

# Entering the Anthropocene: The Twofold Challenge of Climate Change and Poverty Eradication

Ignacy Sachs

**Abstract** We are all living in a new era since the beginning of the industrial revolution: the Anthropocene, which reflects the growing influence of the human activities on the earth. If we are responsible, we must limit our environmental impacts without forgetting that we have a huge social agenda ahead. So, we have to work on a tripod: the goals are social, there are environmental conditions to be respected, and if we do not give economical viability to our project, it will not happen. Economic viability does not come out of nowhere. We are in a period in which planning is totally demoralized and markets do not know how to manage themselves, they are shortsighted. And, in sensitive to social dimension, if we want to reintroduce social dimension, if we want to organize ourselves in a long time perspective, we have to go back to planning.

**Keywords** Anthropocene • Social inequalities • Social contract • International cooperation • Planning

In Molière's play, *Le bourgeois gentilhomme*, Monsieur Jourdain speaks prose without being aware of it. Similarly, we have already been living for a while in a new geological era – the anthropocene, *the age of mankind* – defined by Paul Crutzen as a result of “the central role of mankind in geology and ecology” (Crutzen and Stoermer 2000).

In reality, the entry into the anthropocene, prompted by the industrial revolution of the eighteenth and nineteenth centuries, marked the second major turn in the extensive history of the existence of our species on the spaceship Earth. The first, the Neolithic revolution (Childe 1942), had started 12 years ago in Mesopotamia. It paved the way for the transition from hunting and gathering to agriculture and

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permanent human settlements out of which the first towns arose. The next breakthrough came with the unification of the world economy as a result of the discovery of America by European navigators in the fifteenth century.

## The Twofold Challenge of the Anthropocene

Paul Crutzen rightly insists on the increasingly determinant impact of human activities upon the biosphere: “*Without major catastrophes like an enormous volcanic eruption, an unexpected epidemic, a large-scale nuclear war, an asteroid impact, a new ice age, or continued plundering of Earth’s resources by partially still primitive technology (the last four dangers can, however, be prevented in a real functioning noösphere) mankind will remain a major geological force for many millennia, maybe millions of years, to come. To develop a world-wide accepted strategy leading to sustainability of ecosystems against human induced stresses will be one of the great future tasks of mankind, requiring intensive research efforts and wise application of the knowledge thus acquired in the noösphere, better known as knowledge or information society. An exciting, but also difficult and daunting task lies ahead of the global research and engineering community to guide mankind towards global, sustainable, environmental management*” (Crutzen and Stoermer 2000). As a matter of fact, we can no longer postpone the urgent need to tackle two major and closely intertwined challenges:

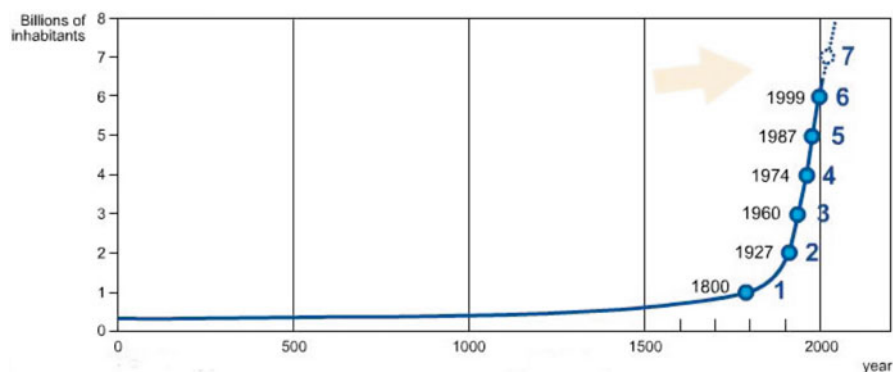
On the one hand, we need to put an end to the scandal of abyssal inequalities in the living conditions and quality of life prevailing today between nations and within nations, so as to eliminate the scandal of hunger and misdevelopment: a small minority occupying the spacious and comfortable cabins on the deck of the spaceship Earth, while many more are condemned to lead a busy, yet miserable, life in its hold, working hard to survive on a hand-to-mouth basis. Do you recall Fellini’s masterpiece *E la nave va*?

On the other, we ought to simultaneously prevent climate change – the warming produced by massive emissions of greenhouse gases that will have deleterious consequences on the living conditions on the spaceship Earth.

By the middle of the twenty-first century, the spaceship Earth will have a population/crew of nine billion, compared to only one billion in 1800; two in 1927, four in 1974; and six in 1999 (see Fig. 1). However, this rapid expansion of the world population should not be seen as a reason for despair, but we ought to slow down the demographic expansion by providing better life conditions to all the passengers of the spaceship Earth, and thus to stabilize the world population around ten billion before the end of the century.

The scientists of the International Panel on Climate Change are adamant: the average temperature should not increase by more than 2 °C if we want to avoid a disastrous worsening of the living conditions for our species.

Is it too much to expect that the anthropocene becomes, on the contrary, the “age of empathy,” thus improving on a lasting basis the human condition? For this, it is urgent to learn how to walk on two legs, combining social justice with environmental prudence.



**Fig. 1** World population increase in the last 200 years (Source: Institut national d'études démographiques)

To do so, we can no longer rely on the myth of the invisible hand and self-regulating markets. Left to themselves, markets have proved shortsighted and, what is more, insensitive to unbearable social costs. That is why we must urgently assume an active role as *geonauts-planners* (Orsenna 2005) striving to steer, as far as possible, the unfolding history, and a very tall order indeed, if we are to avoid excessive voluntarism. Geonauts-planners will have to find the way between Scylla and Charybdis, in our case, between the predicament of social inequality and the menace of climate change threatening to play havoc with the very survival of mankind.

As a matter of fact, if we want to promote long term strategies governed by care for all humans – present and future – we must turn to the Visible Hand and its five fingers: long term democratic planning, a renewed *contrat social*, food and energy security – the two pillars of inclusionary<sup>1</sup> and sustainable development – and international cooperation.

## Back to Planning

The way out may be narrow, but it exists. The biblical needle eye is here an appropriate image. We cannot afford any longer, as already said, to be subjected to the excessively high social costs of adaptation through the free interplay of market forces, hence the *urgent need to institute planning*, both at national and planetary levels. Planning, a child of war economy, was born at the age of the abacus, and in spite of this technical limitation, it proved quite useful in the past. We thus have a

<sup>1</sup> I prefer the term used by A. K. Sen, “inclusionary” to “inclusive,” for an obvious reason: inclusionary denotes a movement.

reasonable chance of achieving a much better performance with computers in our hands, even though they are in themselves a useful, but by no means a sufficient condition for efficient planning.

Paradoxically, planning is unpopular in the computer age. There are two reasons to it: one is the die-hard myth of the invisible hand, still convenient to the capitalists, reinforced by the fall of the Berlin Wall in 1989 and the ensuing implosion of the Soviet Union.

The second refers to the sometimes-spurious relation in the past between planning and autocratic regimes. To take an extreme case, in his essay *L'île aux cannibales*, Nicolas Werth describes the attempt by the Soviet planners to populate an island in the middle of a Siberian river with prisoners randomly grabbed in the streets of Moscow and left to themselves in a hostile environment without adequate equipment or technical advice (Werth 2006). Eager to incorporate new territories to the Soviet economy, the planners ended up provoking a return to cannibalism for real, reminding us of a satirical piece by Swift (1729).

It is thus essential to keep one condition in mind: planning only makes sense so long as it is performed within a truly democratic regime, which respects the right to bona fide error. The failures of authoritarian planning in the twentieth century were to a large extent due to the absence of this condition. Too many politicians in power pretended to have the monopoly of truth, and, therefore, the right to arbitrary and often brutal dismissal of dissenting opinions. Truly democratic planning cannot prosper without free exchange of ideas. The least one can say is that this condition was not always respected in the Soviet Union and people's democracies.

Historians specialized in *histoire immédiate* are still to give us a thorough critical evaluation of the "short twentieth century" and its two terrible World Wars (Hobsbawm 1994): the rise and fall of real socialism in the Soviet Union, the emergence of the Welfare States in the Scandinavian countries and of the New Deal in the United States, as well as the diverse models of mixed economies in the developing countries.

Such a study would certainly contribute towards elaborating new paradigms of democratic planning and economic governance and towards designing development strategies, capable of giving the present and future generations a fair chance to make the most of their lives by granting them decent material conditions, hand in hand with the exercise of basic freedoms.

In particular, the patterns of the public sector in mixed private-public developing economies may be analyzed using two historical models that define the range of possibilities: the Japanese model of the Meiji era, in which the State limited itself to play a transitory initial role, and the Nehruvian Indian model, also known as the "socialistic pattern of society" (Sachs 1964).

We ought to open a discussion on possible "third ways" differing from both the classical capitalism and real socialism as we have known them, focusing on mixed public/private economies with a significant third sector of social economy. Neither history (nor planning) should be forced into the straight jacket of inherited categories. There are at least three reasons to believe that the future will differ from the

past: the lessons that we shall learn from the historical experiences analyzed *sine ira et odio*, the scientific and technical progress and human creativity at large.

In this context, we should remember that, as recalled by Anatol Rapoport, we are the only living species capable of imagining and anticipating alternative futures (Rapoport 1974), and therefore, of planning, so long as we accept M. Kalecki's succinct definition of the latter as "*variant thinking*" about future action.

Not that we are, or ever will be, "masters of nature" as Descartes wanted us to believe. The nuclear disasters of Chernobyl and Fukushima on the one hand, the tsunamis, typhoons and other natural catastrophes, on the other, should teach us modesty. My preference goes to another seventeenth century French philosopher, Blaise Pascal, who compared man to a "thinking reed" (*roseau pensant*), capable of a twofold strategy: bending under the wind in a *reactive posture*, while adopting at the same time a proactive attitude, in the attempt to outwit nature.

Democratic planning, predicated on a quadripartite dialogue between planners, entrepreneurs, workers and the organized civil society, and making good use of the computers is yet to be firmly established on the tripod of social and ethical goals, environmental conditionality and economic viability, the latter being the *sine qua non* condition for things that matter to happen.

Planning implies an iterative process involving actors at the local, regional, national and international levels. It should incorporate, on the one hand, the concepts of *ecological footprint and biocapacity*, making a sharp distinction between countries which are biocapacity debtors and those which are biocapacity creditors<sup>2</sup> and, on the other, the definition of opportunities for *decent work*, as proposed by the International Labor Organization, and which includes *employment and self-employment*, the latter particularly important in rural societies.

At the local level, following the example of the French Revolution, we need to start by compiling *cahiers de doléances*: a comprehensive listing of the social priorities that must be addressed, side by side with the identification of the potential local resources, the bottlenecks to be removed and the necessary critical inputs to be brought from outside – knowledge, equipment and finances.

Planners diverge with respect to the time horizon of long term planning. The longer the time span covered, the greater the margins of freedom, but also of uncertainty. Twenty years seem to be a fair choice with the possibility to extend further some projections, in order to identify the emerging breaking points.

Essentially, planning is an exercise in systems approach aimed at identifying ambitious, yet feasible, social goals by proposing efficient patterns of resource use while matching them with the available working force by creating opportunities for decent work, so as to eliminate unemployment and, as far as possible, underemployment. For that, planners should address such issues as easing up bottlenecks while avoiding the unnecessary piling up of stocks and turning waste into wealth (a catchphrase in Maoist China) by finding productive uses for residues.

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<sup>2</sup>According to the Global Footprint Network 2010 Annual Report, <http://www.footprintnetwork.org>, in 2011, the world population as a whole was a debtor, having exceeded the available biocapacity by 35 %.

We are still far out from having satisfied the basic material needs of the entire human crew of the spaceship Earth. Attacking social inequalities, both at national and international levels, is thus more urgent than ever, keeping in mind the obvious truth whereby in a finite planet we cannot envisage an unlimited growth of material output. The sooner we reduce the still prevailing social disparities in material consumption standards across the world, the sooner we shall be able to move from a growth economy to a steady state economy. We are certainly not there yet.

## What Social Contract?

*Le hasard parfois fait bien les choses*, let us recall that 2012 marked the third centenary of the birth of Jean-Jacques Rousseau and the 250th anniversary of the publication of his seminal *Contrat social*. It is up to us to show that we no longer accept to act along the principle of *homo homini lupus*, nor do we tolerate any longer the deepening of social inequalities between and within nations. The future belongs to *explicit social contracts* established, both at the national and international levels.

The fundamental question to be asked in this respect is: *how much is enough?* Gandhi replied by saying that “*Earth provides enough to satisfy every man’s need, but not every man’s greed.*” However, we should not carry too far his postulate of voluntary simplicity, even though material over-consumption is by no means an indicator of happiness. We should strive to provide each of the nine to ten billion human beings that will be sailing on the spaceship Earth in the second half of this century with a reasonable income, guaranteeing decent material standards of living, on the understanding that the paramount goal is “*a civilization of being in the equitable sharing of having,*” in Louis Joseph Lebret’s terms. In other words, we should learn to self-control our material consumption.

As there is no reason to believe that we have exhausted the potential of technical progress and of better use of available energies, an ever smaller parcel of the working time of human societies will be required in the future to produce the necessary material goods. It will therefore be possible to gradually reduce the relative share of societal time ascribed to the activities of the *homo faber*, making more time available for the *homo ludens* (Huizinga 1955). At the same time, we ought to ensure that the total working time and earnings from work are fairly distributed among all potential workers, so that the scourge of unemployment is eliminated (Aznar 1993).

The sky is the limit to cultural and ludic activities, so long as we learn how to make appropriate use of the time freed from work. Keynes was right to warn us, as early as in 1930, against a “general nervous breakdown” that might be caused by such a fundamental change in the social fabric (Keynes 1963 (1930)). We might take example from a tribe living on Asian seashore. Its best artists were invited to compete by making beautiful drawings on the humid sand of the beach, bound to disappear with the next high tide. I am *still looking for a better example of material désintéressement*.

In order to move towards a less polarized world society, we must bring back to the fore the social and institutional reforms which no longer attract the attention

they deserve in the national and international agendas. The unfinished land reforms certainly belong to this category, side by side with urgently needed fiscal reforms. The experience of the New Deal in the United States ought to be revisited in the latter context.

## Food Security

Food and energy security ought to be considered as the two pillars of socially inclusionary and environmentally sound development strategies.

Even assuming a stabilization of the world's population by the mid twenty-first century, we must think of how to provide enough food and a reasonably comfortable life for 9+ billion human beings. For that, we depend on further progress of the green and blue revolutions with special reference to the interface between the two and to their dissemination throughout all the continents.

Rather than sticking to the elitist green revolution as initially proposed by N. Borlaugh, based on the massive use of selected seeds, fertilizers and water, we must move towards the “*evergreen revolution*,” as advocated by the well-known Indian agronomist M.S. Swaminathan<sup>3</sup> and directed towards the small peasants who still represent the majority among rural dwellers in developing countries (Griffon 2006).<sup>4</sup>

At the same time, we ought to limit the devastating impact of extensive cattle breeding on forests by resorting to a husbandry better integrated with small scale family agriculture as well as encouraging the substitution of meat consumption by that of fish coming from pisciculture.<sup>5</sup>

This leads us to emphasize the importance of intensive production units combining horticulture, pisciculture and arboriculture inspired by the traditional dike pond systems in Southern China (Ruddle and Zhong 1988). Such systems can also be adapted to different Brazilian contexts – the Amazonian *igarapés*, natural and manmade lakes, ponds and *açudes*, as well as the coastal areas, in particular the lagoons behind the reefs.

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<sup>3</sup>The M. S. Swaminathan Research Foundation is a reference with respect to sustainable agriculture and rural development (<http://www.mssrf.org/bd.html>).

<sup>4</sup>See on this point, Bruno Parmentier who opposes the two green revolutions in the following terms: “*Là où la révolution verte cherchait à artificialiser le plus complètement possible le milieu naturel, la révolution doublement verte vise à inscrire le système productif au sein des écosystèmes. La première force la nature via le recours massifs à des intrants, la seconde l’accompagne en recherchant un équilibre entre potentiel interne et apports extérieurs; la première spécialise les productions, la seconde les diversifie pour qu’elles se renforcent mutuellement; la première recherche une protection absolue de la production via l’éradication complète des maladies et des ravageurs, la seconde compose et gère le système pour contenir ces envahisseurs*” (Parmentier 2007, p. 160).

<sup>5</sup>As far as Brazil is concerned, fish farming has a great future in the Amazon region, the Mato Grosso Pantanal, not speaking of the Atlantic coast, so long as a satisfactory solution is found for long distance transportation of fish, more efficient than by road, and cheaper than by plane. Should we give a second chance to the zeppelin, the more so that we can fill it today with non-inflammable gas?

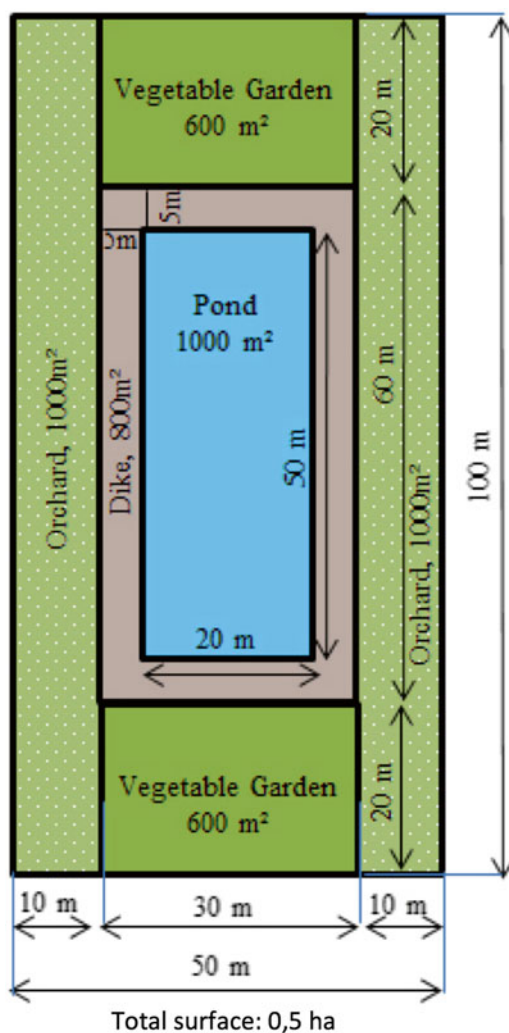


The following diagram illustrates such a unit (Fig. 2):

Two hundred people fed throughout the year on half a hectare, too good to be true! If it were only possible to create throughout Brazil an archipelago of one million of such units, it would ensure the food security to 200 million Brazilians and furthermore, generate 2.5–5 million jobs, while preventing further deforestation. Only floriculture can compete with such units as far as employment per hectare is concerned, but obviously, the demand for flowers is much more limited than that for food.

At any rate, we are not there yet, and we ought to realistically evaluate the prospect of advancing along these lines. But the challenge is certainly worth a try. Brazil and India could well join their forces in this endeavor.

**Fig. 2** Dike-pond-system in Southern China  
 A 1,000 m<sup>2</sup> pond  
 (50 m × 20 m) producing 10 tons of fish (a productivity deemed feasible by the BNDES), corresponding to the yearly consumption of 200 inhabitants  
 A 800-m<sup>2</sup> dike and an additional surface of 1,200 m<sup>2</sup> used for vegetable gardens meeting the annual requirements of 200 inhabitants (feasible on the condition of resorting to biochar as advocated by the NGO Pro-natura international at the rate of 1 kg/m<sup>2</sup>)  
 A 2,000 m<sup>2</sup> surface for arboriculture





## Energy Security

Let us start by a truism: energy is crucial to development insofar as it increases the productivity of human work. The industrial revolution was predicated on resorting to a widespread use of coal and later oil and gas, three fossil energies responsible for the emissions of carbon dioxide and the ensuing global warming. That is why we ought to reduce and even phase out the use of fossil energies even before they are entirely exhausted.<sup>6</sup>

Fortunately, we may shift to an array of alternative energies: solar, hydro, wind, geothermal and biomass, each one presenting some advantages and obstacles to be overcome. Three remarks are in order here:

- The energy strategy should address three interrelated questions: energy sobriety, efficiency, and alternative energy sources (Dessus 2011). Profligate use of energy can be curbed and efficiency greatly increased, so as to reduce the final demand for energy.
- Resorting to bioenergy calls for a careful evaluation of the potential conflict for scarce land resources between the production of food and that of energy. It need not happen if residues from food production are used as a feedstock for energy production (cellulosic ethanol, biogas from cattle dung, etc.). Moreover, countries like Brazil have enough agricultural land available to still afford expanding both food and bioenergy production, so long as this does not happen at the expense of standing forests. The latter are to be conserved as carbon sinks, not speaking of their other potential economic uses. Algae grown in sea and fresh water are also a potential source of bioenergy. Food, animal feed, fertilizers, fibers (standing for all kinds of industrial feedstock), fuel and standing forests are the six potential uses of biomass, which ought to be articulated through the development plan.
- The Faustian bargain – resorting to nuclear energy – poses a serious dilemma. It is clean in terms of emissions of carbon dioxide, however, not immune to the risk of highly improbable, yet devastating accidents, not to mention the danger of the proliferation of nuclear weapons. That is why some countries have recently taken the wise decision to phase out the production of nuclear energy (Dessus and Laponche 2011).<sup>7</sup>

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<sup>6</sup>This is not tantamount to abstaining from the exploration of the offshore “pré-sal” oil reserves in Brazil. However, utmost attention should be given to the prevention of potentially dangerous ecological accidents. On the other hand, the “pré-sal” oil could be taxed so as to finance the phasing out in future of fossil energies.

<sup>7</sup>The French president, François Hollande, proposed in his electoral programme to reduce the relative share of nuclear electricity from 75 to 50 % by 2025 (*Le Monde*, 17/12/2011). The French Green Party favors a total phasing out of nuclear energy.

### **Conclusions: About International Cooperation**

The UN system has a major role to play. On the one hand, it should greatly increase its financial participation in assisting the less developed countries in their socially inclusionary and environmentally sustainable development. For that, the UN could rely on the following funding:

- A contribution to a UN Development Fund from the developed countries, going back to the much discussed but never implemented pledge of allocating annually for this purpose at least 0.7 % of their GNP (Laget 2009).<sup>8</sup>
- The proceedings from the Tobin tax to be collected on financial transactions.
- A tax on carbon leading to the reduction of carbon emissions and used to finance projects that meet this goal.
- Tolls on oceans and air as a fee for using parts of mankind's common heritage, with the possibility of exempting on certain conditions ships and planes from less developed countries.

It is difficult to set long term quantitative goals but it should not be impossible to aim globally at 2 % of the world GNP, a very large sum indeed, if it were to be used to increase the productive investment and social expenditure in developing countries.<sup>9</sup>

On the other hand, the UN system should use its expertise and organizational skills to create international networks for scientific and technical cooperation among countries sharing similar biomes, instead of using the geography of proximity. This will call for a significant overhaul in the organization of the UN affiliated bodies, requiring in particular, a much closer cooperation between regional commissions (ESCAP, ECLAC, ECA, ECE) substantive agencies (FAO, UNIDO, UNESCO, UNDP) and financial institutions (the World Bank, the regional and national development banks), around biome-oriented programs for humid tropics, semi-arid regions, and savannas, temperate regions and so on. Without forgetting the crucial interface between water and land ecosystems in which the green and blue revolutions interact in the intensive production units described above, combining horticulture, pisciculture and arboriculture.

In particular, the UN member countries should be invited to present within 2 or 3 years national long term development plans containing the relevant information about the ecological footprint and biocapacity use, as well as about social objectives and especially the creation of opportunities for

<sup>8</sup>In 2007, the OECD contribution was of 0.28 %. Only five countries contributed in excess of the 0.7 % target: Norway (0.95 %), Sweden, Luxemburg, the Netherlands and Denmark. The French was of 0.38 %.

<sup>9</sup>In 2011, the global GNP reached 70 billion US dollars at market exchange rates and 79 billion US dollars at purchasing power parities (IMF 2012)

(continued)

decent work. The biocapacity debtors should be encouraged to decrease their ecological footprint while the biocapacity creditors should be assisted in making better use of their biocapacity. Another urgent question is the choice of the energy paradigms.

In parallel, the UN should advance in expanding the international capacity to finance development and setting a collaborative network aimed at designing and implementing biome-based development strategies, which imply much closer South-South links and collaboration along parallels rather than along meridians.

In this way, conditions would be created to move to the next stage of international cooperation: identifying the synergies that can be achieved by mutually adjusting the national development plans, opening new opportunities for trade as well as for scientific and technical exchanges, to be partly financed from international sources and assisted by the network of UN agencies.

In this way, the ground might be prepared to move towards the elaboration of a *first 15-year world development plan* for the period of 2016–2030, to be followed by a second *20 year world plan* for the 2031–2050 time span. Technically, such world plans are within reach. What is still missing is the political will and the initiative to move as quickly as possible in this direction. It has taken us more than two centuries to acknowledge the dawn of a new age. We must now accelerate the pace of the required transformations to make up for the delay, so as to successfully enter into the Anthropocene.

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