by the very National Water Authority seems relevant today, more than ever: "integrated water resources management is a prerequisite for social peace."

Climate change represents a decrease in the availability of water resources, whose supply has in turn decreased due to the pressure effected by an increase in demand; the latter a result of population growth and rising standards of living. For these reasons, it is both essential and imperative to implement country-wide integrated water resources management solutions. For reasons of functionality and operating efficiency, it is recommended that this be done through sub-basins; such as it has already been recommended by both the National Water Authority and Peruvian Network of Municipalities, who have even published in a guide for its implementation.[7] Similarly, the integrated water resources management process must be conducted in accordance with the principles stipulated by the Peruvian Water Resources Law (Law 29338)[8] as well as the Dublin Principles issued in 1992, which state as follows:

Principle No. 1: Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

A study carried out by Anglia Ruskin University[9] has forecast that the collapse of human civilization will be triggered by food scarcity, as a result of; i) climate change, ii) the resulting hydric stress, iii) the globalization process, and iv) growing global political and institutional instability.

Principle No. 2: Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

[7] Peruvian Ministry of the Environment, *Guide for the Integrated Management of Water Resources for Local Governments,* 2013 (in Spanish): http://sinia.minam.gob.pe/documentos/guia-gestion-integrada-recursos-hidricos-gobiernos-locales

[8] Peruvian Water Resources Law (Law 29338) (in Spanish): http://www.ana.gob.pe/publicaciones/ley-no-29338-ley-de-recursos-hidricos

[9] *Resilience of the Global Food Supply Chain to Extreme Events,* 2015. Study commissioned by Lloyds, carried out by Anglia Ruskin University in conjunction with the British Foreign Office's UK/US Task Force on Resilience of the Global Food Supply Chain to Extreme Events.

This approach implies that decisions will have to be taken at the most appropriate elementary level, in unison with public consultations and user participation in the planning and implementation of water-related projects. In the case of Peru, Article III of the Water Resources Law (Law 29338), specifies that the national government must enable mechanisms that foster user and community participation, who must be involved in decision-making that is related to water quality, quantity, availability or any another attribute of this resource. None of which been met in the broadest terms of the legislation just yet.

Principle No. 3: Women play a central part in the provision, management and safeguarding of water.

Women's key role as providers and consumers of water and environmental guardians has rarely been acknowledged in institutional provisions enacted for the use and management of water resources. The acceptance and implementation of this principle requires effective policies that address the needs of women and provides them with the opportunity to participate, at all levels of decision-making, in water resources programs; including the adoption and execution of decisions, through whichever means they choose.

Principle No. 4: Water has an economic value in all its competing uses and should be recognized as an economic and fundamental good, basically one of social relevance.

However, first and foremost, we must take into account that water is a common good and its management must follow a purely social and participatory approach, which lays the foundation for sustainable development.

Peru's Water Resources Law has not been adequately implemented, as per its very own provisions. This is fundamentally due to an oversized bureaucracy and, more often than not, corruption. Peru has plenty of legislation in this and other regards. Nevertheless, its plentiful legislation is rarely enforced and this is why the country continues to operates like a fire brigade; only shocked into action when the blaze is already alight.

Jakarta Seeks Solutions Among Rising Waters and Access Problems

OLIVIER PETITJEAN

Jakarta is one of the world's metropolises directly exposed to the impacts of climate change, such as rising sea levels or flooding due to heavier rainy seasons. Its very existence threatened, the Indonesian capital has responded with grandiose but controversial infrastructure projects, neglecting to address the real sources of the problem: deforestation, lack of access to clean water, and urban inequalities.

As we know, some of the world's largest cities are directly threatened by the consequences of climate change and particularly rising sea levels. Jakarta, the capital of Indonesia, is among them. Located on the northwest coast of the island of Java, the metropolis today counts 10 million inhabitants in the city itself and 30 million in the greater metropolitan area – and these figures are increasing rapidly.

Jakarta lies along a bay into which many rivers run. It is threatened on two sides. Along the coast of the Java Sea, North Jakarta is protected from the water only by an aging, cracked concrete wall. Pollution and development have almost entirely destroyed the mangroves and coral reefs that formerly protected the coast. On the other side, the city is regularly subject to catastrophic flooding when rivers overflow and pour down the mountainside. In February 2007, 30% to 70% of the city was submerged, with 80 fatalities and thousands of people affected by water-related disease. A few months later, in November, the sea overflowed the dikes protecting North Jakarta. Previously, in 1996 and 2002, floods killed 10 and 25 people, respectively. In early 2013, again, floods killed some fifty inhabitants. This is not to mention the "small", frequent floods that are part of daily life in the Indonesian capital.

DAN MARKEYE / FLICKR (CC BY - NC)

Global Climate, Local Problems

Jakarta has always lived under the double threat of flooding from the sea and the mountains. Global warming further increases risks, with rising sea levels on the one hand and intensified monsoons and rain on the other. But although the city is a symbol of the perils created by global climate change, other environmental factors are involved, like the deterioration of the shoreline, deforestation, silting up of rivers and urban canals, unregulated construction, destruction of bodies of water, and above all, subsidence – the gradual sinking of the ground on which the metropolis is built. Scientists estimate that Jakarta sinks 7.5 centimetres per year on average; in certain areas, up to 17 centimetres. In 30 years, the city has sunk 4 metres, so that a great part of North Jakarta is now below sea level. This makes it all the more vulnerable to flooding.

This subsidence is linked, in turn, to two main factors. The first is the multiplication of heavy construction, skyscrapers and infrastructure, in the political and economic capital of a country called upon to join India and China among the world's new giants. The second brings us back to water issues: the exhaustion of the aquifer, whose resources are drawn upon by thousands of wells. The water supply situation in the Indonesian capital is catastrophic, in terms of both network capacity and water quality, forcing the majority of the population to turn towards alternative sources. The situation is not improved – we will return to this subject – by the fact that the city's water utilities were privatised in the late 1990s, as part of a contract that locked the city in a vicious circle of financial haemorrhage and lack of funds to improve and extend its network.

"Great Garuda": Infrastructure and Concrete Confront Climate Change

Confronted with this threat to the Jakarta's existence, city authorities have not been inactive. In the short term, they implemented a programme of restoring and raising the dikes protecting the north of the city from the ocean. In the longer term, they have initiated an extremely ambitious urban project called "Great Garuda", after a legendary bird found in Asian mythology which has become the symbol of Indonesia. An immense artificial island, in the shape of the bird in question, is to be built in Jakarta Bay, together with an gigantic sea wall creating an artificial basin between the island and land, to hold excess water, whether from the ocean or the mountains, and protect the metropolis from floods. The arrangement could be completed, in the longer term, by a second dike. This large-scale project also includes the creation of a variety of artificial islands along the coast. Work has already begun on some of them, but was blocked by Indonesian courts defending the rights of local populations and fishers.

Jakarta Bay plays a vital role for many poor groups in North Jakarta, who subsist by fishing. For them, development of the bay presents many risks: destruction of existing fishing zones due to dredging the seabed for the material to build the artificial islands, but also blocking or limiting their access to the sea. These populations complain that they were not consulted or involved when the project was designed. This neglect is more problematic still in that the "Great Garuda" project, estimated to cost at least 23 and perhaps 40 billion USD, was designed to be financed mainly by the private sector, through urban and real estate operations on the new islands. There were certainly be public buildings and subsidised housing (though more for the middle class than the poor), but overall, these islands will be privatised from the start, and will be a new business and recreational area for the most well-to-do social strata. The traditional fishing communities will be resettled farther inland, destroying their social fabric and creating an underclass. This can only reinforce the feeling that this project is both a symbol and a potential catalyst of the social inequities running through Jakarta.

These are some of the issues raised in a report published in 2017 by a coalition of Dutch NGOs, including Somo and the Transnational Institute, "Social Justice at Bay".[1] The "Great Garuda" project, or, as it is officially known, the "National Capital Integrated Coastal Development" (NCICD), was designed by a consortium of Dutch engineers and consultants, with substantial development assistance financing from the Netherlands (later joined by South Korea, for the same reasons). Other Dutch economic interests are also involved: seabed-dredging, real estate, the oil and gas company Vopak, Rabobank, and the Rotterdam Port Authority. The Netherlands are making efforts internationally to promote their expertise in water, coastal infrastructures, and adaptation to climate change,

[1] https://www.tni.org/en/publication/social-justice-at-bay

deliberately combining humanitarianism and commercial interests (an official policy entitled the "trade and aid agenda"). Dutch authorities have spared no effort to convince their Indonesian equivalents to move ahead with the "Great Garuda" project, considered a future showcase for Dutch engineers' and businesses' expertise. The Prime Minister has gone twice to Jakarta to support the project, and other ministers have also made the trip.

When Climate Change Intensifies Urban Social Tensions

For NGOs, however, future privatised real estate developments and the side-lining of the bay's populations are the very picture of the inevitable shortcomings of the "trade and aid agenda". "It is true that this appears to be a project for rich people," one of the Dutch engineers associated with the project has admitted. "Unfortunately, if you don't want this kind of luxury real estate operation, you need public financing. And that's rare in Indonesia."

Other projects implemented with Dutch development aid raise similar questions. The vast programme "Dredging Jakarta", for instance, to clean up the rivers running through the capital, mainly benefited companies headquartered in the Netherlands. The policy of widening rivers, destroying informal housing too close to the water, and resettling inhabitants – some of whom had been living there for generations – inspired a vast movement of social revolt, with land-parcels occupied and many suits brought.[2] And yet, experiments in self-managed ecological housing, carried out by a partnership of residents and NGOs, have shown that it is possible to build inexpensive housing from recycled materials, with septic tanks, meeting the population's needs without polluting the nearby river.[3] This discontent, increased by a generalised feeling that this policy mainly benefited the richer classes, who moved into new buildings in bulldozed neighbourhoods, and channelled by certain political forces, even contributed to the fall of the governor of Jakarta a few months ago.

A False Solution?

Another objection, equally fundamental, which might be made to the "Great Garuda" project is that it does not really constitute a solution to the flooding problem. This has always been assumed by the designers of the project, who act as though subsidence and the clogging of rivers, together with Jakarta's underlying water problems, were unresolved for economic and social reasons, and that the only choice was massive infrastructure construction; for which, again, there was assumed to be no choice but to submit to the demands of the

[2] See https://www.pri.org/stories/2016-09-15/trying-confront-massive-flood-risk-jakarta-faces-problem-top-problem-0 and https://www.nytimes.com/interactive/2017/12/21/world/asia/jakarta-sinking-climate.html

[3] See http://www.thejakartapost.com/news/2016/01/18/residents-show-housing-can-be-harmony-with-nearby-river.html and http://www.architectureindevelopment.org/project.php?id=570.

private sector. These choices were presented as "pragmatic", but are also, we must note, in the interest of Dutch companies.

And yet a precedent exists: at the end of the Second World War, the city of Tokyo also had a severe subsidence problem, due to domestic wells and the draining of the aquifer, threatening its very existence. The Japanese capital made massive investments in its water network and drew up stricter city planning rules, which resolved the problem in a few years. An approach of the same type applied to Jakarta would doubtless be less costly, ultimately, than a project like "Great Garuda", while at the same time improving living and health conditions for city residents!

Another illustration of the structural limits of the NCICD project: it includes the creation of an immense, semi-closed basin between the first dike and the existing coast, but does not take into account the quality of the water caught there. Jakarta's rivers are extremely polluted, due both to industrial activities and the extremely rudimentary and fragmentary nature of its sewage system. The inevitable result: this basin risks becoming a reservoir of putrid, toxic water. Yet there is no budget for implementing the policies and equipment necessary to clean incoming watercourses, which would seem a prerequisite condition for building "Great Garuda".

A Proactive Approach

In light of all these problems, the Indonesian government finally announced, in December 2017, that it was suspending the project. The question remains, however: how will Jakarta deal with growing threats related to climate change, subsidence, and the deterioration of the local environment? Nonetheless, one point seems clear: building new infrastructure, no matter how well designed, will never be more than a partial solution, probably insufficient, if the Indonesian metropolis does not at the same time address the structural causes of the crisis. One of these causes concerns the city directly: the lack of an urban water system and the crying lack of access to water and sanitation. Other causes involve both city and countryside. This is the case for deforestation, highlighted by the American NGO World Resources Institute in the watershed of the Ciliwung, one of the main rivers running through Jakarta.[4] This river, 120 kilometres long, is suffering from pollution, excess sediment, and other effects of human activity. The Ciliwung watershed has been severely deforested, which, in turn, reduces the protection it can offer against flooding. Deforestation creates a double problem: on one hand, the soil's water retention capacity is reduced, leading to deadly flooding; on the other, the aquifer is unable to recharge adequately. Deforestation thus contributes to reduction of the aquifer level, aggravating subsidence.

[4] http://www.wri.org/blog/2017/07/without-forests-jakartas-water-situation-worsens

In this realm, solutions exist. Protecting watersheds, reforesting, and fighting deforestation can contribute to improving Jakarta's situation downstream. Other cities, such as New York, have been able to implement policies of this kind. The Indonesian capital has also begun to establish "payments for environmental services" in certain watersheds, the funds collected going, particularly, towards reforestation.

To be effective, this water protection policy for upstream areas must be managed in a systematic and consistent manner, and requires financing mechanisms. Since it was privatised in the late 1990s, Jakarta's water service has been underfunded (the amount disbursed to private suppliers, including Suez, increases automatically every year and exceeds the amount of receivables collected) and its management is divided between private operators and a public water utility with no active hold on the ground. In 2014, however, things changed. A coalition of social movements and civic organisations obtained a court order voiding the privatisation contract, and at the same time Jakarta authorities indicated their willingness to remunicipalise water utilities. After months of legal battle, the Indonesian Supreme Court confirmed the voiding of the contract, leaving Jakarta and the water utility in control at last. But also facing fearsome challenges.

As Mining Grows, so Does Water Scarcity: Uganda's Lake Albert.

FIONA WILTON, GAIA FOUNDATION

Extractive industries are a driver of climate change and, at the same time, they reduce the capacity of communities and ecosystems to adapt to a warming planet, in particular because of water pollution or the depletion of traditional water sources.

Our changing climate and global population (growing by approximately 85 million people a year)[1] are often cited as the main causes of today's global water crisis. The Intergovernmental Panel on Climate Change (IPCC), for example, estimates that around one billion people in dry regions may face increasing water scarcity *as a result of* climate change.[2]

But neither climate change nor population growth alone can account for this chilling reality, where a third of the planet's 37 major aquifers are being sucked dry, and many of the world's major rivers no longer reach the sea.[3] A major culprit is the (often silent) advance of mining. From open pit mining, to underground mining, drilling and fracking to extract minerals, metals and fossil fuels, the extraction, transportation and processing consume vast amounts of energy and water - and the bulk of the assets of major mining companies are in water-stressed regions, especially in Africa.

While clean, reliable water sources in both rural and urban areas of Africa are diminishing at an alarming pace; and while governments struggle to guarantee

[1] G. Tyler Miller et al (2015), *Environmental Science*, p.14. Cengage Learning
[2] IPCC. Working Group II: *Impacts, Adaptation and Vulnerability*: http://www.ipcc.ch/ipccreports/tar/wg2/index.php?idp=180
[3] Earth Policy Institute (2006) http://www.earth-policy.org/books/out/ote6_3

access to safe water to everyone, issuing households and small-scale farmers with water saving tips; the mining industries continue to plunder, consume and pollute large quantities of this scarce 'resource'.

Uganda is a prime example, a country well endowed with water resources and famously referred to as the 'pearl of Africa' for its array and scale of natural beauty and biodiversity,[4] putting water security at risk in favour of mining. The Albertine Graben, located on the western side of Uganda, is host to some of the most important waterscapes on the planet. Its lakes, rivers and wetlands include two of Africa's Great Lakes, Edward and Albert, and a section of the Nile River system. As part of Africa's tropical belt, it also plays a critical role in maintaining climate stability, acting as a biotic pump that moves atmospheric moisture around the globe and connecting the water systems of the entire planet. Yet a staggering 23 million people in Uganda still do not have clean water, and the country is likely to suffer from water scarcity by 2025.[5]

The Albertine Graben really is a global biodiversity hot spot, a 'pearl', with more species of vertebrates than any other region on the continent and nearly forty percent of African mammal species. Tourism-based 'conservation' in the region contributes significantly to Uganda's national economy; while the livelihoods of the local populations, such as those living in Bunyoro region around Lake Albert (the largest single water body in the region), are closely linked to the watershed and dependent ecosystems, with rich fishing traditions and farming that is rainfed and subsistence based.

Lake Albert, ranks 27th among the world's larges lakes by volume of water. It is the northernmost of the chain of lakes in the Albertine Graben, sitting between Uganda and the Democratic Republic of Congo, and flowing into the Albert Nile, known as the Mountain Nile when it enters South Sudan – making it strategically important to all three countries.[6]

Following the discovery of commercial quantities of oil in the Albertine Graben, the Ugandan government licensed oil blocks in protected areas and areas intersecting with Lakes Albert and Edward for exploration and production. A trans-boundary pipeline was negotiated with Tanzania, and oil extraction was put firmly at the heart of the country's national development agenda. The first drop of oil is expected to flow in 2020.

[4] Churchill's Pearl of Africa more than today's Uganda, *The Monitor*, October 2 2012, http://www.monitor.co.ug/OpEd/columnists/Davidsseppuuya/Churchill-s-Pearl-of-Africa-more-than-today-s-Uganda/1268850-1522558-pv4md9z/index.html.
[5] *The Observer*, 2 septembre 2014. http://www.observer.ug/index.php?option=com_content&view=article&id=33652:-uganda-to-be-water-stressed-by-2025.
[6] See European Parliament Directorate General for External Policies, Policies Department (2011) : *The Effects of Oil Companies' Activities on the Environment, Health and Development in Sub-Saharan Africa*; available at: http://www.europarl.europa.eu/RegData/etudes/etudes/join/2011/433768/EXPO-DEVE_ET(2011)433768_EN.pdf (last accessed June 2014).

A report commissioned by the Gaia Foundation and NAPE-Uganda[7] revealed that mining and extractive activities in Uganda's Bunyoro district are likely to have widespread and long-term impacts on ecosystems and communities, including increased water scarcity and pollution resulting from oil spills, pipe leakages and dumping, as well as rain water passing through piles of rock dug from oil wells and flowing into and affecting water sources; not to mention the oil drilling and processing leading to increased competition for water, and streams drying up. In the case of an oil spill, the life of the lake, including fish, would be poisoned, and drinking water for humans and other species contaminated, with multiple health effects. Food production would be reduced and land and crops toxified.

"Lake Albert is my livelihood and the rest of the community. We obtain fish and water that we use in our homes. We wonder how oil will be extracted without spilling into the lake. And, in case of an oil spill, we shall be no more!" (Agnes Kirabo, Coordinator, Food Rights Alliance-Uganda)

These impacts may not only be limited to Lake Albert, but could affect all the rivers that flow from the lake and the underwater system too, as these water systems are interconnected.

Simon Bidandi a shell trader has lived and survived on the shores of Lake Albert for over 23 years. The livelihood of his family depends on picking snail shells and silver fish from the water before he sells them for chicken and animal food processing. Today, when Bidandi dips a bucket into the mirrored waters of Lake Albert, his wife, Irene Namaganda, stands near the tarpaulin, spread on sand about 30 feet from the water's edge to pour, select and sun-dry the snail shells. Fifteen years ago, she would have been standing in the lake. The lake is drying up and its shoreline has moved a distance of close to 100 meters. The silver fish and snails, just smaller than a penny, are among the few living things that can tolerate Lake Albert's severely hot water edge. Nearby, local fishermen say that the papyrus swamps along Lake Albert shores, the breeding grounds for bigger fish have dried up and have been turned into grazing grounds for cattle.[8] The National Association of Professional Environmentalists (NAPE), in Uganda, reports that over 11 rivers, their tributaries and three swamps that flow into Lake Albert, have dried up completely.

Aside from their role in providing water security, these rivers and swamps harbour many sacred natural sites (traditional worshiping places). Dennis Taboro, who heads the Community Ecological Governance Programme (CEG) at NAPE, says there is an urgent need to restore the vital role of custodians especially women

[7] *Mining and its Impacts on Water, Food Sovereignty and Sacred Natural Sites*. NAPE, Gaia Foundation. July 2014. Available at: http://www.gaiafoundation.org/new-report-mining-and-its-impacts-on-water-food-sovereignty-and-sacred-natural-sites-in-uganda/

[8] *Lake Albert Ruined by Lost Traditional Practices*. Blog by NAPE-Uganda. Available at: http://www.nape.or.ug/project-news/pnews/134-lake-albert-ruined-by-lost-traditional-practices

whose role is to guide communities not to tamper with Nature. He is working with the custodians to revive their indigenous knowledge, practices and seeds.

"One of the major tasks of a custodian is to visit the shrine embedded within that sacred natural site and ask the Earth to forgive her people. We go and hold a traditional prayer near the lake so rain comes and rivers remain alive. A crucial part of this ceremony is that we take our seeds there and use them to ask for multiplication of food in the coming season, pouring them in the water for the ancestors to receive and multiply them." (Mzee Wendi Kazimula, a custodian at Lake Albert.)

Uganda laws and policies do provide for the protection of the Albertine Graben's wetlands and lakes, and for regulating activities that may cause pollution. The 1997 Water Act, for example, provides for the protection and management of water use and supply, and has important provisions on water rights, protection of water against pollution, water allocation and control of water use. However, the Act recognises that all rights to investigate, control, protect and manage water in the country for any use are vested in the Government[9] rather than with communities.

If large-scale oil production becomes a reality across the Albertine Graben, more and more communities, and the ecosystems that sustain them, will be deprived

[9] Section 11, Article 5 of the 1997 Water Act "All rights to investigate, control, protect and manage water in Uganda for any use is vested in the Government and shall be exercised by the Minister and the director in accordance with this Part of the Act."

of life-giving fresh water. The impacts of water pollution threaten to undermine agricultural production and food sovereignty, communities' domestic water use, the livelihoods of local people such as Simon Bidandi and others on the shores of Lake Albert, and the indigenous cultural and spiritual values that can protect Uganda's rivers and lakes. Mining simultaneously drives climate change and reduces the ability of communities and ecosystems to adapt to a warming planet.

As Maude Barlow, water activist and author of Blue Planet explains, "Major bodies of water have been destroyed from over extraction and water diversion, not climate change as we usually describe it. The destruction of watersheds and water–retentive land is causing rapidly growing desertification, which in turn warms the planet."

Dennis Taboro from NAPE and colleagues who are part of a growing African Earth Jurisprudence movement, are calling for all water systems - from aquifers, springs, rivers and lakes, to estuaries and oceans - to be off-limits for extractive industries.[10] They also believe that we need to cultivate a 'new water ethic,' to rediscover our sense of water's own rights and our responsibilities to it. Water is a common good for all species, and should never be privatised or treated as property. Water has a right to fall from the sky, to flow through the land and fly over it, to remain clean and to course through its cycle constantly – see *Water is Life, Don't Undermine It,*[11] a short animation supported by France Libertés.

[10] http://www.gaiafoundation.org/revive-decolonise-transform-meet-africas-first-earth-jurisprudence-graduates/
[11] https://vimeo.com/158010644

Trade and Investment Agreements: Water Under Threat

COUNCIL OF CANADIANS

International trade is sometimes presented as an answer to the uneven distribution of water across the planet. For the Council of Canadians, however, trade agreements such as TTIP or CETA are just a way to give economic heavyweights total power over water resources.

In recent years, trade and investment agreements have been at the forefront of the political debate in Europe and North America, with plans for new agreements such as the TTIP (Transatlantic Trade and Investment Partnership) or TAFTA (Transatlantic Free Trade Agreement) between Europe and the US, the TPP (Trans Pacific Partnership) between countries in America, Asia and the Pacific, and the CETA (Comprehensive Economic Trade Agreement) between the European Union and Canada. Not to mention more opaque plans such as the TiSA (Trade in Services Agreement), negotiated multilaterally within the OECD. These agreements have all generated heated protests from the public, due to fear of massive offshoring (particularly in the US) and the potential for social and environmental deregulation (particularly in Europe). The public's rejection of free trade agreements is not unrelated to Donald Trump's election in the US. In the wake of his victory, he abandoned the TPP. The EU is still seeking to sign new trade agreements with countries all over the planet, but TAFTA negotiations have been suspended. The only agreement to be really up and running for now is the CETA.

Water and international trade, the perfect couple?

Yet water and climate issues are increasingly being used as a pretext to (re)legitimise international trade. Given that some regions don't have enough water for their agricultural and food needs and others have plenty, it seems it would be "natural" for this "competitive advantage" to be balanced out through trade,

AMIS DE LA TERRE QUÉBEC

those with more water selling their agricultural surplus to those who don't have enough. New Zealand, for example, often uses this argument to justify the fact that its economy is geared towards agricultural exports.[1]

International trade is thus presented as a "market-based solution" to manage the climate issue without having to challenge the dominant economic structures; the idea seems to be that "we can keep on with this water-intensive agriculture as long as it's in suitable parts of the world". This is exacerbated by the fact that an increasing number of transnational corporations like to convey an image of themselves as the guardians of responsible resource management, reflected in how they control and monitor their supply chains and the practices of their suppliers. They are now called upon to take an interest in their "water risks" and their "water footprint" as they do with climate issues and their carbon footprint. And companies like Coca-Cola and Danone sell themselves as leaders in water management, flaunting concepts such as "water neutrality" used by Coca-Cola, despite the many contentious issues around their excessive water extraction in Mexico and South India. Pushing this logic to its extreme, Nestle's former CEO Peter Brabeck, has even gone so far as to advocate the idea of "private property of water" as the answer to the problem.[2]

In a recent publication entitled *Water for Sale,*[3] the Council of Canadians, a non-governmental organisation directed by Maude Barlow, also examines the link between water and international trade, but from a very different angle. According to this analysis, unregulated global trade represents a serious threat to water resources . The organisation even directly challenges the argument put forward by those defending the virtues of trade:

[1] https://www.partagedeseaux.info/L-eau-or-bleu-de-la-Nouvelle-Zelande.
[2] See https://www.partagedeseaux.info/Quand-les-multinationales-de-la-boisson-s-interessent-aux-enjeux-de-l-eau
[3] https://canadians.org/wfs

"While some argue that trading water through food should mean that water-rich countries share their bounty with drier countries, in fact, many wealthy nations of the Global North are saving their own water resources by importing the products of land-rich but water-poor countries in the Global South. As global trade has grown exponentially in recent decades, many communities have had their water diverted from local sustainable food production to export-oriented agribusiness corporations. (…)

In a 2012 study published by the National Academy of Sciences, world-renowned water scientist Arjen Hoekstra and his team at the University of Twente in the Netherlands found that more than one-fifth of the world's water supplies go towards crops and commodities produced for export, placing immense pressure on freshwater supplies, often in areas where water governance and conservation policies are lacking. (…) "Fair international trade rules should include a provision that enables consumers, through their governments, to raise trade barriers against products that are considered unsustainable... or are responsible for harmful effects on water systems and indirectly on the ecosystems of communities that depend on these water systems," Hoekstra writes in a paper for the World Trade Organization."

The Canadian experiment

It's obviously no coincidence that it is a Canadian organisation that is taking an interest in the issue. For a number of years, Canada's supposedly "plentiful" water resources have attracted a lot of attention and profit-driven fantasies from both sides of the Canadian border. American (and Canadian for that matter) businesspeople and politicians are openly considering bulk exporting Canadian water resources to the US, especially California and the whole semi-arid south-west region. However, technical obstacles and/or the major costs involved in such a venture would make it virtually impossible.

Canada, the US and Mexico are also connected by a large-scale free-trade agreement, NAFTA (North American Free Trade Agreement), currently under renegotiation. According to the Council of Canadians, NAFTA's excessive removal of trade barriers would make it impossible to set any kind of limit on bulk water exports: "Various attempts to introduce export bans on Canada's water, most recently in 2012, could be challenged under the WTO and NAFTA."

More than twenty years after the agreement was signed, NAFTA represents a full-scale illustration of the disasters involved in unregulated trade liberalisation when it comes to water resources:

"In a report providing a 20-year assessment of the environmental impacts of NAFTA, a number of North American organizations including Red Mexi-

> cana de Acción Frente al Libre Comercio (a Mexican network of social and environmental justice groups), the Institute for Policy Studies in the United States, and the Sierra Clubs of both Canada and the U.S. sounded the alarm. NAFTA facilitated the expansion of large-scale, export- oriented farming that relies heavily on fossil fuels, pes- ticides and genetically modified organisms, the groups said. Commodity trading exploded in those years, fuelled by the high degree of consolidation in the water-intensive meat and grain sectors. NAFTA-induced growth contributed to deforestation in Mexico and higher levels of water pollution and nitrogen runoff. Groundwater levels in some parts of northern Mexico where free trade zones are prevalent declined by as much as 50 per cent. The increase in genetically modified corn exports from the U.S. added large amounts of nitrogen, phosphorus and other chemicals into U.S. waterways as well."

According to the Council of Canadians, there are three ways in which trade and investment agreements affect water resources and their sustainable management: the risk that water be considered a commodity like any other and that anything preventing its exportation be considered an illegitimate trade barrier; the trend towards liberalisation and privatisation of water and sanitation services; and lastly, the ISDS mechanisms for resolving investor-state disputes in private arbitral tribunals, which could jeopardise any legislative or regulatory attempt to protect a country or community's water resources.

The commodification of water

NAFTA and the WTO do not provide any specific rules for water. It may be considered an economic good like any other, subject to the same trade barrier rules, when used for economic purposes:

> "Trade agreements treat water as a "tradable good", which prohibits any restrictions on the trade of water. Bottled water and water used to produce other goods and commodities fall into this category. Whether water in its "natural state" (lakes and rivers) is tradable is disputed, but once that water is used at all – such as for industry, municipal water systems or hydroelectricity – it is subject to international trade law. Trade exemptions for environmental or conservation reasons are extremely limited."

While bottled water and its trade are becoming increasingly controversial, trade agreements could be used to bypass regulations or other measures taken by governments or administrations to limit the quantity consumed and/or produced:

> "As both the bottled water industry and the opposition to it grow, there are likely to be more disputes over its cross border trade. According to Transparency Market Research, the global annual market for water will be

> worth just under $300 billion by 2020. In volume, annual sales will reach 465 billion litres in that same year. Governments trying to reduce local water consumption from bottled water manufacturing and export would clearly run afoul of Article XI [of NAFTA]."

The other issue is the bulk export of "natural" water through mega pipelines and other (for now, non-viable) methods. According to the Council of Canadians, if the legal debate continues in regards to the legal status of "natural" water under commercial law, one thing is certain: If this type of export scheme goes ahead, in any form whatsoever, it will be extremely difficult to restrict, regulate or stop it under commercial law. There has, in fact, already been a case of this kind: Slovakia was sued for 100 million dollars in arbitration compensation after saying no to a water export pipeline to a factory in Poland.

Liberalisation of water and sanitation services

Another unfortunate trend is that recent free trade agreements openly promote the commodification, privatisation and liberalisation of water and sanitation services, and are introducing mechanisms designed to make it impossible to remunicipalise these services.

> "These agreements aim to create new markets for global service corporations by pushing aside or restricting public monopolies and government regulations that might interfere with the corporate right to profit from those same services. All have a very narrow definition of public services and are strict about what can be deemed to be truly public and therefore, qualify for an exemption. (…)
>
> As well, CETA, TTIP, the TPP and likely TiSA include "ratchet" and "standstill" clauses that promote the privatization of public services. Standstill clauses lock governments into current levels of liberalization. If a municipality has a private water service when the deal is signed, that is where it must remain. "Ratchet" means that any change in status of a service can only go in a direction that is compatible with the liberalizing goals of the trade deal. (…)
>
> Further, CETA and the TTIP are the first regional free trade agreements to apply to subnational government procurement, giving foreign service corporations the right to compete for state, provincial and municipal procurement and public service contracts – the mother lode in terms of total government spending."

Pressure from the European and Canadian public ensured that drinking water services were excluded from the CETA. However, certain sanitation services will be included under the new free trade agreement and be potentially subject to

privatisation pressure. Any attempts to "remunicipalise" these services are likely to be met with resistance. Even the public water service itself, which under the CETA is exempt from market access and national treatment rules, is not exempt from the rules relating to investment protection. This effectively means that this type of service could be subject to private international arbitration (the infamous ISDS) from European or North American transnational corporations seeking to prevent remunicipalisations or make them extremely costly.

Water, an "investment" shielded from regulations

Lastly, the Council of Canadians express concern in regards to the so-called "ISDS" or Investor-State Dispute Settlements, a particular point of contention in the CETA/ TAFTA debate in Europe:

> "Water is an "investment" and therefore subject to the clauses in these agreements that give corporations the same status as governments to challenge laws and trade disputes. Investor-State Dispute Settlement (ISDS) is a key tool used by corporations to knock down environmental rules that protect water and challenge public management of water services. Foreign investors involved in massive land grabs around the world can use ISDS to claim actual ownership of the water used in their operations. ISDS is the most profoundly anti-democratic tool used to promote the interests of transnational corporations in modern times. (…)"

The Council of Canadians lists a series of NAFTA-related arbitration disputes filed by companies against Mexico or Canada, which tried to ban certain activities or substances to protect their water resources. Most of the time, these cases have turned to the advantage of the companies involved, forcing governments either to reconsider their decisions, or to pay compensation, or both. One of the most recent, emblematic cases is the ISDS procedure initiated by the company Lone Pine Resources (which happens to be Canadian). The company, (through its US affiliate) sued Quebec, which had introduced a defacto moratorium on hydraulic fracturing to protect its water resources.

Of even greater concern is that the recent history of ISDS cases illustrates a trend towards an increasingly broad vision of investment protection, so that the right to use natural resources (in this case, water) as part of a concession or other agreement, tends to be considered as not merely a right but actual ownership. ISDS cases are now effectively making it possible for natural resources to be owned by private investors even though this is theoretically impossible under national laws:

> "Transnational corporations could one day use their new investor-state powers to claim the actual water resources of countries in which they op-

erate. There is a dangerous precedent. In 2010, the Canadian government paid North American pulp and paper giant AbitibiBowater (now Resolute Forest Products) $131 million after it successfully used NAFTA to claim compensation for the "water and timber rights" it left behind when it abandoned its 100-year-old operation in Newfoundland, leaving the workers with unpaid pensions. The provincial government reclaimed its assets after the company's departure, saying the company only had the right to use these resources as long as it was providing jobs. This is a particularly disturbing precedent, because it gives a foreign investor leave to claim compensation for the water it had a right to use while operating in another jurisdiction. Think of what this could mean for transnational mining companies that require water for their operations in foreign countries. Or what it means for big agribusiness that uses – and removes from the local watershed – vast amounts of water for the production of commodities for export in a variety of countries. Private investors own an area of land in Africa three times the size of Great Britain."

The Shortfalls of "Water Markets"

Proponents of "market-based solutions" often refer to "water trading" as the best answer to resource scarcity and the best way to share it out given how little of it there is. The theory is that by treating water rights as private property, i.e., by making them fully tradable in an open market, these rights always end up going to the highest bidder, in other words (according to the theory), whoever can find the most lucrative way to use the water. The market would thus ensure the most optimal use (in the economic sense) of available water resources.

The water trading systems set up in Australia, the Western United States and, in particular, Chile are among those based on this model. The reality is, however, that these systems benefit powerful economic and political players and do nothing to protect the environment – except in cases when public authorities are able to retain a strong supervisory hold over these trading systems.

The Chilean water trading system was established during the dictatorship, under the 1981 Water Code, which introduced fully tradable water rights. These water rights were based on land ownership – Pinochet's regime had reversed everything achieved in the land reform that had taken place before the coup d'etat. Water could thus be traded as a commodity in private markets by private landowners with water resources, without the need for any official consent or condition on beneficial use (as there was in the US); that is, there was no obligation to use the water and not merely purchase it for speculative purposes or to create a monopoly.

The introduction of water trading in Chile has facilitated the expansion of an economic model where water rights are held by a handful of the major economic players in water-intensive sectors such as horticulture, mines, paper, and also urban water companies, which then strive to make efficient use of the resource they have appropriated... In addition, water trading, supposedly the best way to manage a scarce resource, has often not prevented over-exploitation and/or pollution due to agricultural and mining activities, as environmental damage is not calculated in the "price" set for water, and often public authorities do not adequately oversee the extraction process. The story of Quillagua, which made international headlines, illustrates the flaws in the system. The village, located in the Atacama desert, once had a river that fed a small oasis. Since the water has been monopolised by two mining companies (Codelco and Soquimich) the river is dry most of the year, and too polluted to be used the rest of the time.

03

THE RIGHT TO WATER

Defending the Right to Water in France: The Case of France Libertés and Coordination Eau Ile-de-France

FRANCE LIBERTÉS AND COORDINATION EAU ÎLE-DE-FRANCE

Since a law passed in 2013, it has been illegal in France to cut off a household's water supply due to unpaid bills. France Libertés and Coordination Eau Ile-de-France, two French civic groups, have campaigned in the media and in court to ensure this ban is respected by private water companies, which consider it a threat to their business model. But this victory is only a first step towards a genuine and effective right to water in France.

It is estimated that approximately two million people in France are without secure access to water and sanitation. Some are homeless or live in unstable conditions. Others simply struggle to make ends meet and to pay their water bills, running the risk that their water be cut off. At least this was the case until 2013 when the so-called "Brottes Act" quietly introduced a provision prohibiting water cut-offs for unpaid bills in principle residences. The "Fédération professionnelle des entreprises de l'eau" (FP2E), the trade association of the private water sector, which is dominated by Veolia and Suez and whose members supply 72% of the French population, acknowledged no less than 100,000 cases of water cut-offs in France in 2010 – which illustrates just how serious the issue is.

The new ban remained largely ignored by water providers, and often by social services themselves, until two French non-governmental organisations,

#Onnesetairapas campaign.

France Libertés and Coordination Eau Ile-de-France, took up the issue. Following the publication of an article by the legal scholar Henri Smets,[1] one of the main advocates of the notion of the "right to water" in France, Coordination Eau Ile-de-France began receiving countless calls for help from families whose water had been cut off. Together with France Libertés, the group launched a call for evidence which resulted in the identification of more than one hundred cases of water cut-offs in just a few weeks. They collected testimonies which shed a very different light on victims of water cut-offs to that depicted by companies such as Veolia and Suez, which portray them as "bad payers" or "fraudsters". Sometimes, water was cut off without notice; often companies did not comply with their own procedures; they remained vague and unresponsive towards their customers, often refusing dialogue; they let penalties accumulate instead of seeking solutions; and they often failed to take into account exceptional personal situations such as deaths in the family or extended absences.

Legal Victories

France Libertés and Coordination Eau Ile-de-France provide assistance to victims of illegal water cut-offs and say that in most cases, it takes just a few phone calls to resolve the issue and have water access reinstated. Sometimes, though, certain water companies refuse to respect the law, and it becomes necessary to lodge a formal legal complaint. The groups have selected some of the most egregious cases of illegal water cut-offs and sued the suppliers who refused to reinstate water. They have initiated no less than 14 legal proceedings between 2014 and 2017, all of which resulted in the conviction of the water supplier – as well as attracting much media attention.

Water providers – primarily the large companies which dominate the water sector in France – Veolia, Suez and SAUR, but also a few public operators – had initially opted to ignore the Brottes Act, arguing there was "legal uncertainty" around the prohibition of water cut-offs. After this line of argument was proved wrong again and again in court, those same companies sought to have the law nullified by the French Constitutional Council, arguing that it violated their constitutionally guaranteed "freedom of enterprise".[2] Their demand was turned down. The private water sector also tried – again, unsuccessfully – to have water cut-offs re-legalised through an amendment to the flagship 2015 French energy transition bill that was proposed by Senator Jacques Cambon, a legislator closely aligned to water companies.[3]

[1] http://eau-iledefrance.fr/en/water-cuts-for-impayes-s-ille-illegal/.
[2] http://multinationales.org/La-Saur-defend-les-coupures-d -eau.
[3] http://multinationales.org/Un-senateur-sous-influence-veut.

Prohibiting cut-offs, a challenge to the commercial conception of water

According to France Libertés and the Coordination Eau Ile-de-France, the reason that private water companies have been so obstinate in refusing to acknowledge and apply the ban on water cut-offs is because it undermines their business model and shifts the balance of power between companies and their customers. Private companies argue that there were already procedures in place, involving social services, to deal with genuine social difficulties, and the outright prohibition of water cut-offs will only favour bad payers who, in reality, have the means to pay their bills. "Cutting off water is our only weapon against bad payers" – was how a Veolia executive phrased it in front of employee representatives.

However, France Libertés and Coordination Eau Ile-de-France stress that prohibiting water cut-offs is by no means the same as erasing customer debt. Many testimonies they have collected show that cutting off water is a way for providers – especially large, impersonal private water companies – to inflict their views on customers. "There are people involved in disputes with water companies, and cutting off water is a way of exerting pressure, to avoid having to negotiate with them, and force them to accept the water companies' conditions," explains Jean-Claude Oliva, director of Coordination Eau Ile-de-France.

As noted by both groups, "The vast majority of the water cut-offs we have identified involve Veolia, followed by SAUR, then Suez, then smaller private water companies. Among public providers, we have one case involving SPL du Ponant and two cases by Noréade, a provider supplying water to dozens of cities in Northern France and seems to have veered away from public service values." No case was found in any of the large public-owned water services of Paris, Nantes, Strasbourg or Grenoble. "90% of cases involve Veolia. Water cut-offs seem to be key to this company's commercial strategy," states Emmanuel Poilane, director of France Libertés. In effect, with arrears and late penalties adding up, as well as additional cut-off fees and water reinstatement fees, the debt owed by customers can drastically increase over a short period of time, to the benefit of water providers.

Counter-attacks

After their failed attempts in court and in Parliament, water multinationals resorted to other tactics. First, they tried to replace water cut-offs with forced water flow reduction – a process called *lentillage* in French, which consists of installing a capsule to reduce water flow to a trickle instead of cutting it off completely. Yet courts ruled once again that the practice was in violation of the Brottes Act. As a last resort, private water companies turned to the local councils which had contracted their water services to them, asking them to pay – in advance! – for the costs due to an increase in unpaid bills, which (according to them) would

be the inevitable result of prohibiting water cut-offs. In reality, there has indeed been a small increase in unpaid water bills in France, but it dates back to well before the Brottes Act. It is not related to the prohibition of water cut-offs but to the consequences of the global financial crisis and the difficulties experienced by some of the French population.

Private firms thus requested local authorities to sign an amendment to their contracts providing for the payment of unpaid bills by the councils, for an increase in the fixed charges in water bills (charges not related to actual water consumption), and for the possibility of further increases in the price of water if the trend of unpaid bills continued. France Libertés and Coordination Eau Ile-de-France denounced a "new racketeering scheme by multinational water companies" wanting "to have their cake, eat it, and get public money as well" by attempting to offload a risk that is part of their contract onto local councils. Many local officials refused to sign the proposed amendments.

Private companies finally turned against the two civic groups that had been harassing them for months in order to ensure the ban on water cut-offs was being respected. In the spring of 2017, Veolia initiated a defamation suit against France Libertés, Coordination Eau Ile-de-France, their directors, and several of the media sites that had taken up the issue. The case will not be judged for several years, but it has contributed to a growing awareness among French civil society and journalists of the increase in SLAPPs or "Strategic Lawsuits Against Public Participation", by which big business seek to silence those who speak out against them.

How long will it take for France gets a real law on the right to water?

These legal and political disputes around the enforcement of the Brottes Act need to be considered in a wider perspective: that of the shortcomings of water governance in France and the country's ongoing failure to meet its official objectives, whether in terms of reducing pollution or ensuring an affordable water service for all. If water tariffs tend to increase – making it more difficult for the poor to pay their bills – it is partly due to the increasing water treatment costs related to agricultural and industrial pollution. And the burden of paying for these extra costs falls disproportionately on domestic users, instead of agricultural and industrial users.

The legal prohibition of water cut-offs is necessary, but it must come with appropriate measures to facilitate its enforcement. This is why France Libertés and Coordination Eau Ile-de-France have proposed a more general bill to concretise

the right to water in France[4]. It would ensure the installation of free, accessible fountains, toilets and showers in cities over a certain population threshold. It would also introduce "preventive assistance" mechanisms for vulnerable populations who have difficulty paying their water bills, which would be funded by a tax on bottled water. The bill was approved by the National Assembly just before the 2017 French elections, but was then rejected by the conservative-led Senate. It seems that the fight for the right to water in France is far from over.

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This article is based on excerpts from several articles, including "Coupures d'eau : les multinationales ignorent-elles la loi ?", http://multinationales.org/Coupures-d-eau-les-multinationales, and those referenced below.

[4] For an outline of this bill, see http://www.huffingtonpost.fr/emmanuel-poilane /le-droit-a-leau-bientot-effectif-en-france_b_10316890.html.

Can the Right to Water Curb the Global Expansion of Extractive Industries?

OBSERVATOIRE DES MULTINATIONALES AND FRANCE LIBERTÉS

From Australia to the Andes, mining, oil and gas projects are a major threat to water resources and a source of social conflict. A report by Observatoire des Multinationales and France Libertés highlights the extent of the risks and the inadequacy of the responses put forward by companies and public authorities.

In the Andean countries, farmers and indigenous people are fighting giant mining projects planned for the top of their mountains. In Australia, an unusual alliance between farmers and ecologists is opposing the extraction of "coal seam gas", which requires the use of hydraulic fracturing. In Brazil and Canada, local communities and authorities are accusing mining companies of negligence after the collapse of mining dams and the release of toxic wastewater into the environment. In Algeria, the population of southern Saharan is rebelling against the shale gas industry. Even in France, citizen groups are challenging plans to open new mines, while former mining sites that have been abandoned for a long time continue to pollute the environment. These fights have one thing in common: water.

The first years of the 21st century have seen an explosion of new mining and fossil fuel projects, due to the growth of emerging countries such as China, and to the increasing needs of our so-called "immaterial" economies (based on information and communication technologies), which are also increasingly unequal and consumeristic. Smartphones and social networks actually require vast amounts of minerals and energy. As a result, even in Europe itself, industrialists and politicians are advocating for the opening of new mines and for the development of shale gas, in the name of growth.

However, behind the corporate rhetoric of "social responsibility", the reality of the mining and oil industries is still one of insecurity and contamination for

both workers and local communities, of violence and social conflict, of political collusion and millions of dollars or euros garnered in the head offices of mining multinationals in Paris, London, New York and Toronto.

A vital resource under threat

The report *Water and Extractive Industries: The Responsibility of Multinationals,*[1] published by Observatoire des Multinationales with the support of France Libertés, looks at one of the most significant yet often invisible impacts of extractive industries: their impact on water. The direct and indirect consequences of mining and drilling for fossil fuels on water resources are not always well known, but they are of critical importance because water is essential to the life, well-being and integrity of people and ecosystems, and because the impacts of extractive projects can be felt far downstream. This is why, from the Algerian Sahara to the Andean mountains, water is often at the very centre of protests against mining or oil and gas projects.

It would be a mistake to imagine, as the industry would like people to believe, that the impacts of extractive industries on water resources tend to diminish with new, up-to-date technologies. In fact, the opposite is true. Recent technological developments in the extractive sector, such as unconventional oil and gas extraction through fracking (shale gas, oil sands, etc.), create significantly increased risks for water resources. Similarly, the most recent mining projects tend to be ever bigger and/or located in increasingly remote locations, such as the top of the Andean mountains, and they involve the grinding and processing of increasingly large quantities of rock to extract minerals from increasingly thin seams. There is also a risk that the current slump in the extractive and commodities sector be used as an excuse to further loosen social and environmental regulations that protect water sources.

At a time when French politicians and businessmen are considering opening new mines in mainland France and shale gas developments are being advocated in Europe, this should come as an alarm bell. Especially because it reveals that the lessons of the past have not been learnt. Salsigne, in the South of France, is just one of dozens of former mining sites in the country that continue to contaminate water and the environment. The proposed reform of the French mining code largely ignores these issues.

Inadequate solutions

Corporations' responses to these impacts – especially the "corporate social responsibility" spiel and technological solutions such as desalination or wastewater

[1] https://multinationales.org/IMG/pdf/rap_obs.pdf

European Citizen Initiative "Water is a Human Right not a commodity".

treatment – have proved utterly inappropriate, especially from a long term perspective. Experience shows that even where regulations exist on paper to protect water resources and reduce the negative impacts of extractive industries, these regulations are rarely enforced, because of a power imbalance that favours transnational corporations over public authorities and residents. There is also inadequate scientific monitoring of impacts or access to information on these impacts.

Although the "human right to water" was only recognised by the United Nations in 2010, and enforcement mechanisms are still lacking, the concept can play a role in enabling public authorities or local communities to reduce the adverse impacts of extractive projects, or even prevent such projects from coming to fruition at all. The notion of the right to water already seems to underlie many current judicial battles between communities and transnational oil and mining companies across the world.

However, the concept of the right to water should be understood in a wider sense in order to be effective. Delivering drinking water to communities living around polluting mining or drilling sites is charity, not the recognition of a human right, and is not sufficient to address the many impacts of these activities on communities. Ultimately, the right to water should be conceived as a political right; in other words, it should involve respecting the autonomy of affected populations, as well as their right to decide about their own future and that of their water sources.

Water Democratisation, Sustainability, and Sovereignty in Mexico

COLLECTIVE

Mexico is among the countries that have affirmed the right to water in their Constitution. But when it came to putting it into practice, the government proposed a law favouring the industrial use of this resource, as well as the privatisation of water services. In response, civil society mobilised to propose its own "water law".

"Nine million Mexicans – out of a population of 121 million – do not have access to clean drinking water. The situation is growing worse: over 50 years, Mexico's availability of water per inhabitant has fallen 64%![1] *One particularly significant cause is the liberalisation of the national water market in 1992, which made it possible for private businesses or individuals to acquire concessions. This liberalisation brought the private sector into the management of municipal water and sanitation systems. Water-intensive economic sectors, like the bottled water, soda, and beer industries, now have important concessions, some of which are located in high-risk zones. Coca Cola, for instance, has the right to extract 33.7 cubic metres of water annually in Mexico, the equivalent of the minimum annual consumption for 20,000 people.*

Mining – like gas and petrol extraction – has an even greater impact. It uses millions of litres of water every day. The Los Filos goldmine, in Guerrero, in the southern part of the country, uses 418.8 million litres every day just to leach gold from waste minerals (a process using water and sodium cyanide). [2] *This process has caused many accidents, like the August 2014 spill of 40,000 cubic metres of copper sulphate*

[1] From 18,035 m3 in 1950, then 11,500 m3 in 1955, to 4,312 m3 in 2007. http://www.dof.gob.mx/nota_detalle_popup.php?codigo=5339732

[2] Environmental impact declaration of the Los Filos mining project, 2005. http://sinat.semarnat.gob.mx/dgiraDocs/documentos/gro/estudios/2005/12GE2005M0006.pdf

into the Sonora River, in the northern part of the country. Over 150 kilometres of river turned orange after a containment dam broke in a Grupo Mexico copper mine.

These incidents have their origin in the agrarian reforms orchestrated by President Carlos Salinas de Gortari (Institutional Revolutionary Party, PRI) in 1992.[3] To facilitate the entry of foreign capital, it pushed for "social property" land to become private property and simplified the use of collective land by businesses, dealing a fatal blow to the legacy of Zapata.

In this context, Mexican leaders decided to introduce the concept of the right to water in the country's Constitution – without, however, reconsidering the logic of liberalisation and of the commercialisation of this resource. But, despite this display of good intentions, water remains a stake in Mexico's political struggles, pushing civil society to propose its own "water law".

Introduction derived from Marie-Pia Rieublanc, "Le Mexique va-t-il se vider de son eau au profit des multinationales?", Observatoire des multinationales, 30 Octobre 2015.

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In Mexico, a 2012 constitutional amendment recognised the human right to water, requiring a new national water law. Coordinadora Nacional Agua para Tod@s Agua para la Vida has proposed the citizens' bill, which has been developed through a nation-wide bottom up process. It connects local grassroots struggles against privatisation, water resource contamination, indigenous peoples, and urban popular movements for access to, and local control over, water resources. Important local water struggles in Puebla, Guadalajara, Tuxtla Gutiérrez, Ramos Arizpe, Saltillo and Mexico City are the background of this national mobilisation. The citizens' bill ambitiously addresses sustainable water basin plans and democratic water service provision in an integrated way.

In contrast, the federal government's proposed bill, developed behind closed doors, would strengthen executive authority over water, and would mandate the privatisation of municipal systems: it would promote energy-intensive hydraulic megaprojects and ensure water availability for mining and fracking. The citizens' initiated National Process for Consensus on Water has managed to thwart three attempts to pass the government's proposed bill fast-track, without debate.

The Citizen's Proposed National Water Law

The Constitutional reform recognising the human right to water in Mexico, approved on February 8, 2012, mandated a new National Water Law, to guarantee

[3] Reform of Article 27 of the Mexican Constitution, ending State redistribution of large landowners' lands to peasants as implemented after the 1910 Revolution, facilitating a free trade agreement with the United States and Canada (NAFTA).

"equitable and sustainable access and use" of water, through the participation of citizens (unprecedented in the Constitution) together with the local, regional and national levels of government.

That same month, organisations[4] and researchers throughout the county initiated a broadly participatory process to write "the water law that Mexico needs", and to build the strength required for its approval and enactment. This process has been structured and driven by the Coordinadora Nacional Agua para Tod@s, Agua para la Vida, a regional and national coordinating body which has been forged out of the process itself.

Our proposed water law establishes that water is a national commons, produced by Nature, and that the decisions regarding water must be made by Mexico's citizens and peoples from the local to the national level. Our law would not permit any arrangement which would make water a commodity or would allow private control over, or the extraction of profits from any aspect of water management.

Our law is centred on community, citizen[5] and governmental co-management of watershed and municipal systems through legally binding plans, with citizen oversight to ensure governmental compliance. The participatory planning processes will seek to achieve a National Agenda for Water in 15 years: Quality water for all; water for ecosystems and for food sovereignty; an end to water contamination, to the destruction of watersheds and aquifers, and to avoidable vulnerability to droughts, floods and climate change in general.

Our law defines two types of decision-making structures. For watershed planning and management, we propose Microbasin Committees, Sub-basin Commissions, Watershed Councils, as well as a National Council of Watersheds, with citizen and community representatives holding the majority of votes in each. The first, local microbasin level would be open to participation by all, and from there, spokespeople would be elected to participate on each successive scale to the national level, with the possibility of electing or inviting external specialists as needed. Representatives from governmental ministries of water, environment, forestry, health, agriculture, economy, urban development and civil protection would also participate in these councils.

Participatory watershed bodies would ensure sustainable, planned management of water and territory from the microbasin to the national level. These systems would work together through a non-partisan, democratically elected Local Water Council.

[4] The process involves indigenous peoples', water users', municipal workers', urban poor peoples', and human rights organisations, as well as community-run urban and agricultural water systems, and organisations fighting water privatisation, toxic mining and toxic farming, dams and fracking.
[5] The Mexican Constitution recognises the collective rights of original peoples (Art. 2), of ejidal communal landholders (Art. 27) as well as citizens' rights (Art. 4) to participate in water-related decision-making. Therefore both this article and the Citizens' Proposed Water Law refer consistently to "communities and citizens" as valid actors in watershed and water system decision-making and management.

Citizens' Water Oversight Bodies would combat corruption, monitor the fulfilment of the human right to water & sanitation and pressure public officials to implement the plans and decisions of the co-management councils.

The Watershed Councils would develop legally binding Watershed Master Plans, which would describe the actions required to achieve the goals of the National Agenda in that watershed, giving priority to local and upstream solutions. These Plans would define Areas of Importance (forests, recharge zones, wetlands, flood plains) in which land use would be severely restricted, and public funding would be available for restoration and management by local communities.

To overcome the current crisis of extremely excessive and concentrated water rights for non-essential uses, the Watershed Councils would also recommend the reassignment of superficial and groundwater rights to fulfil the Constitutionally mandated criteria of: equal and sustainable access; the fulfilment of the rights to water, food and a healthy environment, and indigenous peoples' rights to preferential access to the waters in their lands,

Given that the rights to 77% of the country's water have been assigned to agricultural users, primarily highly polluting agroexporters in the northern desert region of the country, each Watershed Council would have Committees for Food-and-Water Planning. These Committees would determine the infrastructure and actions required for achieving food sovereignty within the context of watershed restoration. Farmers would have to develop and follow transition plans towards agroecological practices in order to have access to irrigation water.

The National Council of Watersheds would propose the yearly federal budget for water to the Legislature, and would also name a short-list of three candidates for the President to choose from to preside over the National Water Commission (a cabinet-level position). The National Council of Watersheds would also have the right to review and question any international treaty which could affect water sovereignty or the human right to water in Mexico, prior to its signing.

In watersheds which suffer from subsidence and surface cracks due to aquifer overexploitation, chronic flooding, or neighbourhoods without continuous access to quality water, their Councils could demand that their watersheds be declared Zones Under Extreme Water Stress. Under such decrees, new projects of profit-oriented urbanisation could not be authorised until existing water crises were resolved.

For the planning and management of water and sanitation systems the Citizens' Proposed Law would recognise and strengthen the role of community-run systems (commonly the sole source of water for indigenous, rural or poor urban communities). It also foresees the democratisation of the Boards running municipal systems—which would be composed primarily of elected representatives

from the various zones of the city, without the intervention of political parties, whose terms would be staggered in order to guarantee continuity.

A Municipal Board, composed of citizen representatives of the water systems and government representatives, would develop and carry out a Municipal Plan for the Right to Water and Sanitation, to guarantee the equal and sustainable access to water, primarily for personal domestic and public use. It would guarantee access to public drinking fountains and clean bathrooms, and would seek ways to make optimal use of rain and domestic and public waste water. This Board would oversee the transition to a zero discharge (100% recycling) policy for industrial users.

In order to eradicate corruption, Citizens' Water "*Contraloría*"[6] Boards with official standing would be self-organised at the municipal, watershed and national levels. These bodies would work with a (proposed) Water Justice Procurement Agency, as well as with the Federal Auditing Authorities and the National Commission for Human Rights, to monitor whether government officials are ensuring the respect for the human right to water. These citizens' bodies would produce recommendations, including, when needed, the request that a government official be removed from office. A publicly funded Legal Services for the Protection of Water and Environmental Rights would make it possible for citizens to sue government officials and companies.

The proposed water law would establish a National Fund for the Human Right to Water and Sanitation to guarantee direct access to public resources for self-organised projects in communities without access to these basic rights.

Our law would prohibit access to the nation's waters for toxic mining, toxic industries or fracking, or for the irrigation of lands where toxic agrochemicals are being applied.

The first version of our Citizens' Water Law was presented to federal legislators from a diversity of political parties on 9 February 2015, with the express agreement that they would promote it as is, without submitting it to party dynamics. On February 23, it was presented in the Senate as a Citizens' Initiative by 22 Senators from 4 parties.

We have been able to successfully block repeated attempts (2014, 2015, 2016) by the federal government to impose their own National Water Law, due in great part to the fact that we had come up with our own widely supported alternative. Their law would reduce the "human right to water" to 50 litres a day; it would mandate the privatisation of municipal systems; it would promote the construction of (private) capital- and energy-intensive hydraulic megaprojects. "Strategic" activities such as mining, fracking and energy production, would have priority

[6] *"Contraloría"* refers to an organism which exercises oversight, "watchdog", auditing and other fairness and anti-corruption functions.

access to water, and the rights of indigenous peoples to water would be erased. It would allow the "water authorities" to make direct use of force; polluting industries would "self-police"; and huge fines would be levied against anyone installing water research or monitoring equipment without prior governmental approval.

In order to continue to improve and gain ever greater support for the Citizens' Water Law, on November 3 and 4 2015, Agua para Tod@s initiated a National Process of Consensus-Building for Water, for which Thematic Working Forums are being held in 27 universities around the country. In August, a National Forum will review the proposals generated by these forums, to produce an improved version of the Citizens' Water Law.

Meanwhile, we are organising Local Water Committees among communities whose right to water is not being respected. We work to defend and strengthen community water management systems, and to further the rights of workers in municipal water systems. We are promoting bottom-up processes for watershed co-management, wherever conditions will permit. We are drawing up watershed management plans and carrying out community projects, including rainwater catchment, reforestation, maintenance of streams and canals, water treatment plants, water quality monitoring.

In the midst of an adverse environment, together with other organisations, we are questioning expensive and damaging megaprojects, as well as toxic mining and fracking; we seek to end the opacity and promote public debate regarding the policies that the World Bank and other institutions are promoting in Mexico. We are struggling for alternatives to the privatisation of municipal systems and we are speaking out against the violence which is being exercised against those who are defending their lands, waters and other commons. Through actions involving the courts and human rights bodies, forums, marches, caravans and presence in the public and social media, we are seeking to eliminate and overcome corruption and external intervention in the water sector.

Together we have been discovering how water in Mexico should be governed, and we are building the capacities, the legitimacy and the organising strength to make it happen.

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This article was written collectively by : Gerardo Alatorre, Omar Arellano, David Barkin, Elena Burns, Rolando Cañas, Luis Rey Carrasco, Helena Cotler, Adriana Flores, Esther Galicia, Emilio García, Raquel Gutiérrez, Rossana Landa, Diana Luque, Alfredo Méndez Bahena, Rosa Isela Méndez Bahena, Leticia Merino, Rodrigo Migoya, Pedro Moctezuma, Ana Ortíz Monasterio, Úrsula Oswald, Ricardo Ovando, Luisa Paré, Francisco Peña, Raúl Pineda, Víctor Quintana, Gloria Tobón and Alejandro Velázquez

The Case Against Bottled Water

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Pondering the theory of value, Adam Smith, the "father" of classical economics in the eighteenth century, pointed out the paradox that water, a vital element, costs nothing, while diamonds, which are not of much use, are worth a fortune. This simple observation illustrates why selling bottled water for a price significantly higher than that of tap water should be anything but easy. Yet, in recent decades, there has been a boom in the sales and consumption of bottled water, even though a litre of bottled water is sold today at the same price as a thousand litres of tap water and as ten thousand litres of water used for irrigation purposes. While countries such as France and Italy were until recently the largest consumers of bottled water per capita, they have been joined by the United States and the emerging countries of Asia, the Arab world and South America, where the consumption of bottled water is linked to social status. Big business did not fail to seize a market opportunity that promised substantial profits at very little cost.

There are many examples of multinational corporations appropriating water sources at the expense of local communities, not only in the Global South, but also in some richer countries such as the United States, where there is little in the way of regulation over water ownership. In some cases, water corporations can just claim ownership of a water source and deprive the local population of its traditional use: this was the experience of the population of Ben Smim,

near Ifrane, in Morocco. In other cases, the granting of extraction permits has resulted in the accelerated depletion of local water resources, provoking despair and anger among local communities. which is exactly what happened to those living in the vicinity of Coca-Cola's factories in India.

The environmental impact of bottled water is also a great cause for concern. To begin with, there is the widespread use of plastic bottles (mostly made of non-recyclable plastic), a source of waste and pollution. The production of bottled water is also particularly wasteful. According to experts, it takes on average three litres of water to produce one litre of bottled water. The amount of energy needed to produce the plastic bottle, and then transport, distribute and recover the bottles is even more alarming. It takes on average 2000 times more energy to produce one litre of bottled water than to deliver one litre of water to faucets connected to a public water system.

The supposedly superior quality of bottled water over tap water and its alleged health benefits have been largely recognised as a marketing myth. Several studies in the United States, Europe and India have shown that bottled water is no healthier or cleaner than tap water. In many cases corporations had merely bottled tap water, after filtering it and adding various substances such as salt, and then sold it at a high price. Studies in countries such as India have found even larger amounts of pesticides and other chemicals in bottled water than in tap water.

Legal Rights for Rivers and Ecosystems?

OLIVIER PETITJEAN

Alongside the growing importance of the concept of the human right to water, another legal innovation could radically change our vision of water and its governance: that of recognising the legal personhood and rights of rivers and other natural bodies, as New Zealand has done.

In 2010, the United Nations formally recognised the "human right to water". Several countries have followed suit and included the right to water in their Constitution. Legal scholars and lawyers, civic organisations and social movements everywhere have seized on this official recognition of the human right to water to advance public interest causes, such as fighting poverty and opposing privatisation, pollution and major industrial projects. The "right to water" thus represents a major breakthrough in spurring change.

There has been another major legal development in recent years, which in a way goes hand in hand with the human right to water: that of granting legal rights to nature or natural "beings" (such as ecosystems, living things, important natural sites, rivers, forests, etc.), so as to protect them against pollution, degradation and appropriation. This trend can be seen in the increasing number of legal proceedings around the globe against governments or corporations that are unable or unwilling to reduce greenhouse gas emissions. It can also be seen in decisions to grant legal personhood to natural ecosystems. New Zealand, in particular, has attracted significant international attention with its decision to grant legal personhood to the Whanganui River and several other natural sites in 2017.

These two legal innovations could seem somewhat contradictory: on the one hand, we give nature, and especially water bodies, legal "rights" to protect them from harm caused by human beings; on the other, we seemingly give human beings an unconditional "right to draw water". Yet these two notions actually go hand in hand: defending the "right *to* water" is often integral to campaigns

to protect ecosystems and watersheds from pollution or privatisation. And promoting the "rights *of* water" typically entails recognising the rights of the communities living around these water bodies and using them. And the New Zealand example is a perfect illustration of this.

Why give rights to nature?

The notion of granting formal legal rights to nature or to specific ecosystems and natural bodies is not as new as one might think. It was first formulated in the 1970s within the American environmental movement. In Europe and beyond, a coalition of lawyers and environmental organisations has been campaigning for many years for the legal recognition of "ecocide", a new category of crime involving serious damage to the environment. In the late 2000s, Ecuador and Bolivia – two countries that had also pushed for the human right to water to be internationally recognised – introduced an official recognition of the rights of Nature or "Mother Earth" into their respective Constitutions. In the Ecuadorian case, these new constitutional provisions state that nature has the right to "integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes".

Why give specific rights to Nature? Because conventional Western law only recognises environmental damage when it affects the interests of specific individuals or groups. This makes it difficult to hold governments or corporations accountable for environmental crimes, however serious they may be. This was the case in France, for example, with the 1999 Erika oil spill, which eventually led to the creation of a new concept in French law in an attempt to address this gap: that of "ecological harm". The recognition of nature's rights also opens up the possibility of initiating legal proceedings against polluters or privatisers: it is no longer just the people who are directly affected, but virtually anyone who wishes to file a complaint on behalf of nature. "The law is just a tool," explains legal scholar Valérie Cabanes. "Recognising the legal personhood of ecosystems – rivers in this case (although it could just as easily be forests or the ocean) – will help initiate proceedings against industrial activities that would not entirely fit into conventional environmental law."[1]

The idea of granting nature specific rights and legal personhood to a natural body is sometimes criticised because it seems to give more importance to the integrity of natural ecosystems than to the needs of humankind. Some reject the very notion of granting legal rights to non-human entities. The advocates of these legal developments argue that they are just the most recent step in a wider historical trend of extending formal legal rights to new areas or to beings that previously remained excluded, or were regarded to be of inferior status.

[1] Quoted in *Télérama*. http://www.telerama.fr/idees/le-droit-est-un-outil-pour-reconnaitre-une-personnalite-juridique-a-des-ecosystemes,155816.php.

They also see it as a necessary response to the urgency of the environmental and climate crisis. And they point out that there have long existed other non-human "legal persons" – such as corporations, which have a legal personhood that is separate from that of their managers and employees.

The New Zealand context

International Nature Tribunal, 2014.

In New Zealand, the official recognition of the legal rights of several natural sites is rooted in the country's very specific history and political context. Unlike their other colonies, including Australia, the British have always claimed to have acquired sovereignty over New Zealand not by force but by legal consent, through the signing of the Treaty of Waitangi between Queen Victoria and Maori tribal leaders in 1840. Although it remained without much effect for decades, the Treaty of Waitangi gained new political importance from the 1970s onwards with the revival of Maori activism and the demographic growth of New Zealand's indigenous population. Its flagship provisions relating to the protection of Maori "treasured possessions" and cultural heritage were used to secure the creation of Maori television and radio channels, funding and support for the revitalisation of Maori language, and led to the establishment of the "Waitangi Tribunal". The purpose of this Tribunal is to shed light on the historic despoliation of the Maori and to negotiate a "settlement" (reparation agreement) with each tribe. These settlements typically include official recognition of negligence by the New Zealand government, financial compensation, and other provisions aimed at protecting the tribes' commons and natural resources.

These settlements were the first steps to providing solid legal protection for natural bodies. The agreement between the Crown and the Tainui tribe, for example, included specific rules for safeguarding the water quality of the Waikato River, considered as a heritage of the tribe, and which flows through its historic territory. The Waikato region is one of the main centres of the booming New

Zealand dairy industry, and consequently has high levels of nitrate pollution. This same agreement established a de facto co-sovereignty of the Tainui tribe and the New Zealand government over all decisions which might impact the river. The fact that each major Maori tribe has negotiated its own settlement separately with the Crown has created emulation between them to get better conditions. This resulted in the settlement negotiated by a group of tribes around the Whanganui River (the second largest in the North Island of New Zealand after the Waikato River), which for the first time included an explicit recognition of the legal personhood and rights of this river.

As part of the settlement, a board with representatives from the tribes and the New Zealand government will be responsible for ensuring the integrity of the river and of its watershed. Funding will be made available for ecosystem restoration. And it will now be possible to go to court on the river's behalf to punish violations of its integrity. For the Maori, this legal solution is just a means to a political and spiritual end, as Gerrard Albert, lead negotiator for the tribes involved in the settlement, explains: "We have fought to find an approximation in law so that all others can understand that from our perspective treating the river as a living entity is the correct way to approach it, as in indivisible whole, instead of the traditional model for the last 100 years of treating it from a perspective of ownership and management."

A snowball effect

Recognition of the legal personhood of Te Urewera National Park followed as part of the settlement with the Tuhoe tribe. Then, at the end of 2017, that of Mount Taranaki, an iconic mountain also in the North Island. As part of this settlement between the Crown and eight Maori tribes, any activity that would impact the integrity of the mountain will be considered as an attack on the tribes themselves, who see this ancient volcano as both an ancestor and as a treasured heritage, and may lead to prosecution. It is likely that this trend will continue and that other natural bodies of importance to the Maori will be recognised as legal persons in the future.

New Zealand is not the only country that boasts this kind of legal development. In the province of the Loyalty Islands, New Caledonia, the new environmental code also provides for a form of legal recognition of nature, yet to be applied to specific natural bodies or beings. In a different context, the Supreme Court of the Indian State of Uttarakhand – explicitly mentioning the recent New Zealand decisions – also ruled early in 2017 that the two Indian rivers Ganges and Yamuna, considered sacred in Hindu tradition but now heavily polluted, also had the status and rights of a person. The two rivers have been declared "legal and living entities having the status of a legal person with all corresponding rights, duties and liabilities", to be placed under the legal custody of three senior officials

appointed by the Court. It also ordered that a management board be established, as well as appropriate administrative mechanisms to ensure the protection of the rivers and their rights. The case was brought to the Uttarakhand Supreme Court following a dispute between two states and the central government over the implementation of a plan to clean up the Ganges and the Yamuna, in which millions of litres of untreated wastewater are being dumped every day.

What is the actual concrete outcome of these legal innovations in modern Western law?

Of course, granting "rights" to important natural bodies will not bring about much change in itself, without effective enforcement mechanisms and management tools. In the New Zealand case, the practical arrangements included in the settlements – the recognition of a co-sovereignty or co-guardianship of government and Maori tribes, regulations to protect these natural and cultural entities, funding and the creation of management bodies – are there to give effect to the recognition of a river's or a mountain's rights. In the case of India, the institutional and governance arrangements required to give effect to the "rights" of the Ganges and the Yamuna do not yet exist. In July 2017, the Supreme Court of India overruled the order made by the Uttarakhand Court for that exact reason.

The "Right to Water": Under Threat in the United States?

OLIVIER PETITJEAN

In a world where several hundred million people, concentrated in the poorest regions of the planet, do not have assured access to water, who could imagine that the richest country in the world, the United States, would also be in the spotlight for its inability to guarantee the "human right to water"?

This, however, has happened several times in the past few years, when various scandals even came to the attention of the UN experts responsible for overseeing the application of the right to water. How could this happen? These crises are due to a combination of factors. There is, first of all, the persistence of inequality and discrimination, particularly on the basis of race, in American society; most of the victims are African-American and Hispanic. Then there are the effects of the violence of American capitalism, which has, on the one hand, drastically reduced sources of funding for maintaining infrastructure and water networks and, on the other, accepted leaving vast sectors of the population without clean water.

This sad story begins in Detroit. The former industrial capital of America, whose population has been fleeing since the 1980s, cannot maintain a water network that is now too large for its needs. In the years following the financial crisis of 2008, the economic difficulties of the city and its inhabitants set off a huge wave of water shutoffs for residents who did not pay their bills (already among the highest in the country), often by particularly brutal methods. At the same time, water access was maintained for businesses or other commercial customers who failed to pay their bills. A coalition of American NGOs sent a report to the UN's Special Rapporteurs for the right to water, housing, and extreme poverty, detailing the policy of water shutoffs and increased rates implemented by the municipality of Detroit. The response of the three experts was unambiguous: this

policy constitutes a clear violation of the human right to water. [1] This reprimand, and above all the tireless activity of Detroit's citizens, helped temper the brutality of the water shutoff policy, but not to call it into question.

In early 2016, a new scandal rocked public opinion. The inhabitants of Flint, a city not far from Detroit and undergoing the same economic and social difficulties, learned that their tap water had abnormally high levels of lead, with a consequent risk for their health and particularly that of their young children. The cause of this health disaster was the decision – not made public at the time – by administrators, nominated by the State of Michigan to manage the bankrupt city, to change the supply source for the water network in order to save money. Instead of continuing to buy water treated in Detroit, the city was supplied directly from the Flint River, without the necessary treatment. The low quality of the water entering the pipelines induced corrosion and released significant quantities of lead. The governor had to declare a state of emergency and mobilise the National Guard to ensure distribution of bottled water in the city. The same three UN Special Rapporteurs who had worked on the Detroit case published an opinion showing a new violation of the human right to water: [2]

"The Flint case dramatically illustrates the suffering and difficulties that flow from failing to recognise that water is a human right, from failing to ensure that essential services are provided in a non-discriminatory manner, and from treating those who live in poverty in ways that exacerbate their plight."

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In late 2017, a new official visit by a UN Special Rapporteur to the United States[3] provided another opportunity to highlight the issue of water access in that country. Philip Alston, Special Rapporteur on extreme poverty, met with the homeless in Los Angeles, where they had recently suffered an epidemic of hepatitis A linked to low water quality. He visited urban and rural regions in states such as Alabama or West Virginia, where populations do not have basic access to sanitation. Not to mention Puerto Rico, where the federal government has obstinately refused to unblock the aid necessary to ensure the fundamental needs of the population after the ravages of Hurricane Maria. "The living conditions of the 20% at the bottom of the social scale present a striking contrast to the wealth of this country", declares Philip Alston (himself of American nationality), denouncing punitive drug policies, lack of funding for public health and sanitation, political discrimination against minorities, demonization of the poor in official discourse, and the treatment as criminals of the homeless who urinate in public. "In cities with no public toilets, what else can they do?"

[1] http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=14777&LangID=E
[2] http://www.ohchr.org/FR/NewsEvents/Pages/DisplayNews.aspx?NewsID=19917&LangID=E
[3] http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=22533&LangID=E

There are, fortunately, more positive examples. The terrible drought that has struck California over the past few years has brought to light the critical situation of certain of the state's populations regarding access to water, particularly certain small rural Hispanic communities in the Central Valley, exposed to water shortages and nitrate pollution. Confronting these crises, state authorities have implemented a series of policies to ensure the effectiveness of the right to water and sanitation, a principle adopted in a 2012 state law. These policies include the reinforcement of the power of the state in water management, policy coordination, reinforced technical and financial support to local water services, regulation of groundwater extraction, and funding and programmes to ensure that water service remains affordable. Of course, many questions remain unresolved, such as who (businesses? wealthier households?) will bear the cost of programmes ensuring the right to water for all, and how to fight pollution at the source.

Can the Struggle Against Extractivism Lead to Restoring Water as a Common Good in Chile?

ELIF KARAKARTAL

Taking as its starting point the legal victory of the Caimanes community in Chile against the Los Pelambres mining company, which had taken their valley's water, this article offers several elements for reflection on the difficulties of recognising water as a Common Good in a Chilean society still confronting the model of water privatisation inherited from the Pinochet dictatorship.

On 25 November 2014, the inhabitants of the village of Caimanes, Chile, organised to block traffic on the road leading to the largest tailings dam in Latin America. They demanded that the Los Pelambres mining company respect the decision of the Chilean Supreme Court ordering them to restore "the free flow of water, unpolluted, from the El Mauro tailings dam".

How could this happen? Why did a community that had already had the loss of its water to a mining company recognised, with restitution ordered by the court, still have to apply additional pressure to have that order respected, although it came from the country's highest court? And how did that same Chilean Supreme Court come to sentence a mining company to restore a river? But, first, how did the river run dry? and how was so deleterious a project even possible?

A Project Approved Despite Foreseeable Negative Impacts on Water

In the early 2000s, Minera Los Pelambres, one of the largest copper mines in Chile, a subsidiary of the London-based Antofagasta Minerals consortium,

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looked for a new tailings dam for its copper mine on the Argentinian border. The company chose a location 50 kilometres from the mine, a few kilometres upstream from the village of Caimanes, in a wooded valley, a zone populated by some hundred ranchers, which constituted the groundwater reserve for valleys downstream. The dam was set in the natural circular basin of the valley, enclosed by surrounding mountains. An economical solution for the company – requiring construction of only one retaining wall – but damaging to the environment, for, in order to contain the tailings, the work would seal off groundwater and block waterflow, making downstream land permanently infertile and depriving the community of its own water.

Some 1,200 observations made in the course of the preliminary environmental study pointed out the inevitable drying up of the natural stream, risks of groundwater contamination, and the risks of the retaining wall, planned as over 240 metres high. The community opposed the project and organised against it. Suits were brought and won, freezing the project in 2006. But the damage had already been done, water was already blocked off by underground excavation, and construction was almost finished. Against a background of corrupt officials and lawyers, as well as political pressure, the project was resumed. The dam was finally finished and began operations in 2008.

A few years later, the risks foreseen were already visible: water lost and the valley transformed into a "zone of sacrifice". To understand how such a project could be implemented despite many technical warnings, opposition, and lawsuits won by the community, we must consider the Chilean context.

Legislation Protecting Private Rights at the Expense of Common Rights

Pinochet's dictatorship left Chile with a series of laws inspired by the economic theories of Milton Friedman and the Chicago School, aiming to liberalise all sectors of the economy in the service of a vast free market where the State's function would be simply to distribute shares of this market. Resources, goods, and services were considered commercial property.

The Water Code of 1981 privatised this resource. Although Article 5 of this code stipulated that water remained a "public good", Article 6 indicated that its character was "economic". The Chilean state would provide "water right" concessions, a sort of exclusive property title to water, measurable in litres per second. "Water rights", granted free and in perpetuity by the State, were expected to self-regulate through the market via buying and selling transactions between private parties. Water was thus considered a productive good, fungible as any other, held by its owners and subject to the law of the market.

Although these "water rights" could officially be acquired by any person or business on request, and although there were possibilities of regularising the attribution of those rights to communities that had the use of them prior to the legislation, in practice, given technical difficulties, administrative red tape, and the productivist slant of the Water Code, it was primarily businesses that benefited from this fixed tenure of the fluid element.

The attribution of these *water titles* was made independently of established usage and relationship to the land, contributing to the separation of land and water. It was now possible to acquire land without water and, conversely, to find one's own land deprived of water access. For not only human activity was affected, but also the dynamics and interactions of the fluid element in ecosystems. The circulatory, cohesive, and even political role of water in ecological, animal, and social environments – any non-market environment – disappeared, drowned in economic abstractions, creating imbalances throughout entire regions.

The legalisation of private appropriation of water had destructive effects on the dynamic of the commons and would often push extractive enterprises to grab water rights even before land concessions.

The 1983 Mining Code, also established under Pinochet, facilitated the appropriation of land by mining projects. It established the supremacy of businesses over land and gave multinationals unbreakable rights over concessions. The Mining Code privileged productive property ownership, with no respect for the priority and pre-existence of the communities living on the land. In addition, it obligated the State to reimburse all unrecovered profits to any company forced to abandon an exploitation. These two instruments would

be used together by multinationals, accelerating legal dispossession of land and water, provoking conflicts and migrations, creating inconsistencies and irrationalities in the integrated use of the resource.

In the late 1990s, nearly all surface "water rights" had been attributed and the only possibility of acquiring one was to buy it at market price. Furthermore, any company that discovered new underground water sources in the course of excavation automatically became their owner. This facilitated the appropriation of deep water by mining companies.

These instruments, established by force under Pinochet's dictatorship, were further reinforced by the Chilean Concertation (a coalition of centrist parties that succeeded the dictatorship and whose representatives have carried all national elections since), while successive governments put all their faith in extractivism, given soaring world demand for copper.

Victory for Justice in Caimanes: A Hope for the Recognition of the Commons?
It has been 28 years since Pinochet left power and yet the Chilean Constitution is unchanged. The instruments of appropriation of the commons are still in place, indeed perfected. In such a context, how can we interpret the victory of a community over the abuse of its land by an extractive business and the Chilean court's order to restore its water?

In an climate unfavourable to the expression of rights and communities, and after more than eight years of legal battles and criminalisation of protest, the lawyers for the Caimanes community, starting in 2013, won a series of legal victories, the most important of which was the judgement of the Supreme Court ordering the company to restore the watercourse. An unprecedented verdict for a project of that size, the third largest tailings dam in the world, with more than 2,000 million tonnes of tailings.

This resolution followed upon a well-argued case by the community's lawyers, but may also be interpreted in the context of multiplying water-related conflicts at the national level. Throughout Chile, the immense permissiveness of power towards multiplying, large-scale extractivist projects has created situations of increasingly flagrant and widely condemned injustice and dispossession.

For a rural and urban citizenship that is increasingly alert and organised, that is moving forward despite the persistence of the imposition of the extractivist paradigm as a motor of development, the decision taken 21 October 2014 by the five Supreme Court judges for the restitution of Caimanes' water is a milestone. It puts into question the sacred right of businesses to despoil Chilean lands. Meanwhile, local voices are beginning to be heard through progressive media outlets and are even winning over certain Chilean political figures, and the government and

established political class is undergoing a credibility crisis due to successive incidents of corruption and conflict of interest between politicians and big business.[1]

Harder to Say Than Do … Timid but Significant Advances

The decision of the Supreme Court provoked an uproar among the mining lobby, and 2015 was marked by pressure from Antofagasta Minerals, the owner of Minera Los Pelambres, upon the court decision. The company's discourse focused on what it claimed was "the country's interest", ranging from employment to the threat to the valley and the country's development overall.[2] It finally settled on a desperate strategy of "social dialogue" to attempt to prove that a community could be convinced to participate in co-management of risks … and catastrophes.

At this moment there appeared a new public-private institution, "Valor Minero".[3] Created by the mining lobby, it also included members of the government, working together to present extractivism under the ideal colours of "green, inclusive, and virtuous mines". It went so far as to draw in the judiciary to fight against a tendency, which it found unacceptable, to take environmental conflicts to court, thus threatening investments.

But beyond the mining lobby and its pressure, we must wonder why the court decision was not enforced. Post-Pinochet Chile boasted of its respect for institutions; why did a court sentence remain unexecuted? What happened? In fact, despite the euphoria generated by the announcement of the court decision, the order was not executed because the Chilean judicial system does not involve the direct application of verdicts. Although based on experts' findings, taking into account the loss of groundwater and determining responsibility, according to which the Court ordered the company to restore the water by "natural" means (with the obligation, if that condition was not met, to take down the tailings dam), the sentence had only declarative power. The Court sent the responsibility for enforcing the verdict's application to the court of first instance.

This return to the original court mysteriously provided an opportunity for a new experts' finding, financed by the company, which was used to justify a so-called "conciliation agreement" with the community – a agreement which was not validated by popular vote[4]…

After the euphoria of victory, bitter disappointment. The Chilean judicial system

[1] http://www.theclinic.cl/2015/06/07/aumenta-la-crisis-politica-renuncio-ministro-jorge-insunza-por-asesorias-a-antofagasta-minerals/
[2] http://www.capital.cl/negocios/2015/03/20/104228/diego-hernandez-el-nivel-de-judicializacion-de-proyectos-llego-a-un-punto-limite
[3] http://www.valorminero.cl/
[4] https://www.france-libertes.org/fr/echec-de-la-negociation-entre-minera-los-pelambres-et-la-communaute-de-caimanes-chili/

allowed a great divide between the judges' recognition of rights in theory and their application in practice, implying that judicial sentences will not be applied and only private conciliation has actual power.

Although the insurmountable wall seems to rise again, the events and advances of these last few years, in terms of recognition of rights and recovery of commons, increasing regional mobilisation, individual stands of certain figures throughout the political spectrum, citizens' resistance in the face of new scandals and conflicts of interest, all this seems to show the exhaustion of a way of governing in which technocracy claimed to replace rights, with politics now seeking, timidly but surely, to take its place.[5]

At the end of her last term, the Chilean president Michelle Bachelet attempted to establish a project to reform the Water Code. This project, a vague response to the demand put forward by the Movement for Water Recovery and Land Defence for the abrogation of the code, without attacking big business interests, did not call into question water privatisation or commercialisation, nor water rights concessions already granted. It aimed to re-establish improved state control of water use, determining priorities for human rights versus those of businesses. This modification project was opposed by lobbies, which have so far succeeded in blocking it, but of course it was also far from the complete elimination of the existing Water Code that citizens demanded. Today, in Chile, it no longer seems possible to contain the question of human rights behind a technocratic barricade. The question is eminently political and will have its day.

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Elif Karakartal is a director of documentary films and a member of the Coordination Eau Île de France and ALDEAH. She has been following the case of the Caimanes community since 2012 as an international observer for the Fondation France Libertés. (Coming soon, her new documentary film: "La Toma")

[5] https://www.france-libertes.org/fr/caimanes-rompre-linacceptable-un-chemin-encore-difficile-a-se-frayer-au-chili/

04

POLITICS OF THE COMMONS

How Can Water Management in Ile-de-France Be Made Truly Democratic?

JEAN-CLAUDE OLIVA

How can true water democracy be achieved in France, given a technical subject, dominated by private actors, not always of active interest to ordinary citizens? The experience of Coordination Eau Ile-de-France suggests several possibilities.

I would like to discuss the democratisation of water management and alternative forms of participation through the experience of the Coordination Eau Ile-de-France. This association includes both physical and moral persons (associations and, more infrequently, regions or local governments). It was created in 2008 when we realised that we – household users, elected officials, independent experts, researchers, etc. – had not been heard when the Syndicat des Eaux d'Ile-de-France (SEDIF) renewed its delegation contract. The SEDIF's consultative commission for local public services had clearly expressed an opinion in favour of public management, but it was not acted upon; an indication of the limits of such a form of participation. Discussions had indeed taken place in a certain number of cities, and even in municipal councils. But democratic debate worthy of the decision at stake did not take place. This allowed a handful of oligarchs to impose their own choice, that of continuing the delegation of public service (DSP) to Veolia. Aside from SEDIF, the place and participation of users is an ongoing issue for all water and sanitation organisms, public or private, in our region. These organisms share certain characteristics: large scale, with power concentrated in the hands of a few people (often the same ones).

Residential water users have persistent complaints regarding water management. We have just won a decision from the administrative court of Cergy-Pontoise to void two deliberations of the Syndicat des Eaux de la Presqu'île de Gennevilliers (SEPG), the first concerning the renewal of their DSP contract, one of the largest

CÉLINE HARRAND / FLICKR (CC BY-SA 2.0)

private water contracts in France, after SEDIC and the greater Marseille area. The reason for this voiding is basic: the session of the SEPG board (which includes elected officials of member cities) was not public! The meeting room was closed to the public; several people were sent away by building security. Even more egregiously, the meeting was held in the offices of the delegate, the "Eau et Force" company, a subsidiary of Suez. A flagrant display of the arrogance and contempt for citizens and the elementary rules of democracy at play in the water sector. This is not an exception, this is the rule!

In response to this situation, we have developed alternative forms of participation. Alternative in two senses: in relation to institutional forms of participation, but also to more traditional forms of militant intervention.

Let us begin by examining alternative forms of participation in relation to institutional forms. Several key points may be noted here. The question of access to information was shown to be crucial in our action in the urban community Est Ensemble in 2010; because we had study reports and pre-reports in real time (communicated to us by one of the mayors), we were able to develop a counter-argument that confirmed the opposition of public opinion and a significant number of elected officials. This is not, of course, a common occurrence. In general, elected officials receive (and do not share) several temporary versions of the audit report, and the final version is made public only a few days before the decision is taken. In these conditions, it is much more difficult to mobilise the population and convince elected officials.

Another example regarding access to information, this one concerning the pollution of the Marne by runoff from Charles de Gaulle Airport. We had to go

to the Commission d'Accès aux Documents Administratifs and the administrative court to get public documents. We succeeded, but not without encountering a new problem: we were overwhelmed by the volume of documents supplied and were not able to take full advantage of them. This convinced us of the necessity of reinforcing our own expertise, of developing "citizens' expertise".

That meant two things for us: putting researchers, lawyers, consultants, etc. to work on questions raised by citizens and the general public (and not only those raised by public powers and businesses); but also reinforcing on-the-ground work and giving it a scientific validity that would support our action. This took the form, in particular, of an Institutional-Citizens' Partnership for Research and Innovation (PICRI) with the commitment of the Mosaïque-Lavue Research Laboratory of Université Paris Ouest – Nanterre La Défense and the support of the Île-de-France region.

This project, "Collaborative Cartography, Citizens' Expertise: Water Territories and Territories of Political Competence in Ile-de-France", aims to establish scientific bases for citizens to reclaim water management in Île-de-France. Scientific methods of social and urban geography intersecting with social and collaborative cartographic tools, and the additional features of popular education and participative communication, bring scientists, associations, and citizens together; the use, development, and distribution of these tools over almost three years created a community of effort in the Île-de-France region.

Among its first results was the creation of a telephone and map directory of associations for water in Ile-de-France, giving visibility to the citizens' movement for water as a common good. There was also the mapping of management modes (public or private) for water by administrative département for the region and by areas for the metropolis, as well as the service-providing companies. This information was not previously accessible to the public. Its availability should raise awareness of the hold multinationals have on water.

Finally, we applied pressure on decision-making directly, by lobbying elected officials, taking legal action, organising demonstrations, etc. For instance, the dossier on Marne pollution that we developed with a lawyer to lodge an appeal with an administrative court also allowed us to support a parliamentary hearing; our arguments were taken up in a parliamentary report on airport-related pollution.

The failure of the French model of water management, particularly from the point of view of democracy and participation, is well-known. "The democracy of water remains to be created," Michel Lesage said in his report evaluating water policy in France in 2013. Not only have citizen users and their associations been marginalised in water management, as associations have long since noted; elected

officials are side-lined as well. The report identifies, in particular, the gap between organisation by water catchment area and organisation by political territory.

Let us now examine alternative forms of participation in relationship to more traditional forms of militant intervention (pamphlets, public meetings, lectures and debates – which we also practice), which have proved relatively unpopular. What we are aiming for is the participation of youths, women, the socially marginalised – in short, the people not generally integrated in militant, associative, or political networks, who are also the least involved in institutional forms of participation. These people will not be drawn in by existing organisations, shibboleths, or values, but by more direct, concrete, emotional approaches, often including the arts. This led us to develop "spokespeople" in the street, participative workshops in making household or cosmetic products, literacy courses for migrants, defending users whose water has been shut off, etc.

In the beginning, "Eau, ma parole" was an experiment in popular expression, created with people met in public places in the 13th arrondissement of Paris, based on mobilising young students and artists. This first visible incursion in the public space was followed by a deeper involvement in the neighbourhood through partnerships formed with associations, social centres, and the Caisse d'Allocations Familiales (welfare administration), allowing us to better target the disadvantaged. While still promoting self-expression, "Écolo, c'est économe" cultivates a more concrete approach than mere discussion through workshops for making household and cosmetic products. This project led to more developed products, such as the educational recipe book, or the exhibition "Écolo, c'est économe". Its latest version reached a wider audience, both disadvantaged and diverse (migrant women, children, and families, men re-entering the workforce).

For two years we have been leading a national campaign with France Libertés against water shutoffs and reductions for unpaid bills. Although these practices have been ruled illegal, big businesses like Veolia and Saur continue to use them. We help victims of these practices to exercise their rights; we have received more than 1,200 testimonies on our website and that of France Libertés, who offer instructions on how to manage these situations. The driving force is the participation of users whose water has been shut off. Because we have established this direct connection with them, we have been able to go on fighting. Beyond militant circles and cultural and ideological affinities, we have reached people through their situation, their problem. These people have regained confidence in collective action. This is a victory in these times of democratic crisis.

An important point: in all cases, we do not set different forms of participation in opposition to each other, grassroots versus institutional, emerging versus traditional. On the contrary, with our spirit of coordination, we try to find complementarities, to build bridges (one of our member associations is, in fact,

named "L'eau est le pont" [Water Is the Bridge]). Moreover, we try to welcome all forms of (non-violent) action, all organisations, and all activists. The 2012 Forum Alternatif Mondial de l'Eau (FAME) in Marseille cured us of any illusion about a single form of organisation and action for water militants. The many struggles of these past few years have shown that there is no magic formula for winning, but a multiplicity of actions and actors that can mutually reinforce each other, as long as they do not reject each other.

We are also a proactive coordination. In other words, we do not simply coordinate the organisations that ask us to, but we go out looking for actors in order to interest them in what we feel are common issues. This is the multidirectional operation we successfully adopted for the 2012 FAME in Marseille (with a contribution-collection tool that formalised this effort). Last October, we participated in an international meeting on water, agriculture, and climate change in Dharwad, India (see elsewhere in this Passerelle). Water and agriculture are the two sectors most affected by climate change; they may also be at the heart of the response to it. This convergence of water and ecological agriculture, as identified at the international level, brought us to recontact the Confédération Paysanne and the Fédération Nationale de l'Agriculture Biologique to attempt to move it forward in France.

Our criterion for success is the flowering of citizen initiatives. From our 2010 action in Est Ensemble, I was able to categorise a dozen kinds of different actions over a period of several months. When such a level is reached, there emerges a citizens' movement capable of influencing decision-making, which is our goal.

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This text reproduces a public statement by Jean-Claude Oliva at a colloquium on citizens' participation in water management, in Limoges, November 2016.

The "Democracy of Water" in Paris

INTERVIEW WITH ANNE LE STRAT, FORMER DEPUTY MAYOR OF PARIS AND PRESIDENT OF EAU DE PARIS

Why create a Parisian Water Observatory?
The objective was to establish a citizens' space for oversight and information, to which the elected officials of the City of Paris, administrative services, and agents of Eau de Paris would be required to report. All acts, reports, and deliberations relative to water management must be presented at the Observatory before being examined by the Conseil de Paris. Initially, many people were sceptical, but now they see the point of it. It's not simply a registry, informed after the fact. It isn't a deliberative institution proper; the Conseil de Paris still makes the decisions. But these citizens' opinions are taken into account and, perhaps more important still, information must be made accessible to them. For exactly the same reason, Eau de Paris included on its board representatives of associations and a representative of the Observatory. The board isn't always happy about this, because more time is needed overall to explain dossiers or make them available … But, in the end, it means a greater democracy of water, and it facilitates public management.

Do equivalents exist elsewhere?
Very few public water operators have established citizens' spaces of this type. Grenoble has a users' council that is consulted on water pricing. Inspired by the Parisian experiment, the city of Viry has also established governance open to civil society. But there is no real equivalent of the Paris Observatory. Most public operators are reluctant to open their governance to users and associations, because that involves time to inform them and increased expense. I think, however, that it is indispensable for the quality of public service. These are the democratic innovations that foreign observers find most interesting.

Does the Paris Observatory really affect many people?
The Observatory has allowed a certain number of people to educate themselves about water issues. They may not be numerous, but they are people from neighbourhood councils, local housing authorities, and associations, for whom the Observatory is important and who are important connections to the rest of the Parisian population. The same holds for the associations sitting on the Eau de Paris board, Que Choisir and France Nature Environnement: they are large, nationwide organisations.

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Excerpted from http://multinationales.org/Anne-Le-Strat-La-remunicipalisation-a-permis-a-Paris-de-mener-une-politique-de

First Remunicipalization - then Democratization! An interim report on the democratization of Berlin's water management

DOROTHEA HÄRLIN AND BERLIN WASSERTISCH

In 2014, following a public campaign and a local referendum, Berlin decided to remunicipalise its water service. For Berliner Wassertisch, the citizen coalition which campaigned for remunicipalisation, it is only a first step. The second step should be to establish a genuinely democratic and sustainable water service.

Berliner Wasserbetriebe (BWB) has been 100% back in public ownership since 2014, after 24.9% shares had been sold to both Veolia and RWE following the familiar PPP model. As with all PPP contracts, this scandalous contract was secret. In 2011, however, after the first people's initiative referendum to be won in Berlin ("Our Water"), the contract had to be disclosed. This placed Berlin's politicians under such pressure that they bought back RWE's shares in 2012 and Veolia's shares in 2013. BWB has thus been remunicipalised since 2014.

The price was based on the contractually-agreed profit which was guaranteed for 30 years. The two corporations were therefore paid in cash ahead of schedule for profits up to 2028 financed by a loan taken out by BWB for a further 30 years. We now have to pay back this loan every month with our water charges. So Berlin's population continues to suffer from the earlier privatisation (more about this later).

Nevertheless, remunicipalisation of BWB was a great success and an important first step towards our actual goal, which is to manage water as a common. Why is this just a first step? Because, after remunicipalisation, a company which was once sold under PPP is never the company that it was before. Corporations only buy into our public services for one reason: to make the highest possible profit. The entire structure of the company is geared towards this logic and the mechanisms used are always the same:

- Reduction of operating costs, i.e. staffing cuts and consolidation of the work.
- Scaling back of investment
- Increased prices for consumers

This structure does not disappear after remunicipalisation automatically and can only be changed if there is sufficient political will. But this is missing from Berlin. The interest of the Senate and all the political parties, including the coalition of SPD, Greens and the Left currently in power, continues to make the maximum possible returns from water in order to balance Berlin's highly indebted budget (1999: debts amounted to 35 billion €, today they are 60 billion). Against this is our clearly stated demand, as set out in the "Berlin Water Charter": Water pays for water. This means that all the money that we pay with our water charges must be used only for water and effluent. What happens today is that a part of our water money flows into the general budget; we are thus paying a sort of water tax for things which should be covered by our general taxes. This can only be changed by pressure from below, from the people of Berlin who, back in 2011, clearly stated their will in our referendum. For this reason, ever since the buy-back, our slogan has been "First remunicipalisation - then democratisation".

But what does the democratisation of Europe's largest water company (roughly 4 million customers) mean?

The Berliner Wassertisch (Berlin Water Table) does not yet have a definitive answer to this question and we know that we still face a very long road ahead of us. This is why we can only present a few aspects of the general framework and unresolved questions here:

- Our demand for no profit from water is contrary to the Berlin Public Utilities Act which states that the public utilities in Berlin must make a profit. This means that we need to amend the Public Utilities Act, but how can we explain this to the general public?
- So far, none of Berlin's parties have demonstrated the will to open up BWB's structure to allow more participation by the population.
- Unfortunately, this demand is not yet supported by the trade unionists within the utility.

- Many Berliners who voted Yes in the referendum in 2011 believe that the goal was achieved with the remunicipalisation.
- We are delighted that tap water in Berlin is very good. But this means that the population has no specific problem that will encourage them to campaign for water. Other problems, such as the horrendous rent rises, are much more pressing for many people at present.

These are just a few points that make it difficult for us to turn water into an urgent topic for discussion among the public. This is an essential condition for any model of democratisation, however.

But this does not mean we are doing nothing. We have been discussing a number of different approaches within the Berlin Water Table and on the Berliner Wasserrat (Berlin Water Assembly), which was established after remunicipalisation in 2014. To reiterate, water is still a long way from being a common, even after remunicipalisation. Even though good water comes out of our taps, Berlin still has massive environmental and sustainability problems associated with water. Here are just a few examples: The tap water has to be obtained from bank filtrate since the groundwater is already too contaminated. Berlin's rivers and canals are far from conforming to the European Water Framework Directive and are threatened by the brown coal mining in the South East of Berlin. There is no forward-looking rainwater management.

So there is much to do with Berlin's water beyond profit-oriented structures. We are trying out various approaches to develop ways to achieve greater participation:

1. Restructuring the decision-making structure in BWB. One-third parity representation (company/employees/population) in a new Supervisory Board to be constituted.
2. Setting up citizens' councils, based on the model of Future Councils developed by Professors Leggewie and Nanz.
3. Encouraging awareness of water's importance among the population with the aid of the "Blue Community" project initiated by Maude Barlow.

All of these approaches should be regarded as complementary and should no longer be discussed as though they are in competition. Our discussion processes are far from over, so we are grateful for any suggestions from outside.

Berlin Water Charter

Preface

The private shareholdings in the Berliner Wasserbetriebe (BWB) were bought back by the State of Berlin in late 2013. We wish to take this further and democratise both Berliner Wasserbetriebe and water policy as a whole, and so achieve transparent, socially just and environmentally sustainable water management in Berlin.

This demands a complete return of the formerly part-privatised company to ownership of the State of Berlin. To this end, the Berliner Wassertisch has drawn up a draft water charter for Berlin. Our intention is to develop this draft further by means of a broadly-based debate within society. We wish to bring together all the different areas of expertise on the subject of water in our city, and to invite Berlin's population to actively participate. We regard the Berlin water charter as the basis for statutory regulations and as a guide for Berliner Wasserbetriebe.

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Preamble

1. This Charter is based on the UN Resolution on the human right to water and basic sanitation of 28.07.2010 and on the initial petition of the European Citizen's Initiative right2water successfully agreed in September 2013.

2. These fundamental rights are inalienable and may not be restricted by national or transnational treaties.

3. All the people of Berlin should be able to participate democratically in the implementation of a socially, economically and environmentally sustainable water policy. This requires transparency at every level.

4. A high quality drinking water supply and waste water treatment system is inextricably linked to the protection of nature and our natural resources.

5. The business management of Berliner Wasserbetriebe should be oriented towards the common good. This precludes the option of a profit-oriented approach. The population's water revenue must be used solely to ensure a sustainable drinking water supply and waste water treatment. "Water pays for water".

General and political principles

1.1. Berliner Wasserbetriebe serves the public good. Access to clean water and basic sanitation must be permanently guaranteed to all Berliners as a human right.

1.2. Water must be affordable for all Berliners. They have a right to obtain high quality water subject to socially appropriate charges.

1.3. Berliner Wasserbetriebe shall permanently remain a public service that is entirely owned by the Federal State and managed by the municipality. There must be no privatisation or part-privatisation of the drinking water supply and sewerage system, not even in the context of so-called public-private partnerships or similar models. The provision of clean, safe water, which is essential to life, and its disposal rank among the highest priority and indivisible tasks of the State.

1.4. Berlin's domestic water management must be sustainably developed in a process of coordination that involves all stakeholders, particularly with the participation of the citizens of Berlin. This requires a high level of transparency.

Economic principles

2.1. Berliner Wasserbetriebe is not run for profit. It may levy charges that cover the costs of facilities and to make provision for investment in sustainable economic and technical development.

2.2. The pricing model of Berliner Wasserbetriebe takes the burden away from small consumers and places it on large consumers.

2.3. No companies that are not associated with water may be integrated into Berliner Wasserbetriebe.

2.4. Water from Berlin's groundwater and bank filtrate should be available in at least the same high quality to the current and all subsequent generations. To this end, the technical equipment associated with the drinking water supply and sewerage system must meet the latest scientific and technical standards and incorporate an alternative water management system.

2.5. Berliner Wasserbetriebe is open to cross-body cooperation in the context of publically-run domestic water management, with the common good as its guiding principle. A profit-oriented approach to inter-regional cooperation will be rejected on principle.

2.6. The working conditions and remuneration of Berliner Wasserbetriebe personnel must satisfy the requirements of freedom, justice, safety and human dignity defined in the guiding principles of the International Labour Organisation ILO. The salaries for all employees shall be based on the principle of "Equivalent pay for equivalent work". The existing right to codetermination of employees of Berliner Wasserbetriebe will be guaranteed and further extended.

2.7. The State of Berlin provides, to a reasonable extent, resources to allow democratic participation and for water-related research.

Environmental principles

3.1. Berliner Wasserbetriebe supplies Berlin with drinking water from its own groundwater resources and the bank filtrate obtained from the Spree and Havel rivers.

3.2. The work of Berliner Wasserbetriebe and the orientation of Berlin's policy are characterised by the desire to protect resources. Berlin's environmental balance must not deteriorate, and should be constantly improved.

3.3. The State implements the environmental standards of the EU Water Framework Directive (WFD) of 2000 and enshrines these provisions in statutory standards.

3.4. Organic agriculture is to be encouraged in order to protect water resources and reduce contamination of the groundwater. Berlin is in favour of a reform of the European and German agriculture and biomass cultivation policy with the aim of greatly reducing the pollution of our waterways by fertilisers and pesticides.

3.5. Berlin's surface waters are to be developed in greater harmony with nature as regards riverside landscaping and environmental consistency. The State will not pursue any development of bodies of water that impacts negatively on nature.

3.6. Water protection areas are to be maintained and cared for. They may not be redesignated as speculative building land.

3.7. To protect groundwater resources, water extraction shall be limited to a defined, environmentally compatible extent.

3.8. The State of Berlin shall develop an overall concept for groundwater management in cooperation with BWB and with the agreement of the population.

3.9. The groundwater extraction charge shall be defined as a ring-fenced levy and used for the protection of the groundwater and Berlin's bodies of water.

3.10. The State of Berlin promotes the development of its green spaces in harmony with nature with the aim of ensuring soil conservation and thus preventing water pollution. Berliner Wasserbetriebe is jointly responsible for the urban water supply; championing the retention of Berlin's green spaces of all types thus also falls within its remit.

3.11. Soil management is oriented towards protecting the ground and surface water and watercourses. Further soil sealing is to be avoided and reversed

wherever possible. The quantity, quality and structure of unsealed soils are to be retained. Wherever possible, rainwater will be allowed to seep into the ground locally to reduce the load on the sewerage system.

3.12. Fracking and other methods of obtaining crude oil and natural gas in and around Berlin are to be ruled out for all time. The underground storage of separated CO2 shall also remain banned in Berlin in the future. The State advocates a Germany-wide ban.

3.13. The State of Berlin is working with the other Federal States towards the early ending of pollutant discharges into the rivers and ensuring a stable water supply for all.

Legal principles

4.1 The Berlin water charter is the basis for interpretation of existing and new laws, statutory provisions and other regulations.

Munich, New York and Paris: Three Cities Targeting Agriculture to Protect their Water

Faced with the rise in agricultural pollution (nitrates and pesticides), many cities – encouraged by private companies that cash in on these markets – choose to add new water treatment and purification systems. But as in many other areas, prevention is often much more effective – as well as being less costly over the long term – than post-treatment. Three cities (Munich, New York and more recently Paris) have been at the forefront of this experience, initiating innovative policies focussed on protecting their resources upstream, with a particular emphasis on support for environmentally-friendly farming. They are showing how the water service can strengthen the link between the urban and rural world and act as a catalyst for the transformation of agricultural and food systems.

Munich: organic food and clean water

How has Munich, a city of 1.3 million inhabitants managed to avoid any chemical treatment of its tap water? Part of the answer lies in the decision taken at the end of the last century. At that time, the water supply system of the town from the Mangfall Valley was introduced. Although 40 kilometres from the town, this valley that provides over 80% of the city's tap water supply, was chosen because of its high annual rainfall, the filtering ability of the soil, and particularly because of its altitude that allows the water to flow using the law of gravity. The municipality also bought up agricultural lands in the Mangfall catchment area. Most of this land is wooded, and the idea – considered very avant-garde at the time – was to create a natural filter and purifying system for water, that belonged to the town and covered 1,600 hectares. None of this was left to pure chance, and the management of the woods is carried out for the municipal water services by the municipal department for woods and forests.

This strategy has paid off, as the 1,200 microbiological analyses and 200 monthly chemical tests prove, the 110 million cubic litres of water used every year by the inhabitants of Munich and its twenty neighbouring communes have tap water of a quality similar to that of mineral water.

In the early 1990s, the water services (which were privatised in 1998) were worried to note that there was a slow but constant increase over a 30-year period in the pollutants of agricultural origin. These figures were far from being worryingly high. The worst analyses showed a maximum of 15 milligrammes/litre and 0.065 microgramme of pesticides were present in 1993. This was well below the limits of the European Union directives on " nitrates " (50 mg/l) and " pesticides " (0,5 µg/l).They did however take the alert very seriously. The possibility of buying up additional land around where the water was pumped and of planting more trees there, was rapidly ruled out as a solution, given the issues of land ownership. The town therefore decided to encourage organic farming on all the land situated upstream in the Mangfall Valley. Encourage: the word is too weak, because over the following years, the town intervened very directly at all levels in the chain, from production to marketing, and ensuring that there were sufficient sales for organic products in their own structures: nurseries, school restaurants etc.

Excerpted from "Munich: Promoting organic agriculture to avoid treating water", https://www.partagedeseaux.info/Munich-Promoting-organic-agriculture-to-avoid-treating-water

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New York: urban-rural partnership to preserve the pristine quality of drinking water and save billions of dollars

Beginning in the 1830s, the City of New York created a water system generally considered to have no equal in the world. Generations of city leaders chose to go far north and west of the City, to find rural environments that would provide pure, pristine water.

For 150 years, until the 1980s, New York City received the benefits of the largely undamaged rural eco- systems that provided NewYork with pure drinking water at a fraction of the cost of other cities paid. But in the 1980s, as the economics of industrialised agriculture began to undermine the economic vitality of the small family farms that dotted the Catskill mountains, things began to change. Catskill farmers, in a desperate attempt to remain economically viable, began industrialising their own farm operations. Nutrient use increased, erosion accelerated, and pathogen contamination began to grow. Farmers also began selling off the forested portions of their land for environmentally damaging exurban development. Attempts to control these developments by

SAM VALADI/ FLICKR (CC BY - NC)

traditional environmental regulation completely failed, as traditional top down environmental regulation of agriculture has always failed in the United States. Allowing Catskill drinking water purity to deteriorate and then spending massive sums to clean it up was not the ideal option. Initial calculations showed that a comprehensive program of watershed protection would cost far less than filtration, would maintain water quality more effectively, and would produce numerous other benefits as well, whereas a filtration strategy would be nothing more than a money pit. Instead of paying to clean up the results of degrading the water producing environment, the City would invest in preserving the rural Catskill environment that was providing it with the world's best urban water. The team's philosophy was that a good environment will produce good water. And that made investing in the environment in an area 100 miles and more a smart and profitable investment for New York City.

The problem was how to overcome history, prejudice, bureaucratic folklore and institutional biases to refocus on creating a working program of pollution prevention. It took eighteen months of mutual work between the City and the Catskill farming community but, in the end, using concepts that have now come to be called ecosystem services, an innovative and far reaching agreement was crafted.

Operationally, the question became what environmental investments should the City make. Some, such as adding to the publicly held land in the watershed, particularly critical lands threatened by development, stream corridor restorations and better stewardship of City owned lands were obvious. But that did not answer how to control non-point source pollution on privately held farmlands and other rural landscapes.
The City began to organise an unprecedented program of regulatory enforcement against non-point source pollution runoffs in its watersheds. [After a period of

conflict, followed by dialogue,] Catskill farmers created a program they called "Whole Farm Planning," a title designed to capture the fact that it incorporated environmental planning into the business strategy of the farm. Under whole farm planning, a pollution control plan was developed for each farm, by a team consisting of the farmer and local farm and agricultural experts. Instead of using "one size fits all" standard pollution control measures, the whole farm plan was tailored to the needs of each individual farm and farmer, using his or her own knowledge and expertise. The plan was then reviewed and approved by the Watershed Agricultural Council, a locally based institution that was created to run the Catskill Farm program. Once approved, the City would then pay the capital costs of implementing it, as well as an ongoing annual stipend. By joining the program, the farmer was not only relieved of the ongoing burden of dealing with pollution control regulators. An equal incentive was that many of the measures in individual whole farm plans had specific economic benefits for the farmer, helping to restore the viability of Catskill farming. To ensure pollution control efforts would reach critical mass, the program set a goal of obtaining the participation rate of 85% of Catskill farmers within five years. Thus, while the program was voluntary for any individual farmer, the Catskill farm community as a whole was committed to reach a goal that would ensure the City met its pollution reduction objectives. They did even better. After five years, 93% of all Catskill farmers were full program participants. In terms of Clean Water, the results speak for themselves:

- There was a 75% to 80% reduction in farm pollution loading;
- The pristine quality of the City's matchless drinking water was preserved and improved and the threat that NewYork would have to spend billions of dollars on advanced treatment of drinking water was eliminated;
- The program paid for itself many times over through its many cost savings and played a critical role in helping to stabilise water and sewer tariffs, providing major benefits to low-income households;
- The program was wildly popular with the public and helped build strong urban support for future watershed protection efforts by NewYork City.
- On a broader scale, the Catskill program spurred watershed protection and environmental friendly farm programs throughout the United States and catalysed interest in non-structural alternatives to meet water resource needs as opposed to the traditional facility construction approaches of the U.S. water industry.

Excerpted from Albert F. Appleton, "How New York City Used an Ecosystem Services Strategy Carried out Through an Urban-Rural Partnership to Preserve the Pristine Quality of Its Drinking Water and Save Billions of Dollars*", http://www.ourwatercommons.org/sites/default/files/New-York-preserving-the-pristine-quality-of-its-drinking-water.pdf*

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Paris: remunicipalising and reinventing the water service

Downstream water treatment was for a long time the chosen method to ensure the water quality in Paris, using water treatment plants which removed the majority of pollutants. In the early 2000s, the Paris council also decided to take action upstream. "We start thinking about water quality as soon as the rain hits the ground," says Claude Vignaud, head of the Paris water agency "Eau de Paris Sens-Provins. "Our focus is prevention." The Eau de Paris water company, which was remunicipalised in 2010, works with farmers in the Vanne valley around the Armentières spring and in the other water catchment areas, promoting environmentally-friendly agricultural practices.

EAU DE PARIS

Aqueduc de la Vanne

Christophe Dupuis is one such farmer. Now in his thirties, he took over his father's farm in 2008 – 160 hectares of cereal production and 3 hectares of market gardens – in the town of Arces-Dilo (Yonne), about twenty kilometres from the Armentières spring. "I switched to organic, not only because that's what I believed was best, but also to improve the water quality," explains the farmer. "I didn't want my work to have a negative impact on the region's water." The water quality is indeed not only affected by the land above the catchment areas but the whole 47,000 hectares on which Christophe Dupuis' "*la ferme aux Cailloux*" is located. The farmer began by seeking technical advice from the agency Bio Bourgogne, which works on developing organic farming throughout the region. The partnership between Bio Bourgogne and Eau de Paris also makes it possible for farmers to receive water protection subsidies from the European Common Agricultural Policy.

The outcome is that the area, which only had 286 hectares of organic farmland, now boasts 2100, an increase of more than 70%. The number of organic farmers has also shot up from five in 2008 to 29 in 2015. Twenty of them have formed an organisation called "Agribio Vanne et Othe", which seeks to encourage other farmers to switch to organic. "There has been a radical shift in people's perception of organic," says Hélène Levieil. "It has become an option like any other and is much less marginal than it was several years ago."

Eau de Paris is boosting its support for organic farming and other ecological methods over the 240,000 hectares of groundwater catchment areas, and they

are seeing positive effects on the water quality. "The maximum amount of nitrates[2] is 50 mg per litre, and we are at around 30 mg of nitrates per litre – and this level has stabilised," says Claude Vigneaux. "When it comes to pesticides, we are sometimes over the limit. But overall the water quality of the Vanne basin is stable due to the actions we are taking. If we weren't doing this, the water quality would deteriorate." Even after certain chemicals are banned, they can still be detected in the water and the soil. Traces of atrazine, a molecule found in a pesticide used for corn crops which was banned by the European Union in 2002, are still sometimes detected in the Vanne water.

"Less pesticides are being used for agricultural purposes these days so there are less major cases of water contamination," says Christophe Gerbier from Eau de Paris. "But it will take ten to twenty years to see a real decline. Because the level didn't get this high in ten years!" Although there is no more trace of certain pesticides, traces of others are appearing … or are not yet known. "We are intensifying our research into new pesticides," explains Christophe Gerbier. "We need to rethink the whole system," says Célia Bauel, Chair of Eau de Paris and deputy mayor of Paris. "Right now we are paying to get pollution out of the water, and possibly health costs as well."

Excerpts from "Boire l'eau du robinet à Paris, risque d'exposition à des pollutions ou acte écologique?", https://www.bastamag.net/Boire-l-eau-du-robinet-risque-d-exposition-a-des-pollutions-ou-acte-ecologique

Rebuilding Trust After Flint: What About the Water In Your City?

DANIEL MOSS

Despite decaying infrastructure and budget pressures, US city water utilities have mostly delivered on their promise of healthy water.

With the unfolding horror of Flint's water crisis, filling a glass of tap water suddenly feels risky.

Throughout history, water quality has been a challenge—cholera, dysentery, and other diseases have felled great cities. Today, more than a billion people remain without safe water access around the world.[1]

Throughout history, water quality has been a challenge.
And yet, internationally, water is now recognised as a human right, and how to manage it equitably and sustainably is highlighted in climate change agreements as well as the United Nations Sustainable Development Goals. Climate change and energy conservation imperatives are driving changes. As cities learn to protect source water, capture rainwater, recycle grey water, involve the public and establish watershed committees, creativity in urban water management is taking off.

In the end, though, water consumers want results—clean water gushing from their faucet. They wonder: Is my city a leader or a hazard to my health?

Flint can be looked at two ways. It may be an exception, a story of a callous governor making cost-saving decisions at the expense of Flint's mostly black and brown children. Or it could signal the beginning of a systemic breakdown within the more than 50,000 water utilities in the United States.

[1] http://www.who.int/water_sanitation_health/mdg1/en/

So far, despite decaying infrastructure and budget pressures, water utilities have delivered on their promise of healthy water. Many cities have taken positive steps to avoid what has happened in Flint.

Flint is preceded by plenty of disasters, most the result of bad management decisions, that have eroded public confidence and prompted utility action. In 2014, algae blooms, fed by heavy nitrate use, ruined the water supply in Toledo, Ohio. A dramatic chemical spill in Charleston, West Virginia, left that city's water undrinkable. These calamities are free advertising for the United States' $13 billion bottled water market.[2]

But before giving up on public water, there's evidence to consider. As tragic as the news is out of Flint, said American Water Works Association Communications Director Greg Kail, almost all of the nation's water utilities are in compliance with the Safe Water Drinking Act's Lead and Copper Rule.[3] The utilities would have to acknowledge any violations in annual Consumer Confidence Reports.[4] "In the vast majority of cases," said Kail, "water professionals discharge their duties with seriousness and protect public health. When something like Flint occurs, it strengthens their commitment."

On the heels of Flint, the Massachusetts Water Resources Authority (MWRA) and New York City's Department of Environmental Protection (DEP) circulated reassuring letters to legislators and customers describing their water quality measures. The DEP proactively distributes 1,000 test kits per year to customers to collect household-level data on lead and other contaminants. The MWRA and DEP both rely on feedback from customers, what Stephen Estes-Smargiassi, the MWRA's director of Planning and Sustainability, described as "building confidence at the retail level. We want customers to have a good feeling about their water after they interact with us." The MWRA, like many water utilities, tracks and publishes water quality data on its website, and has a water quality hot-line with a public health professional to respond to inquiries. In Flint, the switch to a new water source was not disclosed, and customer complaints were routinely ignored.[5]

In-house and regulatory safeguards shouldn't stop alert water citizens from making a nuisance of themselves at City Hall, but in the vast majority of cases, public urban water meets EPA standards. While the American Society of Civil Engineers' Report Card for America's Infrastructure[6] gives the nation's drinking-water infrastructure a "D" grade—raising red flags about the $3.2 trillion the United States

[2] http://www.bottledwater.org/economics/bottled-water-market
[3] http://www.epa.gov/dwreginfo/lead-and-copper-rule
[4] http://ofmpub.epa.gov/apex/safewater/f?p=136:102
[5] http://www.thenation.com/article/in-flint-michigan-overpriced-water-is-causing-peoples-skin-to-erupt-and-hair-to-fall-out/
[6] http://www.infrastructurereportcard.org/

needs by 2020 to upgrade water infrastructure nationwide—the report also says that "outbreaks of disease attributable to drinking water are rare." While that is not a ringing endorsement, healthy water advocates can point their public officials to smart cities that manage their water well, investing in transparent governance, "grey infrastructure"—piping and treatment—and "green infrastructure"[7]—rehabilitating ecosystems to ensure water quality and quantity.

New York City's water system[8] is emblematic of this trend, frequently featured at water-management conferences around the world. Its innovative planning began in the 1800s with gravity-fed pipes carrying pristine water to the city from the Catskill and Delaware watersheds. In the 1980s, facing contamination from industrial agriculture and encroaching suburbanisation, rather than build a $6 billion treatment plant, the water utility pioneered urban-rural collaboration in what came to be known as "payments for environmental services." In return for healthy drinking water, the city transferred cash to rural areas to improve animal-waste management on farms and sanitation in towns.

Although New York City likes to claim title to the "champagne" of drinking water,[9] in 2014 it was edged out by Boston in the American Water Works Annual Tap Water Taste Test.[10] Similar to New York City, Boston keeps water clean at its source. Whereas New York primarily forges land-use agreements with private landowners, Boston concentrates on protecting public lands in collaboration with state agencies. Conserving the forest around the Quabbin and Wachusetts reservoirs means that, to achieve Environmental Protection Agency (EPA) standards, Boston water requires only minimal treatment.[11]

The city's good tasting water isn't just an aesthetic bonus: It means that when water smells bad or is discolored, customers call the utility to complain.

Upstream and downstream, watersheds are home to competing economic interests, many of which can compromise water quality. Governments have used both carrots and sticks to ensure responsible water and land use that yield clean water. After stirring a hornet's nest of angry farmers with strict regulation enforcement, New York's water utility switched tactics and offered direct aid to farmers who voluntarily engaged in watershed-friendly farming.

A similar challenge emerged in the Midwest. Iowa's $30 billion grain trade is fattened by a multimillion-dollar infusion of chemical fertilisers, only a portion of which actually ends up feeding corn and soy plants. Much of the rest of it is

[7] https://www.manomet.org/sites/default/files/publications_and_tools/natural_infrastructure.pdf
[8] http://www.agriculturesnetwork.org/magazines/global/wisdom-of-water/nyc-farming-for-healthy-urban-tap-water
[9] http://www.dec.ny.gov/lands/58524.html
[10] http://voices.nationalgeographic.com/2014/06/18/boston-wins-annual-tap-water-taste-contest/
[11] http://www.epa.gov/dwstandardsregulations

washed into the Raccoon River, a principal Des Moines water source. Bill Stowe, the chief executive of Des Moines Water Works, said that the state failed in its efforts to get farmers to willingly reduce nitrate runoff.[12] "It's very clear to me," Stowe said in a *New York Times* article,[13] "that traditional, industrial agriculture has no real interest in taking the steps that are necessary to radically change their operations in a way that will protect our drinking water." Treating the nitrate-filled water to potable water standards isn't cheap, so in 2015, the water utility served the farmers the bill via a lawsuit against two upstream counties. While this may sound like the makings of an urban-rural civil war, the lawsuit has set in motion an important public debate in Iowa about who ought to pay for clean water.

Self-taxing may seem unlikely today, but California voters in 2014 approved a $7.5 billion bond to repair and replace ageing and vulnerable water infrastructure.[14] Parched lawns, made more visible by Governor Jerry Brown's vocal leadership on water conservation and climate change, shook voters from complacency; water can't be taken for granted. The bond meant that water bills will likely spike, but voters put thirst before wallets. Funds will be used to, among other things, shore up water reliability, meet safe drinking-water standards, and clean up groundwater. Some $260 million will go to the State Water Pollution Control Revolving Fund's Small Community Grant Fund, run by the State Water Resources Control Board. In the Bay Area, a 2002 voter-approved bond has helped the San Francisco Public Utility Commission blend groundwater with Sierra Nevada snow melt and incentivise San Francisco builders to collect and treat water onsite, part of what Paula Kehoe, director of Water Resources at the San Francisco Public Utilities Commission, describes as "a new water paradigm.[15]"

Such a paradigm may not come without a struggle. When United Water won the contract to manage Atlanta's water system in 1999, they halved the workforce and increased rates. Brown and orange water dripping from city faucets led to boil-only alerts. Then Mayor Shirley Franklin canceled the contract in 2003 and restored municipal management of the water system.[16] Around the world, citizens are forcing re-examination of private contracts and pressuring city governments to take back control of water services. Faced with rate hikes without service improvements, communities question how returning profits to private shareholders squares with managing water for the public good. The Transnational Institute's remunicipalisation tracker reports that in the past 15 years, 235 cities in 37 countries have brought water systems under public control.

[12] http://www.sierraclub.org/iowa/des-moines-water-works-file-lawsuit
[13] http://www.nytimes.com/2015/04/19/us/conflict-over-soil-and-water-quality-puts-iowa-nice-to-a-test.html?_r=1
[14] http://time.com/3557658/california-voters-back-7-5-billion-water-bond/
[15] http://issuu.com/sustainia/docs/sustainia100_2015/148
[16] http://www.nytimes.com/2003/02/10/us/as-cities-move-to-privatize-water-atlanta-steps-back.html?pagewanted=all

Flint has moved the country like no other water crisis. When one water utility betrays the public trust, Estes-Smargiassi said, "it damages confidence everywhere." The injuries in Flint will persist well beyond its scarred children. It may be some time before families feel reassured enough to drink from their tap. And yet every day and everywhere, there are examples of committed water workers and forward-thinking city officials demonstrating that, with enough investment and public oversight, water can be managed for the public good.

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Why Water is an Endangered Vital Resource in the Maghreb

SANA SBOUAI

In the Maghreb, water-related problems vary with the changing seasons—droughts, interruptions in service, floods—and can cause many deaths. This vital resource is increasingly scarce. In addition to the dry climate and water-intensive farming, bad government management and rising aggregate consumption, the region is a hotspot for global warming. The agricultural crisis, famines and climate change are often cited among the causes of the "Arab Spring" revolts. And thus, in Algeria, Morocco and Tunisia, citizens' initiatives attempt to deal with urgent issues.

"As a child, I would often go walking in an oasis. I used to pick plums, peaches, pomegranates... But then, when the Groupe chimique tunisien and the Société des ciments de Gabès began their activities, the water table levels began to fall and this has directly affected second tier tree farming in the oases." The speaker is Amin Abdedayem, 25, who thus found himself working to preserve the environment: "An oasis is inconceivable without water, without its life's blood." In Chenini, a small oasis in southern Tunisia, this agronomist is an active member of the "Association de sauvegarde de l'oasis Chenini-Gabès (ASOC)".[1] It was founded in 1995, following the demonstrations triggered by the oasis crisis.

The civil society is resisting on every front, in the desert as well as on the coast. Take the case of the "Réseau associatif de développement durable des oasis, the RADDO", which CCFD-Terre solidaire has been financing for fifteen years and which encompasses associations in Tunisia, Algeria, Morocco and Mauritania, all working to save the oases. The ASOC is the network's central hub.

[1] https://www.facebook.com/AssociationDeSauvegardeDeLOasisDeCheniniGabesasoc/?fref=ts

Moroccan professor of geology and co-ordinator of the research team on "Geoscience and the environment" at the Moulay Ismaïl University in Meknes, Lahcen Kabirir is also the founder and president of the association "Oasis Ferkla pour l'environnement et le patrimoine (OFEP)". He explains that while the oases have always been located in a dry environment, it is the "human footprint" which has worsened the droughts.

"Between 1970 and 1985, Morocco experienced a decline in rainfall rate with a severe drought in 1983. People then began pumping underground water resources chaotically" which in his opinion was the cause of an ecological catastrophe.

"Water resources are the linchpin of the oasis system, composed of family farms which have thrived for thousands of years, because humans were concerned to preserve their natural surroundings". He deplores that this is no longer true.

Projects have been conducted by the OFEP which consists of rehabilitating two systems of "khettara" (or "qanat") in the oases, a traditional method of underground irrigation which recycles waste water and makes the oasis a self-sufficient food sources "in which the farmers take great pride," Kabiri stresses.

While the situation differs from one country to the next, water resources are dwindling in Algeria, Morocco and Tunisia as two specialists, Mohamed Taabni and Moulay-Driss El Jihad, explain. In fact a study published in 2012 shows that in all three countries, water reserves are lower than the world average of renewable water per inhabitant.[2]

Worse still, climate change causes "further strain on regional water resources" with a decline in rainfall rates that could be as high as 10 % by 2020 according to a report issued in July 2013 by the Institut français des relations internationales.[3]

Causes of water scarcity

According to the UN Food and Agriculture Organisation, water withdrawals for farming purposes represent 90 % of the overall consumption in Morocco (2010), 80 % in Tunisia (2011) and 59 % in Algeria (2012).[4]

How did this come about? For Larbi Bouguerra, a former professor at the Science faculty in Tunis who studied water issues for twenty-five years and published five books on the subject, the major cause of the water shortage is the population's lack of information: "People, especially in cities, have lost a sense of what we

[2] https://com.revues.org/6718
[3] https://www.ifri.org/fr/publications/enotes/notes-de-lifri/leau-maghreb-contraintes-defis-perspectives
[4] Data for a given year were not published so that a direct comparison was impossible.

Illustration against water cuts. Tunisian Water Observatory.

are: Mediterranean countries, characterised by erratic rainfall rates."

And yet the knowledge and competences required for water management once existed in these countries and today's situation could be quite different. Both Tunisia and Morocco boasted excellent hydro-technicians, but their competence proved no match for the Ben Ali system in Tunisia and the wave of privatisation in Morocco, as Bouguerra explains. Hence, teaching people to respect this vital resource is of primary importance.

Indeed, among the various citizens' initiatives surfacing in the region, "La dynamique autour de l'eau en Tunisie"[5] focuses on education. Last September, this grouping of citizens' associations and administrative bodies whose brief is to think about the future of the Tunisian aquatic ecosystem, held a conference in Tunis.

Web applications to increase the awareness of the young

"La Dynamique is mainly aimed at mobilising youth", says Hatem Marrakachi, a computer engineer and active member of the association. "We work a lot with schools, in particular those which have no access to water", he continues. "The objective of our first visit is to evaluate the situation with regard to water access and then we return with a hydraulics expert." Next comes the matter of getting the necessary work done with the participation of locals, while at the same time educating the children.

To achieve this, a digital ecosystem has been developed with downloadable web applications. Through "SOS Eau"[6] citizens can report distribution failures and through "Tunisian Water Resources" these can be measured. "Waterbank" is a system of solidarity between Tunisians facilitating the transfer of water to those who have none. And "3edmenaa"[7] is an application for children enabling them to measure the water consumption in their home. It offers a novel, playful approach to the issue of water waste, primarily aimed at raising awareness of the young. Finally, "Chajra"[8] urges citizens to plant trees.

Along the same lines, the association Nomad08,[9] a partner of the CCFD-Terre solidaire, has created a water observatory, "Watch Water".[10] Last summer the

[5] http://dynamiqueeau.net/
[6] http://soseau.net/reports/view/6
[7] http://3edmenaa.net/
[8] http://www.chajra.net/
[9] http://www.nomad08.org/
[10] http://www.watchwater.tn/

association spoke out on behalf of the protestors, thus representing other associations active in the field.

A political approach

While citizens are certainly mobilised at the grass roots level, no major changes can take place without governmental action and industrial accountability. Indeed, sea pollution is one serious consequence of industrial activity, especially in Tunisia. In 2013, The Tunisian Forum for Economic and Social Rights (FTDES), a partner of CCFD-Terre solidaire, issued a report on the ecological situation at Monastir Bay.[11] It shows that the maritime pollution is due to two water treatment plants solicited far beyond their capacity and rejecting untreated water into the sea as well as to textile factories that also reject their waste water untreated. According to the FTDES, the region is now a "maritime cemetery".

Hamza Hamouchene, an Algerian specialist in environmental and climate justice based in London goes so far as to lay the blame on a political logic, an extractivist model of development inherent in "neo-colonial mechanisms of plunder, dependency and appropriation."

At the World Social Forum (WSF) 2016, he denounced extractivism, those activities which remove huge quantities of unprocessed or barely processed natural resources. Extractivism is not confined to minerals or petroleum. It also has its counterpart in agriculture, forestry, fishing and even the tourist industry, all of which make intensive use of water. Hamouchene also cited the case of an Algerian city, In Salah, site of one of the continent's richest gas deposits but where the infrastructure is underdeveloped, creating a gap between the wealth the town produces and what it receives. The city is at the centre of the struggle against shale gas exploration which the Algerian government wishes to undertake with the backing of France.[12]

Struggles that are spreading

In 2015, a revolt began to erupt in this region and since then it has spread. The inhabitants of In Salah have risen up against this fracking project: an Albian aquifer, a portion of which lies beneath the Sahara Desert, is the world's largest reserve of fresh water, and the pollution generated by the prospecting activities would endanger it directly.

Action is needed quickly: the population's food supply hinges on the water issue, with possible serious consequences for the stability of the country.

[11] http://ftdes.net/2013/05/le-desastre-ecologique-de-la-baie-de-monastir/
[12] http://orientxxi.info/magazine/le-gaz-de-schiste-enflamme-le-sud-de-l-algerie,0840

Also in 2015, for several weeks, the people of Tangiers demonstrated against Veolia, a French company that has been in charge of the city's water authority.[13]

The report published by the Institut français des Relations Internationales (IFRI) even establishes a link between water shortages, food security and the Arab Spring, the hydraulic crisis having had an impact on the food self-sufficiency of the most disadvantaged populations. The issue of water is therefore crucial in the Maghreb and the coming crisis will have broad implications.

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[13] http://multinationales.org/Revolte-des-bougies-manifestations-massives-contre-Veolia-a-Tanger-et-dans-le

Dam Removal in the United States: An Opportunity for Different Water Users to Come to an Agreement?

OLIVIER PETITJEAN

In the United States, certain projects to remove dams provide an opportunity for dialogue between various water users and stakeholders with the goal of reaching an agreement acceptable to all. A very concrete way of establishing participative water management at the catchment area level.

New dam-building projects, whether for electricity production or reservoirs of irrigation or drinking water, often give rise to conflicts and controversies. Throughout the world we see social conflict, violence, and the killing of activists in the wake of dam projects, in Latin America, Asia, and Africa … and even, recently, in France, with the Sivens dam project.

Even after their construction, far from becoming a "fait accompli", dams may continue to catalyse opposition. This is particularly the case when it comes to removing existing dams. Like most other infrastructure, dams have a limited lifespan and may cease to be useful for a number of reasons, such as sediment accumulation over time, which may make water unusable or reduce hydroelectric production capacity. Removal operations may also aim at ecological objectives (particularly the restoration of fish populations, for example by recovering access to upstream spawning areas for salmon), or, in certain cases, by dismantling a deteriorating facility that would be dangerous during earthquakes. Over 4,000 United States dams have been identified as at risk of collapse. The cost of removing dams entirely is often lower than renovating them and adding fish ladders.

KATE BENKERT (USFWS) / FLICKR (CC BY - NC)

In France, and Europe in general, the implementation of the framework water directive involves "restoration of ecological continuity in watercourses". In many cases, it has been determined that the removal of dozens of small dams or other hydraulic facilities on European rivers – in most cases, of little or no utility – was the most efficient and cheapest way of reaching ecological quality objectives for watercourses.

Remove a Dam, Revive Conflicts?

One might think that projects to get rid of existing dams and their associated economic uses (generation of electricity, water availability for irrigation) would invariably be controversial, pitting ecologists and indigenous populations against agricultural and/or energy businesses. In fact, this is not always true. Removing dams and reservoirs may, on the contrary, provide opportunities to bring all water users from a given catchment area together around a table to reach a mutually acceptable understanding. This is certainly easier when the dams in question are outdated, dangerous, or clogged with sediment, reducing their value and economic interest.

For decades, integrated management for each catchment area, bringing together all users and stakeholders, has been presented as the alpha and omega of good water resource management. The decision to remove dams – precisely because it often involves a radical (re)transformation of the hydrological system and dynamics of an entire catchment area – is an opportunity to put these principles in practice.

In the United States, in certain cases, projects to remove dams and restore watercourses are implemented as part of agreements – achieved with difficulty – between public authorities, environmentalist associations and private foundations, economic actors, and Indian tribes. The recognition of these tribes' historic rights – particularly the restoration of their traditional salmon or other fisheries – often underlies these projects. These dynamics are variously illustrated in three dam-removal projects: Elwha (Washington), Klamath (California), and Penobscot (Maine).

Elwha Dams, Emblems of Successful Removal?

The removal of two dams on the Elwha River in the state of Washington constitutes the largest dam-dismantling operation in American history. Begun in 2011 and completed in 2014, the project is widely considered a success, its ecological benefits quickly demonstrated by the return of salmon and native plant species, as well as restoration of beaches at the river mouth thanks to redistributed sediment.

The Elwha is a river, only 70 kilometres long, running from the Olympia Mountains down to the Strait of Juan de Fuca through the Olympic National Park near the Canadian border. It was one of the few watercourses hosting the five known species of Pacific salmon. The two structures removed were the Elwha Dam, built only eight kilometres from the river mouth in 1913, and, more importantly, the Glines Canyon Dam, built a few kilometres farther upstream in 1927.

The removals originated in the recognition of the rights of indigenous tribes of the Pacific Northwest. A decision of the US Supreme Court in the late 1970s recognised their rights to their fisheries – guaranteed by a treaty signed with the United States in the early 19th century. On the basis of this victory, the Klallam tribes began to demand removal of the two dams, whose usefulness was no longer clear. They met fierce opposition; the removal plan was not validated until the early 2000s.

In terms of restoring salmon populations, the removal of the Elwha dams has fulfilled its promise: only a few months after removal, the five salmon species had returned to the upper reaches of the river. The redeposit of sediment at the river mouth allowed for reconstitution of the habitats of the molluscs and crustaceans that were part of the traditional tribal diet.

Klamath: A Hotly Contested Removal

By contrast with the relatively consensual removal of the Elwha dams, the case of Klamath, in northern California and southern Oregon, seems much more politically charged, particularly given the presence of more significant agricultural

interests. A first agreement for removal was signed by almost all stakeholders (dam owners, local and federal authorities and agencies, tribes, economic and environmental interests) in 2010, but it was blocked by the Republic majority in Congress for largely ideological reasons.

A new agreement was drawn up, requiring no federal funding and thus no formal vote in Congress. It was officially signed in April 2016 in the presence of all stakeholders, including representatives of the Obama administration's Departments of the Interior and Commerce. People worried, but it seems that the agreement will not be contested by the Trump administration. The company that now owns the four dams in question, PacifiCorp, agreed to transfer its exploitation license to a new, ad hoc private firm, the Klamath River Renewal Corporation, which will be responsible for removing them by 2020. The dams are no longer economically viable as they are and the work necessary to bring them up to standard would be prohibitively expensive.

In parallel, a second agreement was signed, the Klamath Power and Facilities Agreement (KPFA), according to which all stakeholders agree to collaborate to reach the general objectives of environmental restoration of the river, the return of salmon populations, and the maintenance of agricultural irrigation, with the support of the administrations of the two states involved as well as the federal government.

The Secretary of the Interior, Sally Jewell, declared on the occasion of the signature of the 2016 agreement:

"This is an important first step towards developing a multi-faceted approach to restoration and long-term sustainability for tribes, fisheries, and agricultural and residential users throughout the Klamath Basin." The same note was struck by the spokesperson of the Karuk tribe, one of the Indian tribes involved: "We think that taking care of the Klamath River is the responsibility of all who live in its basin. We cannot restore our fisheries without working with our farmer and rancher neighbours, and they cannot ensure the water supply for their land without collaborating with us."

On the Penobscot, a "Win-Win" Removal Agreement

Our last example comes from the east coast of the United States: the Penobscot River, in Maine. In this case, thinking on the scale of the entire catchment area allowed the situation to be unblocked and to conquer the potential reluctance of economic actors. In the 2000s, for the first time, all the dams in the river basin, some of them over 100 years old, fell under the control of a single company. In 2005 that company negotiated a comprehensive agreement with the Indian Penobscot Nation, the agencies of the state and federal governments, and ecological organisations.

The project allowed the ecological continuity of the watercourse to be restored, bringing back a population of Atlantic salmon that had almost disappeared, while maintaining an unchanged level of hydroelectric power thanks to the removal of certain dams that were blocking the river and the upgrading of others, with the addition of fish ladders.

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Water, as an issue, has many aspects. First, there are the hundreds of millions of men and women who lack reliable access to water and sanitation, despite decades of international programmes. There are also the increasingly dramatic episodes of drought or flooding, related to climate change but also to the deterioration of ecosystems. There are the multiple forms of commercial appropriation of water, such as the privatisation of urban services, the bottled-water industry, or the volume of water used in industrial farming for export. There are controversial infrastructure projects, such as large-scale dams. Finally, there is the question of who controls water resources, involving conflict between social groups and entire nations.

Building on work accomplished since 2009, this issue of the Passerelle collection sums up major water-related issues in a context of apparently contradictory imperatives: on the one hand, to preserve the planet's fragile equilibrium and contain global warming; on the other, ensuring adequate sustenance and a life worthy of the name for the world's population. In reality, as the articles collected here amply demonstrate, this contradiction exists only in the framework of the particular development models currently prevalent throughout the world. Restoring or creating a new culture and a new management for water (and, indissociably, the earth itself) could, conversely, allow us to meet ecological imperatives while at the same time ensuring a "good life", in big cities as well as rural regions, in the north and the south, throughout our planet.

This Passerelle has three foci: the rediscovery of and respect for the close interactions between water, earth, and climate; the emerging demand for a right to water as a way of addressing the wider issues associated with this resource; and, finally, encompassing the previous points, reinventing the management of water as a common good, at once local and global.

Ritimo, the Publisher

The organisation Ritimo is in charge of Coredem and of publishing the Passerelle Collection.
Ritimo is a network for information and documentation on international solidarity and sustainable development. In 90 locations throughout France, Ritimo opens public information centres on global issues, organises civil society campaigns and develops awareness-raising and training sessions. Ritimo is actively involved in the production and dissemination of plural and critical information, by means of its website: www.ritimo.org

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