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Jean Jouzel

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ABSTRACT

In this article we provide an analytical framework for a collective effort that we label “the well-being transition” away from growth and GDP towards human well-being and offer some insights as to what is needed to accelerate this dynamic, insisting on the need for a new positive narrative and institutional reforms. We first present the achievements and challenges of the well-being transition first by outlining why and how we can go beyond growth and GDP not just to see the world differently but to change it. We then spell out a possible narrative able to engage citizens and transform these new visions into social realities, linking sustainability and justice in a social-ecological approach of 21st century challenges. We finally propose specific institutional reforms to ground the well-being transition in public policy.

KEY WORDS

Well-being, sustainability, growth, GDP.

JEL

I31, I32

The Well-being Transition: Measuring what counts to protect what matters

Introduction: following our new compasses

In the Paris Agreement, the first universal treaty on climate change agreed upon after the COP 21 in December 2015 and ratified to date by 175 countries, there are only two numbers and none have to do with national income or economic growth¹. Both can be found in Article 2 of the text that spells out the fundamental consensus among parties: “Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels”. These numbers are not just scientific data but policy indicators, the new compasses to the 21st century: they represent a physical limit of the Biosphere and they are *de facto* conditioning economic policy for countries that have collectively and individually agreed to the text, including their growth strategy. The underlying new reality put forward in Article 2 of the Paris Agreement is that in a world warmer by 3 degrees, a Gross Domestic Product (GDP) larger by 3% is of little importance, if any.

Yet two key features are missing from the Paris Agreement. The first one is a robust institutional framework linking targets/objectives to adequate policy instruments so that new visions of the world can translate into effective change. The second missing feature is a compelling narrative explaining why countries should now pursue a 1.5 to 2 degrees world so as to engage citizens and ensure the viability of what was agreed upon States.

As such, the Paris Agreement is a testimony of what has been achieved and what remains to be done in the course of what we call here the *well-being transition*: a refocusing of global, national and local policy on human well-being under a severe and increasing ecological constraint.

Why is a well-being transition needed? Because the 21st century challenges cannot be understood let alone addressed with 20th policy indicators such as growth of Gross Domestic Product (GDP) conceived in the mid-1930s. To put it differently, while policymakers govern with numbers and data, they are as well governed by them. These data thus should be relevant and accurate. Such is no longer the case of GDP. Consider the crisis of inequality (the growing gap between the haves and the have-nots) and the crisis of the Biosphere (the alarming degradation of climate, ecosystems, and biodiversity that threatens human well-

¹ Economic growth is the increase of Gross Domestic Product at constant prices (i.e. in volume). Gross domestic product can be defined as a composite indicator measuring only marketable and monetized economic activity. It was first developed in 1934 by Simon Kuznets at the demand of the US Congress, whose members wanted to have a clear and synthetic view of what had happened to the American economy after the 1929 stock market crash.

being). Neither can be analyzed or mitigated with growth (of GDP) simply because GDP was not designed to assess either. As a result, focusing on growth leads to analytical and policy mistakes: policy-makers neglect equality and distributional issues, confusing growth with social progress, and degrade ecosystems for short-term economic gains, harming human well-being while believing to improve it. Policy ends up divorcing from citizens' aspirations and scientific knowledge. But there is nothing inevitable about this: we can change what we measure to reform what we manage and put human well-being back at the center of policy at all levels of governance.

What is well-being?² Its stems from an eternal question: what are the real drivers of human development and success beside material conditions? Exploring human well-being means articulating a multidimensional vision of human welfare casually referred to as "quality of life." Human well-being can be assessed at different geographic scales, objectively (via measures of health status or educational attainments), subjectively (through the assessment of happiness or trust), but it is in all cases a static metric that tells us nothing about its evolution over time.

For a dynamic approach that sheds light not only on the current state of well-being but also on its future, one has to turn to the concepts of resilience and sustainability. The questions asked by citizens and policy makers then become substantially more complex: "Can we project our well-being over time?" Resilience is a first step in this direction, as it tries to determine if well-being can resist and survive shocks. More precisely, it assesses the ability of a community, a territory, a nation, or the whole planet to cope with economic, social or environmental shocks and their capacity to return afterward to their pre-shock level of well-being without seeing it degraded or destroyed. One typical, pressing resilience issue is how human communities around the world can adapt to climate change.

The measurement of sustainability is even more ambitious, in that it seeks to evaluate well-being in the long run, both after the occurrence of shocks and during normal times. Attempting to assess sustainability is about trying to understand how well-being reserves can be maintained or even increased over time, for instance how services freely provided by ecosystems can continue benefiting future generations. (Consider, for example, pollination, on which 75 percent of the world's crops at least partially depend.) From this perspective, resilience can be understood as the short-run horizon of sustainability: resilience is concerned with shocks and sustainability with stocks.

The meaning of the well-being transition is thus the following: instead of growth, policymakers should be concerned with the advancement of well-being (human flourishing), resilience (resisting shocks) and sustainability (caring about future well-being by preserving the Biosphere). It implies for instance that the current global recovery, measured by the increase of GDP in many parts of the world, does not matter that much. The return of

² See Laurent (2018).

growth will not result in prosperity for people or sustainability for societies because it was not designed to achieve either goal. In our time, regardless of its current or future level and the enthusiasm that greet them, growth is indeed outdated as a collective horizon and it is a broken compass for policy.

This paper explores the achievements and challenges of the well-being transition first by outlining why and how we can go beyond growth and GDP not just to see the world differently but to change it. We then spell out a possible common narrative able to engage citizens and transform these new visions into social realities. Finally, we propose specific institutional reforms to ground the well-being transition in public policy.

1. Mapping, measuring and governing well-being

Conceived in the mid-1930s by Harvard development economist Simon Kuznets to take stock of the Great Depression and improved by a team of British economists around John Maynard Keynes in the midst of the war effort, GDP was crowned king of all economic data at the Bretton Woods conference in July 1944, when Western nations embraced it as their common currency of power and success. From then on, to be “developed” meant to have developed its GDP. It took three decades for the “beyond GDP” to emerge. In a series of papers published between 1972 and 1973, economists William Nordhaus and James Tobin suggested that “growth”(understood narrowly as the increase of GDP) had become “obsolete” and attempted for the first time to offer not just an ethical or theoretical alternative to growth, but an empirical one (Nordhaus and Tobin, 1973)³.

This research and policy making agenda has greatly expanded since then (see Gadrey and Jany-Catrice, 2006), and gained momentum in the last decade, starting with the organization of the “Beyond GDP” conference under the auspices of the European Union in December 2007, aimed at taking stock of existing alternative indicators to GDP⁴. Today, dozens of well-being indicators (i.e. well-being, resilience and sustainability indicators) are being produced and updated each year⁵. But what exactly do they measure? How to map this burgeoning field? A possible analytical and visualization framework is offered at Figure 1 (the table attached to Figure 1 gives for each dimension of well-being an example of existing indicator)⁶.

This representation is organized to mirror a gradual understanding of the complexity of human well-being, from core economic well-being to the frontiers of sustainability analysis.

³ Interestingly, Nordhaus stuck to conventional economic indicators and GDP when attempting to model economic impacts of climate change.

⁴ Proceedings of this conference can be found here: http://ec.europa.eu/environment/beyond_gdp/2007_conference_en.html

⁵ A good place to keep track of this production is the news section of the Beyond GDP blog maintained by the European Union: http://ec.europa.eu/environment/beyond_gdp/news_en.html as well as the Wikiprogress website <http://wikiprogress.org/>

⁶ See Laurent (2018).

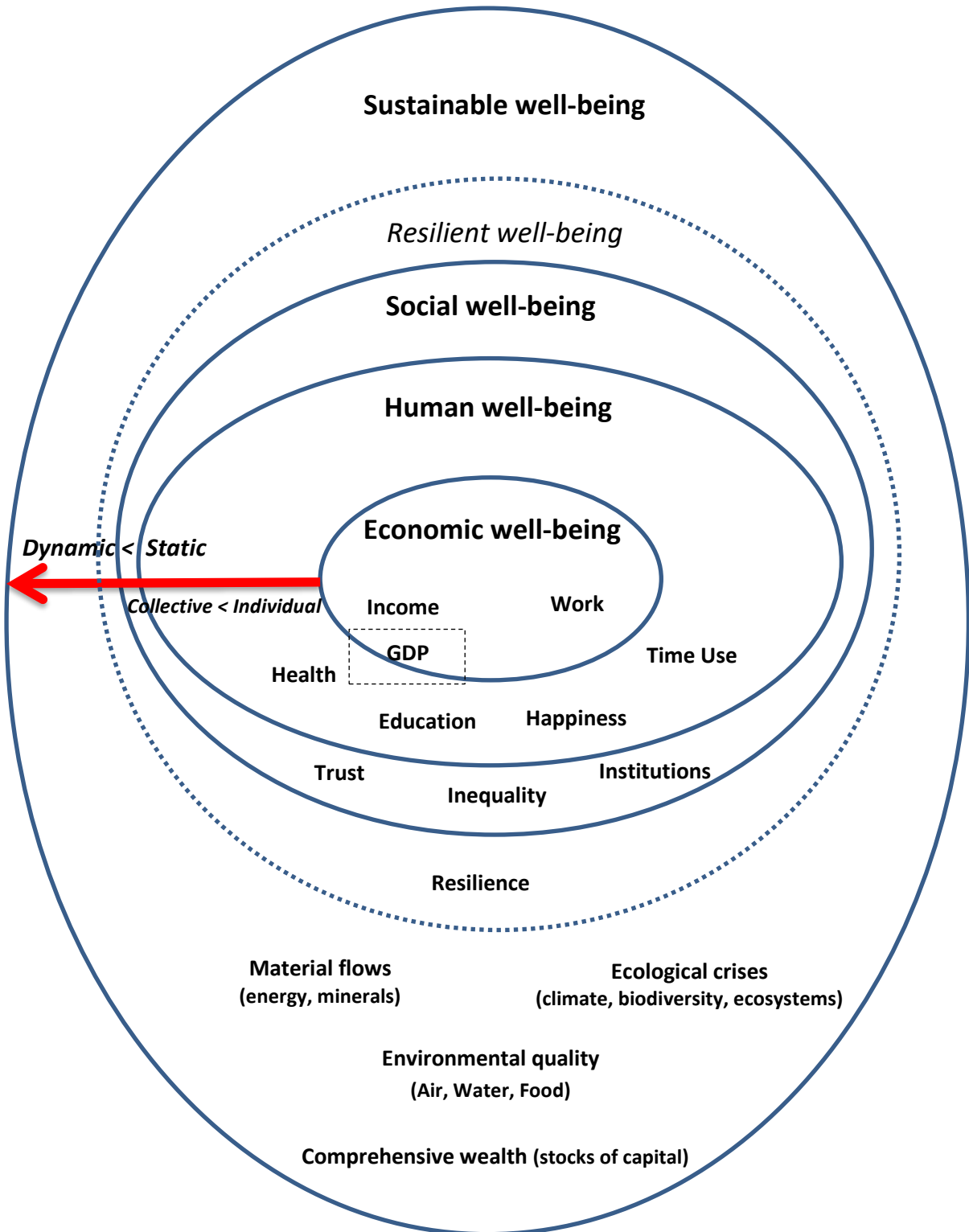
This figure reflects the belief that we need to move “beyond GDP” not so much by building a single alternative composite indicator (replacing GDP with a counter-GDP) but by relying on policy area specific indicators that form the building blocks of well-being and sustainability. In other words, we should not so much be looking for what Costanza et al (2014) have called “the successor of GDP” than for its alternatives. This pluralistic approach appears to be the best way to desacralize GDP not just in terms of substance but also form.

In this overall picture, GDP appears small. Indeed, it captures only a tiny fraction of what goes on and matters in our complex societies: it tracks some but not all of economic well-being (saying nothing about fundamental issues such as income inequality); it does not account for most dimensions of well-being⁷ (think about the importance of health, education or happiness for quality of life); and it says exactly nothing about “sustainability”, which basically means well-being not just today but also tomorrow (imagine the quality of human life on a planet where the temperature would be four degrees higher or where there would be scant drinkable water or breathable air).

⁷ While GDP partially measures some human development dimensions (such as public services like health and education), it does so based on their supply cost and not their outcomes or the actual benefits they provide citizens such as health status or educational attainments.

Figure 1. Mapping and measuring well-being, resilience and sustainability

Source: Laurent, 2018



DIMENSION OF WELL-BEING	INDICATOR	SOURCE
Income	Household income	For the US: BLS For the EU: Eurostat For the OECD: OECD For the ROW: national sources
Work	Employment rate	For the US: BLS For the EU: Eurostat For the OECD: OECD For the ROW: national sources
Health	Life expectancy	WHO
Education	Skills and knowledge of 15-year-old students	Program for International Student Assessment (PISA), OECD
Happiness	Life satisfaction	World Happiness Report 2018
Time Use	Time use survey (amount of time people spend doing various activities)	For the US: BLS For France: INSEE For the ROW: national sources
Trust	Trust in people and institutions	World Values Survey.
Inequality (income and wealth)	Percentiles share of national income and wealth	World Inequality Database.
Institutions	Quality of governance	Governance Matters Database, World Bank.
Resilience	Resilience index	Hallegatte, Stephane; Vogt-Schilb, Adrien; Bangalore, Mook; Rozenberg, Julie. 2017. <i>Unbreakable : Building the Resilience of the Poor in the Face of Natural Disasters</i> . Climate Change and Development, Washington, DC: World Bank.
Material flows	Material footprint	Thomas O. Wiedmann, Heinz Schandl, Manfred Lenzen, Daniel Moran, Sangwon Suh, James West, Keiichiro Kanemoto, "The material footprint of nations", <i>Proceedings of the National Academy of Sciences</i> May 2015, 112 (20) 6271-6276.
Ecological crises (climate, biodiversity, ecosystems)	Climate change, biodiversity and ecosystems data	IPCC and IPBES reports and assessments.
Environmental quality	Environmental health and ecosystem vitality	2018 Environmental Performance Index (EPI).
Comprehensive wealth	Comprehensive wealth	<i>The Changing Wealth of Nations 2018</i> , World Bank.

Figure 1 has two essential meanings. First, well-being dimensions are cumulative: we can choose to look at (and take care of) only economic well-being or capture human well-being and social well-being as well (in this latter case, it means embracing not just an individual approach to well-being but a collective one also, for instance by measuring the quality of our institutions such as the judiciary system or the Parliament). Then we can choose to enlarge further our concern and add a time component to our analysis by trying to measure if our interactions with the biosphere can be sustained tomorrow and the day after without damaging our well-being. By doing so, we move from a static approach of well-being to a dynamic one. But why should we care about the quality of education, the reduction of inequality or the depletion of trust if indicators related to ecological crises reveal to us that we are on the verge of a near collapse of the biosphere? What's the point of rejigging education systems to achieve more equality if whole human habitats will disintegrate within a few decades?

This is where the second meaning of this framework comes in. It represents an attempt at linking together well-being, resilience and sustainability to understand their synergies. Well-being without sustainability (and resilience understood as short-term sustainability) is just an illusion. The climate crisis has the potential to destroy the unprecedented contemporary progress in human health in a mere few decades. If China's ecosystems collapse under the weight of hyper-growth with no unpolluted water left to drink and nor clean air to breathe, the hundreds of millions of people that have escaped poverty since the 1980s in the country will be thrown back into it. In figure 1, if the outer circles collapse then the inner ones will follow suit while the opposite is not true. But sustainability without well-being is just an ideal. Human behaviors and attitudes will not become more sustainable to "save the planet" but to preserve human well-being. What is more, as argued convincingly by the late Elinor Ostrom (Ostrom, 2010), social cooperation is the key to sustainable practices and social cooperation depends critically on education, equality, trust and good institutions (which are to be found in Figure 1 inner circles). Comprehensive wealth, the ultimate metric representing sustainable well-being, means both that well-being is approached in a multi-dimensional way and tracked through time in a dynamic manner.

Mapping well-being indicators is a first necessary step that leads to two questions: do these metrics help us see the world differently (What is their analytical value added)? Can they help us change it? (What is their performative power?).

To attempt to answer the first question, let's consider health. Simple metrics such as life expectancy or mortality rates tell a whole different story about what has happened in a given country in the last thirty years than economic growth. Consider the United States. The recent discovery by economists Angus Deaton and Anne Case of very high mortality rates among middle-aged whites in the U.S. (Case and Deaton, 2015), all the while GDP was growing, is proof that health status must be studied and measured regardless of a nation's perceived wealth status.

Indeed, the standing of the US with respect to economic prosperity can be questioned more deeply using well-being indicators, for instance inequality and trust in institutions. Recent data show that income inequality is higher today than it was during the Gilded Age, relentlessly fracturing the American society and blocking social mobility and that the level of trust in Congress has been divided by three and half since the mid-1970s with political polarization at an all-time high all the while Growth domestic product per capita roughly doubled⁸.

Another example is China, which has seen its per capita income grow exponentially since the early 1990s, while happiness levels have either stagnated or dropped (depending on the survey) only to increase again in recent years when growth was much lower⁹. Looking at China only through the lens of GDP growth obscures key aspects of the actual lives of people.

Paying attention to well-being rather than just growth can also help us understand the importance of social well-being and more specifically the human aspiration for civil rights and political liberties. This aspiration explains why the Arab Spring erupted in Tunisia in 2011, a country where GDP growth was strong and steady but where civil liberties and political rights clearly deteriorated before the revolution. Finally, considering environmental quality helps assess accurately the true quality of life: in beautiful and opulent cities like Paris, air pollution (especially particulate matters) has reached life threatening levels clouding the future of tens of thousands of resident children.

Measuring well-being simply change the way we see the world. But alternative indicators should also be performative: they should inform and reform policy. Measuring, indeed, is governing and well-being indicators have already started to deliver progress.

It is now a scientific fact that smoking deteriorates health and thus human well-being. WHO estimates that tobacco use is causing the death of 7 million people each year (tobacco roughly kills half of its users). But the WHO also estimates that countries that have implemented tobacco control policies, including taxation, graphic pack warnings and no smoking areas, have greatly reduced consumption. Only two decades ago, 36% of young Americans were smoking, they are only 10% now (in the OECD, daily smokers represented around 40% of the population aged 15+ in the early 1980s, this figure has plummeted to around 15% today). If this transition has actually happened, it was thanks to the design and dissemination of metrics highlighting not only the prevalence of smoking but the causal link between smoking and illnesses and the collective cost of these illnesses. Then policy instruments were carefully conceived and resolutely implemented. And all along, powerful lobbies with considerable economic interests at risk have been fought and eventually overcome. Smoking is still a serious health problem in countries where no political will exist

⁸ See World Inequality Database and Gallup.

⁹ Helliwell, Layard and Sachs (2017).

to address it, but in countries that opted for action based on data-driven science, human well-being has been improved. Looking at the past 25 years, GBD (2017) note that: “The scale-up of tobacco control... is a major public health success story”.

Of course, mitigating climate change is a global sustainable well-being problem. But the challenges of time and space were also standing in the way of ozone layer depletion substances control and they have been overcome.

The Montreal Protocol on Substances that Deplete the Ozone Layer, signed by only 24 countries and the European Economic Community in September 1987, became the first universal treaty (with 196 parties) in September 2009. It is based on undisputable science (i.e. ground and satellite data demonstrating the ozone layer depletion), grounded in efficient governance (assigning quantitative and transparent targets for developed and developing countries alike) and realistic economics (taking into account national production and imports and exports but also allowing for financial transfers between parties and revision of targets according to science and achievements). The result has been the elimination of 97% of Ozone depleting substances (ODS), the gradual reconstruction of the ozone layer and the prevention of hundreds of millions of cancer cases around the globe.

These two examples show how well-being metrics can become new visions informing and changing policy while overcoming powerful economic interests that contribute positively to GDP and growth (tobacco control and ODS control both end up decreasing GDP at least in the short run). For a comprehensive well-being transition to take place, what is needed is thus the design of metrics of input (drivers) and outcomes (results), relying on an analytical framework establishing causal links between the two and using policy instruments able to change behaviors and attitudes so that drivers are altered and outcomes improved. Despite its complexity, there is no reason why climate change, a scientifically proven ecological crisis with identified causal indicators and considerable health consequences, cannot be addressed with powerful regulation instruments (including pricing carbon) in order to be mitigated. Such transition is technically feasible and there is no reason other than policymakers (mis)giving the priority to other policy indicators, such as growth of GDP. As a matter of fact, a considerable literature now exists¹⁰ on how to translate carbon metrics into carbon policy through pricing taking into account effectiveness as well as equity (see Boyce, 2018).

Actually, the well-being transition is already under way: examples abound of regions, nations and cities changing their policy by adopting new well-being metrics, from the European Union to the UK and Australian governments to the province of British Columbia or the city of Santa Monica. China itself, while still an emerging country lagging behind the OECD group in terms of standards of living, is now pursuing a much more balanced development strategy where economic and environmental targets are on par.

¹⁰ See for instance Laurent (2018).

But once GDP has been empirically invalidated, a fundamental challenge remains: how to get rid of the mythology of growth. Going beyond growth as a social goal does not only mean complementing and eventually replacing GDP with indicators of well-being, resilience, and sustainability that better reflect the social and ecological reality of our world. It also implies linking those three objectives in a common positive narrative and building robust institutions to sustain it in order to engage citizens in the well-being transition. Indicators of well-being need to be embedded in a new narrative that can convince individuals to change not only their behaviors (stop smoking or polluting because it has become more expensive) but also their attitudes (cut carbon emissions because they think it is wrong for themselves their children and the most vulnerable around the globe). William Cronon (1992) has argued that “what we most care about in nature is its meaning for human beings”. Indeed, one can think that current ecological crises, however severe they become, won’t be fully addressed until they make ethical and social sense to humans.

A new narrative is actually emerging: by linking justice and sustainability in a “sustainability-justice nexus”¹¹, a number of scholars argue that our societies will be more just if they are more sustainable and more sustainable if they are more just¹². In other words, in the 21st century, it makes environmental sense to mitigate our social crisis and social sense to mitigate our environmental crises.

2. An emerging narrative: the justice-sustainability nexus

While the link between justice and sustainability was at the center of the Brundtland Report (1987), scholars such as Elinor Ostrom (2010) and James Boyce (2002, 2013) have been trailblazers in attempting to link inequality and sustainability in what can be referred to as a social-ecological approach (Laurent, 2011a and 2011b).

The main goal of the social-ecological approach is to determine how social dynamics, such as inequality, cause environmental degradations and, reciprocally, how environmental conditions such as climate change impact social dynamics. In other words, the social-ecological approach considers the reciprocal relationship between social and environmental issues, demonstrating how social logics determine environmental damage and crises and exploring the reciprocal relation i.e. the consequences of these damages on social inequality. Environmental risk is certainly a collective and global horizon but humans are socially differentiated. Who is responsible for what and with what consequences for whom? Such is the main question of the social-ecological approach.

¹¹ Agyeman, Bullard and Evans (2002) have first mentioned the idea of a nexus between “sustainability, environmental justice and equity”.

¹² See for instance Laurent (2011 and 2018), Dasgupta, P., and Ramanathan, V. (2014), Motesharrei S et al. (2014) and Gough (2017).

There are two possible ways to connect the current inequality crisis with ecological crises. The first arrow of causality, which runs from inequality to environmental degradation, can be labelled “integrative social-ecology,” as it shows that the gap between the rich and the poor and the interaction of the two groups leads to the worsening of environmental degradations and ecological crises that affect every member of a given community (e.g. greater income inequality leads to a lesser adaptation capacity).

The reciprocal arrow of causality that goes from ecological crises to social injustice can be labelled “differential social-ecology,” as it shows that the social impact of ecological crises is not the same for different individuals and groups, given their socioeconomic status (the most vulnerable socially are “ecological sentinels” in the sense that they are first and foremost affected by current ecological crises).

An example of how the social-ecological approach is a useful narrative to empower indicators of well-being is the key question of climate justice. Using emissions and vulnerability metrics, Althor et al. (2016) for instance have profiled “climate free riders” as countries with emissions in the highest quintile and vulnerability in the lowest quintile, and “climate forced riders” as countries with emissions in the lowest quintile and vulnerability in the highest quintile. This typology provides a rationale as to why some countries may not act as much as they should regarding climate mitigation, imposing the cost of inaction on others.

This notion of « climate justice » which came across as a key theme during the opening of COP21 – the President of the French Republic stated that we must act in the name of climate justice – goes well beyond this useful classification of countries as free or forced riders. Climate change deeply affects populations. The risks populations will have to face are unequally distributed and are generally more significant for underprivileged communities and people at all levels of development : *people who are socially, economically, culturally, politically, institutionally, or otherwise marginalized are especially vulnerable to climate change and also to some adaptation and mitigation responses* (IPCC, 2014).

And there is no doubt that such inequalities will increase along with the amplitude of future global warming. One can cite food security and risks linked to heat stress, extreme precipitation, floods, landslides, droughts, water scarcity, sea-level rise and violent conflicts. These risks could affect people, ecosystems, goods and economies both in urban and rural areas and they are amplified for those without vital services and infrastructures or those who live in poor-quality housing or in exposed areas (IPCC, 2014). Indeed, once impacts of climate change are aggregated, the most important consequence could be this increase of inequalities between poor and marginalized populations and those populations who, can relatively easily adapt.

In this context, one can define « climate justice » as aiming to do everything possible to stop global warming from increasing these inequalities, in drawing up and articulating public policies; this should contribute to preserve, in an effective and sustainable way, the right for

an healthy environment for everyone, including the poorest, those most exposed and those more vulnerable to climate change (Jouzel and Michelot, 2016).

We are well aware of the vulnerability of certain countries and populations who hardly contribute to greenhouse gas emissions. But vulnerability also concerns developed countries in which the poor strata of populations could be the most vulnerable to climate change (IPCC, 2014). This risk of global warming to increase inequalities in developed countries has been recently analyzed for France (Jouzel and Michelot, 2016) and Europe (Lohan, 2017). Following Katrina, Mutter (2010, 2015) pointed out to the propensity of natural disasters to victimize society's poorest and most vulnerable. These poorest populations were less well prepared before Katrina and had more difficulties to leave New-Orleans during this devastating hurricane and, after it, all along the reconstruction phase. « Climate justice » is indeed part of « environmental justice » which is the key to understanding the human impact of all ecological crises¹³.

3. A transition in values and institutions

Given our analysis, what specific institutional changes and policy reforms are required for the well-being transition, which is taking place, to take hold?

The basic course of action is to make visible what matters for humans and then make it count. Un-measurability means invisibility: “what is not measured is not managed.” as the saying goes. Conversely, as we have argued, measuring is governing: indicators determine policies and actions. Measuring, done properly, can produce positive social meaning. It does not mean that everything should be monetized or marketed but understanding how what matters to humans can be accounted for is the first step to valuing and taking care of what really counts. There is no accountability without accounting.

A key distinction should be made here among quantification, monetization, and commodification (or marketization). We certainly argue for quantification of invisible value so that it is not ignored or blindly destroyed (this is the example of health in the US and happiness in China). But this quantification should not necessarily imply monetization. And this monetization, when necessary, does not lead inevitably to commodification.

¹³ The loss of biodiversity is one very illustrative example. This loss is already very important independently of climate change – specialists evoked the 6th extinction (Ceballos et al., 2017) – but it should be exacerbated in case of an emitting scenario leading to a 4 to 5°C warming at the end of the century. Maximum speeds at which species - such as trees, plants, rodents and primates - can move across landscapes will then be lower than speeds at which temperatures are then projected to move. Such exacerbation associated with important climate change also holds for many other environmental issues, food security, water scarcity, air pollution, climate refugees, soil erosion, ... These ecological crises, with their social, economic and cultural dimensions, are far from independent from one another.

Consider food labelling. If the only dimension of food resources that receives recognition is their monetary cost, the health dimension will never be reflected in production and/or consumption behavior. Appropriate labelling on the other hand (such as the one being proposed for France in the form of a “Nutri-score” ranging from A to E), will inform the consumer about important aspects of the food that manufacturers may have an interest in concealing, such as the presence of chemical additives, the total caloric value, or its salt or fat content.

Or consider ecosystems valuation. To destroy a wetland rich in biodiversity on the basis of the economic value of the housing that can be built on it is to rely on one value (the immediate economic one) against all the others that have just as much bearing on human well-being. Revealing the plural values of biodiversity or ecosystems, monetized or not, amounts in this case to protecting them from blind destruction.

In fact, the performative power of well-being indicators does not depend only on the technical quality but, much more importantly, on their embedment in public debate and the democratic process.

This can be done by integrating indicators in policy through representative democracy, regulatory democracy and participatory democracy. Applied carefully by private and public decision-makers, well-being indicators can foster genuine progress.

For instance, we should be rethinking the way we vote the budget. Even though specific evaluations of redistributive effects of public policy reforms exist in some countries such as the US, most Parliaments members around the world know very little about the true social and ecological state of their nation apart from aggregate macroeconomic indicators when they make key decisions on public finance. In an old democracy like France, the statistical information given to MPs amounts to GDP and its components. It would not be difficult to select well-being indicators in key dimensions relevant for public finance, starting with inequality, and embed those indicators in the budgetary procedure so that they are made public and discussed prior to voting. A permanent parliamentary body could even be created that could become a place of continuing deliberation on public choice impacting well-being, bringing together experts and citizens to mobilize the right indicators on the right issues in order to provide policy makers with the relevant information to make their choices. This could take place at the national level as well as the regional level (e.g. the European Union)¹⁴. As of today, as many as 23 countries in the world have put in place measures to integrate United Nations SDGs into their budgetary procedures.

¹⁴ See É. Laurent, “Toward a Well-being Europe” in Creel, Laurent and Le Cacheux, *The Euro at 20 and the Futures of Europe* (Palgrave/Mac Millan, 2018).

The second reform concerns regulatory democracy and, more precisely, the reform of economic instruments used routinely by the executive branch of governments to design public policies once laws have been adopted. Public policies today too often rely on simplistic models framed by cost-benefit analysis (CBA). CBA evaluates the efficiency (and profitability) of a project by calculating the net worth or net benefits it produces, that is, the amount of potential benefit less the costs associated with the project. The only dimensions to enter the analysis are economic flows (benefits and costs) that can be monetized. It would be much more interesting to systematically replace these methods with a multi-criteria analysis where the financial cost or benefit is not the sole reference and where intangible effects are considered alongside tangible ones—or at least to perform sensitivity tests to evaluate the impact of alternative parameters, especially social discount rates, on CBA results.

Finally, participatory democracy must strengthen these reforms of the legislative and executive branch. Democracy is not just one dimension of well-being, but also the method that must govern its definition and governance: it is at once an outcome and an input. An example of participatory method are “citizens’ conferences”, a setting that includes a panel of citizens, experts, and decision makers discussing the respective importance of different dimensions of well-being and agreeing on a common dashboard to be implemented (such method was implemented in the French region of Nord-Pas-de-Calais in 2010). It is of crucial importance to build tangible transitions at the local level, since well-being is best measured where it is actually experienced. The well-being transition is, in the words of Elinor Ostrom (2010), a “polycentric transition”: each level of government can seize this opportunity to reform policy without waiting for the impetus to come from above.

Conclusion: a new alliance

As we have showed, the well-being transition is under way. It has received international recognition in September 2015, when the United Nations embraced a “sustainable development goals” agenda in which GDP growth plays only a marginal role. In the US, scores of scholars and (some) policy makers increasingly realize the importance of paying attention to inequality rather than just growth. China’s leaders acknowledge that sustainability is a much better policy target than explosive economic expansion. Pope Francis is also a force of change when he writes in the encyclical *Laudato si*, published in June 2015: “We are faced not with two separate crises, one environmental and the other social, but rather with one complex crisis which is both social and environmental.” and urges us to abandon growth as a collective horizon. Influential newspapers and magazines such as *The Economist* and *The New York Times* recently ran articles arguing that GDP should be dropped or at least complemented. Local transitions are happening all over the planet, from Copenhagen to Baltimore, Chinese provinces to Indian states.

But we need to accelerate the change in our behaviors and attitudes so that we don't end up destroying our life support system. One promising way to make faster progress is to foster collaboration between hard and social science. Social and engineering sciences, both innovation driven, hold the key to the solution of the severe environmental problems that physics, chemistry and biology have revealed over the last three decades. It is not to say that there is currently no interaction between hard and social science. Interactions are indeed growing. For example, the contribution of social scientists – but also of philosophers, historians, jurists, demographers... - has increased since the 1990 IPCC report. In France, interactions between economic, social and environmental issues are the heart of activities of the Economic, Social and Environmental council. Numerous bodies around the world are interested in this multidimensional approach to our well-being. However, they generally focus on sharing expertise, leading to the production of reports and assessments, and not on research itself. For example, IPCC does not conduct any research nor does it monitor climate related data or parameters.

What is missing, or only emerging in some countries and at the European level, is collaborative research. We share with J. C. Mutter (2015), a former geophysicist who has now found his way in social science, that any serious response to natural disasters - either climate related or not - will need to be informed by both spheres and that the pattern and level of destruction they inflict are socially determined.

Numerous examples can illustrate this new thinking but we will limit ourselves to one of them: "climate refugees". Based on a UN report, the figure of 250 million between now and 2050 is often cited. However, the 2014 IPCC report states that a numerical estimate is extremely difficult due to the complex nature and multiple causes of these migrations. Providing reliable figures will need more accurate projections of climatic phenomena at the origin of these migrations, extreme events – floods, droughts and storms – or slower variations linked with sea level rise or lakes drying out. It would also need to better understand why people decide to leave the place they live in, to have reliable projections of the demography in those areas, to better define the idea of « climate refugee » which is still too vague, to evaluate to what extent migrations can be considered as a strategic approach to adaptation with in this case the consent of the populations concerned, to promote a status for climate refugees, to anticipate how they will be - or not be – accepted in countries where they find refuge, and so on ... Obviously, this high level of imbrication also holds for defining and implementing the policy area specific indicators that we promote in Figure 1. More collaborative research between hard and social sciences is needed if we want to be able to measure what counts in order to protect what matters.

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