Climate change as a global political issue

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Abstract: The battle against climate change has placed decarbonised capitalism on the economic, political and social agenda. But the shift towards a regime of accumulation compatible with measures to mitigate climate change raises major issues regarding prosperity and power, on a human and political scale never previously entertained. The paper places climate change in the context of the dynamics of the system which caused that change, namely capitalism. The ecological crisis is one manifestation of the crisis gripping the present regime of accumulation, which has reached a financialised, globalised stage. This being the case, any attempt to halt climate change, far from being an environmental issue, must be seen as a problem for the development model of both North and South.

Keywords: climate change; new growth regime; global political economy; climate-friendly capitalism.

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1 Introduction

In only ten or so years the issue of global warming has gained priority status as an economic, political and human challenge. It all started at the Earth Summit in Rio de Janeiro in 1992, which saw the start of an international campaign, culminating in the setting up of the United Nations Framework Convention on Climate Change (UNFCCC-1994) and the definition of precise targets for the reduction of greenhouse gas (GHG) emissions within the framework of the 1997 Kyoto Protocol. Under this agreement, which was the first global instrument to be negotiated to combat climate change, industrialised countries undertook to reduce GHG emissions by 5% in 2012 compared with the level for 1990. These two treaties form the basis of a future international regime.

Since then the ongoing degradation of ecosystems, the increase in GHG emissions, the growing awareness of the global dimension of the problem and its solutions, the various forms of interaction between climate-related issues and economic growth, or

between free trade and environmental action, have put the question of combating climate change at the top of the agenda for the political economy of the planet. The problem is now to predict what will happen after 2012 and to respond to the new scientific data on changes in the biosphere, due to the shifts in climate which may bring about economic, political and social upheaval worldwide.

In terms of climate science, global warming is a dual problem related to the concentration of GHGs in the atmosphere and the volume of emissions over a given time. The aim of environmental policies is consequently to reduce both the volume and concentration of these gases. In economic terms this means shifting to a low-carbon economy. But taking the carbon out of the economy represents a radical structural and institutional transformation for the content, forms and modalities of the economy. In view of what is at stake for the centres of power and prosperity, the shift to a post-carbon global economy is not an environmental problem, but a global political economy one.

The political economy of climate change puts such change back in the dynamic of the capitalist economic system, which caused it in the first place. This begs the question of whether capitalism is able to adapt to this new constraint, which is neither a matter of space, nor technology nor yet society. The relation between the political economy and the biosphere is the third basic link in the global political economy, the first two being the relation of economics to politics and of the national to the international.

This paper is organised as follows. Section 2 puts forward the main tools and issues from a global political economy approach of the climate issue. Section 3 is dedicated to the possibility of an accumulation regime compatible with climate change issue. Section 4 draws the conclusions.

2 Capitalism, techno-economic paradigms and carbon constraint

To combat climate change the international community set a target to keep global warming below 2°C in relation to the pre-industrial era, in order to prevent any hazardous anthropogenic interference in the climate system. We should note that the UNFCCC does not mention the 2°C limit, nor does the Protocol, nor yet any other of the conferences of the interested parties. The fateful figure achieved international consecration at the Group of Eight (G8) meeting at L'Aquila, Italy, in 2008, and was subsequently endorsed by the signatories of the Copenhagen Accord, of December 2009, and at the Cancun conference the following year.

Initially the policy on limiting GHG emissions was treated as an environmental issue, which could be solved by introducing domestic policies based on tax incentives and multilateral environmental agreements. A shift in the issue's perception became apparent at the Marrakech conference in 2001 and was confirmed at the Bali conference (COP 13, 3 to 14 December 2007) (see Box 1). This change was due to a growing realisation that combating GHG emissions meant decarbonising the capitalist mode of production. This is why the economics of global climate change holds the prospect of a new regime of accumulation, marking a radical break with the industrial development model of the past two centuries.

Box 1 The roadmap

The work of the Rio conference (COP 13) and the third meeting of parties to the Kyoto Protocol (COP/MOP 3) ended on 15 December 2007. It concluded with the adoption of the Bali road map which established a process for negotiating the post-2012 regime for combating climate change. The Bali conference made progress on the following points:

1. A shared vision, including an overall long-term target for reducing emissions. The road map defined four negotiating blocks (mitigation, adaptation, funding and technology), with an ad hoc working group bringing together all the parties, regular meetings four times a year, and a deadline in December 2009.

The final compromise concerned two items: (i) recognition of the scientific findings of the Intergovernmental Panel on Climate Change (IPCC) and whether or not to include medium and long-term objectives in the text of the compromise, and (ii) the affirmation of common but differentiated responsibility, and the scope of differentiation between developed and developing countries, particularly with respect to mitigation.

2. Topics for negotiation defined at Bali

The Bali conference was marked by the growing importance of negotiating topics which will be central to post-2012 climate negotiations.

(i) Adaptation: the Adaptation Fund came into operation. Developing countries – and in particular the least developed countries, which are often the most exposed to the effects of climate change – demanded that adaptation should enjoy as much attention as mitigation.

(ii) Technology transfer: the final resolution focused on the formation of a group of international experts with a broader mandate and an ambitious work programme, the setting up of benchmarks for the actual deployment of technology transfer, and the start of a strategic programme within the framework of the Global Environment Fund. Developing countries called for a waiver on intellectual property (IP) rights for climate-friendly technology.

(iii) Funding: discussions emphasised the financial assistance industrialised countries must give to the least developed countries and emerging small island states to help them to adapt to climate change.

(iv) Deforestation: the road map stressed the need for a rapid response with pilot schemes to build up capacity in developing countries and obtain funding for such actions from developed countries.

2.1 Understanding the climate constraint: a political economy approach

The concentration of greenhouse gases in the atmosphere is partly due to unnatural or more exactly anthropogenic accumulation (energy production and consumption, transport, agriculture, deforestation). This concentration is the sum of previous emissions. The influence of each gas depends on both the intensity of past emissions, its specific contribution to global warming and the length of time it remains in the atmosphere. In this latter respect, the most important gas, in terms of its contribution, the high irreversibility of its accumulation and the complexity of its atmospheric cycle, is carbon dioxide (CO_2). In the absence of deliberate policies to reduce emissions – what the negotiators refer to as 'the business as usual scenario' – annual carbon emissions may reach 15 Gtonnes by 2030. If this proves to be a steady trend this would lead to a CO_2 concentration of about 750 parts per million (ppm) whereas the threshold not to be

exceeded is between 450 and 550 ppm. The current concentration is about 375 ppm, as against 284 ppm before the industrial revolution. If the current trend persists the average temperature would rise by between 2.7°C and 4.7°C by 2100.

The planet taken as a whole released nearly 30 billion tonnes of CO_2 equivalent in 2008. To limit the average temperature increase to only 2°C, beyond which the changes in climate already at work would reach an unsustainable intensity, we must at the very least end the current increase in emissions by 2015, at the latest, and then halve emissions before 2050 without checking economic growth. To achieve this, the international community must cope with three interdependent problems:

- A structural problem associated with uncoupling economic growth from carbon emissions, or in other words the challenge of ridding ourselves of the carbon-based mode of production inherited from the 18th century industrial revolution. This problem in turn raises other problems related to the social and political dynamics required to redirect both industrialised and developing economies towards a form of growth with low carbon emissions.
- A systemic problem rooted in North-South relations and the right to development: carbon emissions must not be reduced at the expense of the basic human needs of four-fifths of humanity, nor of the improvement in their economic and social welfare. But the two priorities seem to be at odds: on the one hand the need to limit global GHG emissions; on the other development of the South which inevitably increases such emissions.
- A problem of global governance, because the externalities of climate change have four specific characteristics: global reach; long-term accumulation in the atmosphere; uncertain future impacts; scale never previously experienced (Stern, 2006). Under these conditions, to build a low-carbon economy it will be necessary to establish an effective international system of commitments involving both historical sources of emissions and developing countries. Because of the global nature of the problem, the shift to low-carbon growth must occur on a global scale.

This is why taking carbon out of the capitalist mode of production requires a change, on the one hand, in the model governing production, technology and consumption, and on the other hand, in the way the whole world lives and works. Such a transformation of the regime of accumulation is in no way comparable to the problems of collective action or environmental governance such as those addressed by the 900 or so multilateral environmental agreements (MEA) already in existence, even if the Kyoto protocol is (wrongly) seen as yet another MEA. The new growth model and the techno-economic paradigm (Freeman and Perez, 1998) which underpins it cancel out the distinction between economic and environmental policy, because the shift to a low-carbon economy transforms any economic policy into environmental policy.

We need to clarify two points, with regard to the idea that combating climate change involves a change in the regime of accumulation.

The first concerns our approach to the economic system and its relation to nature. Capitalism requires outside regulation capable of reducing its entropy rate. Nicholas Georgescu-Roegen is the absolute reference on this point. Responding to the mechanical

universe proposed by neo-classical theory which dismisses ecological constraints, his analysis breaks with the linear approach based on resources, production and consumption. His study of production sets forth a theory of economic evolution which makes the relation between humans and their environment a decisive factor in the dynamics of society. Georgescu-Roegen sees production as a process which, from a physical point of view, consists in transforming natural resources (low entropy) into waste (high entropy). Production – the controlled transformation of nature – is the product of a specific institutional and socio-historical context (Georgescu-Roegen, 1970).

Furthermore, according to Georgescu-Roegen (1979), *"the equilibrium theory is based on the following observation: some events change the structure of supply and demand, but the economy always returns to its initial condition once such events disappear. Inflation, catastrophic drought or a stock exchange crash leave absolutely no mark on the economy. Complete reversibility is the general rule"* (p.84). This is why he demonstrated that *"the economic process is not an isolated, independent process. It cannot work without continuous exchange which alters the environment cumulatively, but without being affected by these changes in return"* (pp.61–62). The standard economic representation of production overlooks the *"ecological conflict"* related to the fact that *"matter is subjected to irretrievable dissipation"*. In this sense, production, the basic matrix of economic irreversibility, may be seen as a *"continual entropic degradation"* of natural and energy-producing resources, of nature and human capital.

Capitalism is a global system of infinite accumulation of products and capital drawing on increasingly rare resources and energy sources. According to the prevailing economic theory, the scarcity of resources can be solved by substituting factors of production. Scarcity is seen as a problem regarding the quantity of work, suggesting that production is only held back by energy and technology.

Technical advances offer a temporary and imperfect solution to entropy. Control of exosomatic instruments – produced by humans but not part of their bodies – and technological innovation do not only depend on the conditions of supply, nor do they only change these conditions. On the contrary, the conditions of demand, the behaviour and tastes of consumers are also substantially and durably affected. However, the various forms of innovation (products and process) do not stop entropy.

Economic evolution is entropic in the sense that *"the economic process is solidly rooted in a material basis which is subject to very real constraints"*. Due to these constraints the economic process is subject to irretrievable change: industrial development exhausts nature and the entropic scarcity of non-renewable resources also gives rise to social conflict and inequality between social groups. The result is that exploitation of stocks of non-renewable resources generates economic growth but degrades the biosphere. One of the manifestations of such degradation is irreversible climate change. Given the present state of the social relations of production and of technology, measures to combat climate change can only have one goal: to reduce the entropy rate of economic activity.

The second point which needs to be clarified relates to the hypothesis advanced by the climatologist and winner of the Nobel Prize for chemistry Paul Crutzen. He maintains that with the industrial revolution mankind became a *"major geological force"*, through its ability to transform the planet using technology and economic activity (Crutzen and Stoemer, 2000; Crutzen, 2002). This demands a brief explanation: the Anthropocene

(from the Greek word anthropos, for human being, and *kainos*, meaning recent) is the epoch following the Holocene. The Anthropocene is characterised by the major role humans now play in the planet's geophysical evolution. The Holocene was a fairly stable geological epoch which allowed the emergence and subsequent development of an agricultural then urban civilisation. The Anthropocene, which is thought to have started around 1800, is characterised by radical environmental instability and a tendency towards global warming. As a result anthropogenic alteration of the atmosphere will increasingly govern natural variations. This, Crutzen argues, is because the human population has become, through its industrial activities and way of life, a geophysical force superior to all other natural mechanisms.

According to Kandel, *"For at least 8000 years, since the invention of agriculture, mankind has been impacting on the biosphere. But in the past few decades it has started to change the actual composition of the planet's atmosphere"* (Kandel, 1998, p.58). According to Angus Maddison, the gross global product rose from $370 billion in 1700 to $33.7 trillion in 1998 (for 1990 economic conditions), an almost 100-fold increase in just three centuries, whereas in the preceding 17 centuries output only tripled. Meanwhile the concentration of CO_2 in the atmosphere was 280 ppm in 1800. It is now 380 ppm, increasing by more than 30% in two centuries after varying by barely 10% in the course of the 10,000 years preceeding the industrial era.

With the concept of the Anthropocene Crutzen provides us with a framework for analysing a cycle of several centuries based on the integration of climatic data. It would be illusory to imagine that at some time the relation between mankind and its environment reached a state of balance, reflecting stability or harmony. However, during the Anthropocene the long-term trends of capitalism unfolded, and they continue to do so. Anthropocene capitalism, founded on controlling nature with technology, on the use of fossil fuels and on urban development, has entered a phase in which its development destroys the stability of ecosystems. What is at stake, in the current debates and decisions, is whether climate change can change the dynamics of the Anthropocene in a way which would radically change the course of capitalism.

2.2 Capitalism and techno-economic paradigms

Fernand Braudel (1979, 1985) highlighted successive long-term (longue durée) cycles in the human history of the systems governing relations between mankind and its material and natural environment. Within these cycles, historical time is divided up into long conjunctional periods, described by economists, in particular Nikolai Kondratieff (1882–1930). We prefer to refer to them as long waves, because climate change has upset the notion of the periodic, automatic up and downward curves, often found in the theory of economic cycles. We should emphasise the autogenous, self-generating character of capitalism, with its succeeding periods of growth and structural instability (Kondratieff, 1992; Bosserelle, 1994).

The capitalist dynamic is based on economic factors inherent to its functioning: maximising the rate of profit and competition between the owners of assets. But the transition to a new long wave of growth depends on exogenous factors. Far from being automatic it depends on establishing coherent technological, social and institutional conditions which define a regime of accumulation.

The global climate crisis is the result of contradictions which were built into the structure of and remain deeply rooted in the regime of accumulation of mass consumerism in its financialised, transnationalised stage (1979–2010) (Castel, 2005). At the start of the 21st century this regime is in the grip of a three-level crisis: in finance and economics, in the spread of the global market, and in climate change. The contradictions, specific to each of these three crises, the way in which policymakers respond to them, and the multiple forms of interdependence that simultaneously give rise to crises and come from crises, are clearing the way out of the crisis. But we cannot disregard the possibility that the world may become bogged down in it.

We should however emphasise two characteristics of climate change which help to explain the particular nature of the climate crisis. This crisis does not fit into the historical pattern of previous crises in capitalism (excess production, insufficient demand, inadequate profits), even if companies initially claimed that the cost of internalising environmental degradation would affect their margins. Furthermore climate change will bring about irreversible, irremediable changes for mankind's environmental and economic systems. It seems that we have entered a phase during which, unconsciously, feeling our way forward in the dark, intentionally and unintentionally we may happen on the solutions which will succeed in establishing a new regime. We posit that capitalism is far from having reached the limits of its real scope for accumulation. Indeed it still has unexpected potential for renewal. The problem with stretching the system's limits is that it assumes that our economic future will be rest on radically new foundations, but there is very little in the changes currently at work which supports this claim. However, renewal does not mean identical reproduction. Henceforth climate policy should lead to a radical change in the capitalist regime of accumulation, in so far as it must now internalise the carbon constraint.

We do not agree that a stationary state (Daly, 1996) or *décroissance* (Latouche, 2006) holds the promise of mankind's ecological salvation. These theories reflect the views of a certain fringe of the population of western countries, which threatened by the environmental crisis and by the emergence of new economic, and ultimately political, forces, would like to preserve its present standard of living and not give up its exosomatic comfort. In view of the social and economic inequality and the many human and social needs not yet covered, it is hard to see how degrowth could offer an attractive way out of the global environmental crisis.

We would argue that capitalism is engaged in a phase of transition and adaptation. The transition from one regime to the next is a period of considerable conflict, of great uncertainty and far-reaching questioning of institutions, ideologies and learning. The risks associated with climate change have little in common with the ordinary risks on which economic analysis habitually focuses. Climate change is bringing about overall, lasting upheaval in the conditions for life on earth. Traditional economic analysis cannot be much help in this case: no market knows how to spontaneously internalise negative externalities or manage a change in the whole system of relative prices (see Box 2). Post-Kyoto economics is not a matter of a change in the existing regime, but a change in the whole regime of accumulation, a dimension on which economists have very little to say.

Box 2 Pigou versus Coase

Economic analysis of environmental issues starts from the assumption that the market-based system underestimates the use of natural resources with regard to their social cost. Economic analysis qualifies such situations as externalities giving rise to inefficient resource allocation or a loss of well-being for some categories of agents or the whole community. This assumption is based on a three-level malfunction: (i) the erroneous definition of property rights; (ii) the interplay of externalities; and (iii) poor targeting of public-sector subsidies.

Having defined the problem associated with this underestimate, the exposition leads on to two types of solution. The approach suggested by Pigou (1932) considers that fiscal and budgetary instruments are an effective means of changing relative prices and can act as an incentive for agents to internalise environmental conservation in their plans, either for consumption or production. Pigou's solution thus involves internalising, through taxes paid by agents, the origin of the negative externality. It is then necessary to identify the externality which needs to be internalised so that use of resources corresponds to its social valorisation.

The approach taken by Coase (1960), known as the market solution, is presented as a criticism of Pigou's approach and its use of public-sector intervention. It is based on the notion of a transaction cost, according to which coordinating economic agents gives rise to costs. According to Coase, the market is quite capable of efficiently allocating productive resources. Environmental policy should restrict itself to defining property rights. The Coase solution is equivalent to considering that there is no need for State intervention to solve problems of environmental externality. The authorities should restrict themselves to allocating clearly defined and delimited property rights for the resources concerned by such externalities.

Climate change forces us to question three aspects of the course taken so far by capitalism. It throws doubt on the 'technological optimism' (Fitoussi and Éloi, 2008) of economic theory, according to which technology can compensate for an environmental imbalance resulting from unreasonable exploitation of non-renewable resources – such as soil, water, hydrocarbons and minerals. The environmental fragility of the capitalist mode of development is now fully apparent. Technical progress, even if science plays a decisive part in the new paradigm, will not be sufficient to overcome this constraint. On the one hand William Stanley Jevons (1835–1882) demonstrated with the paradox of the same name (1866) that technical progress does not necessarily reduce pressure on the ecosystem. On the contrary, improving the technical efficiency with which a natural resource is used tends to increase its use. On the other hand technological progress on its own cannot induce a change in organisation, nor is there any intrinsic reason why innovation should have a virtuous impact on nature and the climate.

The technological hypothesis conveys the idea – which we consider fallacious – that society's capacity to adapt will constantly increase. Nothing is less certain. Some would argue that it would already be possible to stabilise CO_2 emissions through a suitable combination of existing technologies: carbon capture, use of nuclear energy and renewable solar and wind power, improved energy efficiency of buildings. The prime merit of this notion of 'technological wedges' (Pacala and Socolow, 2004) is that it underlines the fundamental importance of a change in the behaviour of industry and consumers, in other words a large gain in environmental awareness without which any technological change will have only limited impact.

Climate change also casts doubt on the belief in an ecosystem serving as an inventory of resources, on which mankind may draw without limit. The manifest destruction of nature is central to the principle of entropy according to which the economic process

involves a one-way change with an irretrievable loss of natural resources. On the one hand interaction between the climate and the ecosystem affects plant cover, food production on land and sea, the water cycle and all the relations between living beings. On the other, the environmental damage caused by economic activity has acquired a life of its own, leading to the destruction of biodiversity and 'the web of life' which covers the planet (Valantin, 2007).

The third stumbling block revealed by climate change relates to the industrial development model, founded on the consumption of coal in the 19th century then oil in the 20th century, leading to a partial but durable transfer of carbon – previously trapped underground – to the atmosphere, resulting in a change in the Earth's climate. We have reached the end of the reign of free carbon, on which was founded the industrial revolution, the spread of capitalism and the emergence of a global economy. It will therefore be necessary to rethink the balance of domestic economic policies, in individual countries, and global economic policy (among others energy policy and the management of scarce resources). Such changes inevitably involve reorganising relations between North and South, redefining the content and goals of economic development policies, and lastly establishing global economic governance wholly devoted to combating climate change (Sachs, 2008). This would open the way for a possible 'de-globalisation' of the regime of accumulation.

Putting these issues in their historical perspective emphasises the novel nature of the constraints on the international community and economic players in a context of gradually increasing environmental awareness. The increase in the planet's human population, and the spread of technology and economic activities are producing noticeable effects on the physical state of the planet which we can no longer disregard. Far from yielding to some sort of ecological or technological determinism, the present paper seeks to underline capitalism's capacity for adaptation, enabling us to see the present climate crisis as a phase in the transition towards a new balance in the political economy. We shall now present a far from exhaustive overview of the (im)balances in the global political economy that are part and parcel of current growth patterns. It is the unsustainable nature of such growth which will prompt players to involve themselves in a transformation of the regime of accumulation.

3 Towards a capitalism compatible with climate change?

The conjunction of a business-as-usual scenario, increasing global population (8.5 billion by 2030 according to the UN), a degraded environment and a rise in average global temperatures of a few (or several) degrees cannot be sustainable and could even lead to systemic chaos. Given the unsustainable nature of the current mode of development and growth, there is no alternative to a profound change in the political economy.

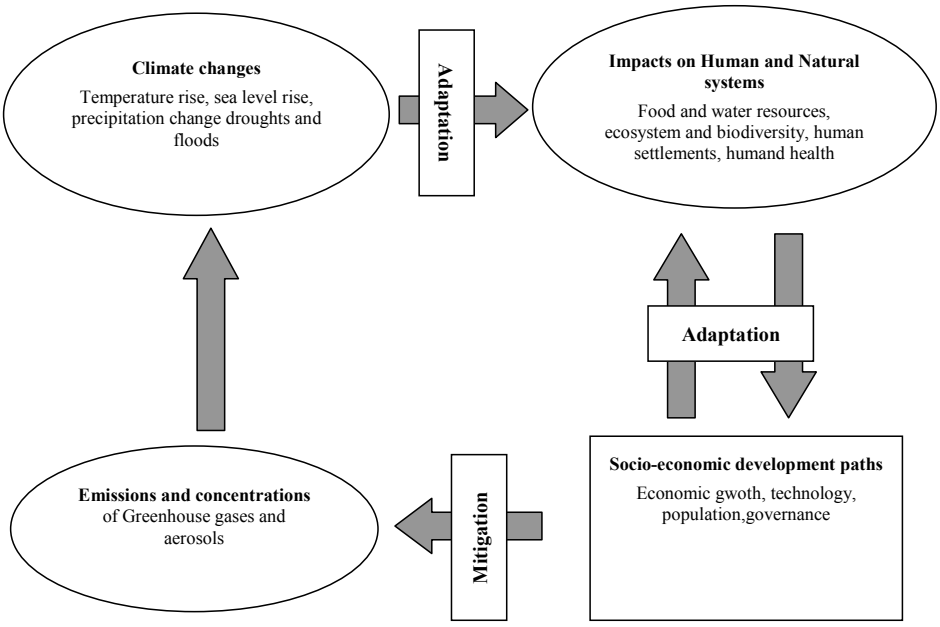
To combat climate change a new regime of accumulation must be defined, one that might be called a climate-change compatible regime of accumulation. We shall now attempt to substantiate this expression. We are not in a position to provide a detailed account of the contents of this new regime of accumulation, which is, as we write, still largely hypothetical. Nor do we make any claim to describing the world of tomorrow, nor yet to providing an account of what a low or post-carbon economy might be like.

3.1 Mitigation and adaptation: the determining factors in a new regime of accumulation

The challenge underpinning mitigation and adaptation policies is the switch to a low-carbon economy, with a smaller ecological footprint. To move towards a post-carbon form of capitalism it is necessary to define a new technological and economic paradigm, as well as the corresponding forms of regulation. The aim is to stimulate change in key sectors – transport, building and housing, energy systems – and to change patterns of consumer behaviour.

The IPCC (2001) defines mitigation as *"technological change and substitution that reduce energy resource inputs and emissions per unit of output"*. It includes activities designed to reduce GHG emissions directly or indirectly, by capturing emissions before they are released into the atmosphere, or by trapping gases already in the atmosphere using carbon-sink techniques. Adaptation is defined as *"adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploit beneficial opportunities"*. It refers to the response to the effects of climate change. The Netherlands, with its infrastructure network and institutional mechanisms for prevention and early warning to protect the population against flooding, offers a good example of an adaptation strategy. Figure 1 summarises the links between adaptation and mitigation. Mitigation reduces the rate, scale and effects of climate change, whereas adaptation increases the ability of people, of human or natural systems to cope with the consequences of effects such as increasingly unpredictable weather and extreme meteorological events.

Figure 1 Linking adaptation and mitigation policies



Source: IPCC (2001)

Three other concepts complete the syntax of climate change. *Sensitivity* measures the extent to which a system is affected, for better or for worse, by climatic stimuli. The effect may be direct (a variation in crop yields in response to a change in average temperature) or indirect (damage caused by increasingly frequent flooding). *Adaptive capacity* corresponds to a system's ability to adapt to climate change, whereas *vulnerability* reflects the extent to which a system can, or cannot, cope with the damaging effects of climate change.[1] Such policies are complementary: by reducing the volume of accumulated emissions, mitigation increases our chances of successfully coping with remaining climate hazards through adaptation. Furthermore, the benefits of mitigation make themselves felt at a global level, whereas adaptation achieves local benefits. Glocalisation, or a combination of bottom-up and top-down techniques, plays a pivotal role in systems to cope with climate change. Similarly, we should not overlook spontaneous adaptation by communities to climatic hazards and variations, on account of the local perception of such effects.

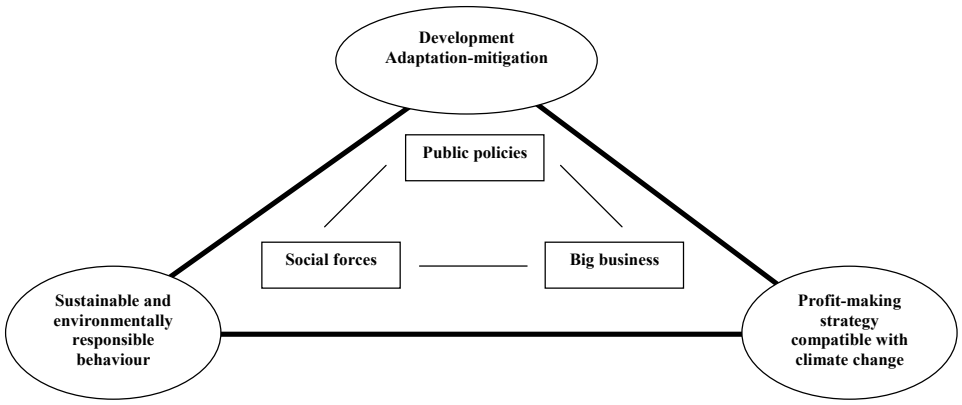
Efforts to combat climate change have concentrated on mitigation, rather than adaptation policies and the necessary synergy between development and combating climate change. It was only in 2001, with the COP 7 in Marrakech, that adaptation gained official recognition and provision was made for its deployment and for technology transfer. This shows that for a time the drive to combat climate was conceived by the North, for the North. It also explains why it is now necessary to consider adaptation as a component of economic development in the context of climate change (Tol et al., 1998). Adaptation and mitigation policies may claim to be the key components of a new regime of accumulation, which they are also helping to define. Economic development strategies, in their three – macro-economic, micro-economic and structural – dimensions, must take account of the problems related to adaptation and make room for mitigation strategies because the more a country develops, the greater its GHG emissions will be. We should add that GHG emissions are increasing much faster in the South whereas their abatement cost is lower. But the necessary synergy has yet to be achieved: the failure of the Copenhagen conference was due to the head-on collision between climate and development agendas. An issue is to consider that adaptation is the new name for development strategies as climate change is the defining international development issue.

What is needed is an integrated approach to the adaptation-mitigation-development triangle, both at a national and a global level. For instance, protecting farmland or reorganising the energy sector are measures which can have a substantial impact on GHG emissions, despite not being included in either adaptation or mitigation measures. In developing countries emissions are already at a low level. Attempting to restrict them puts a brake on the development process, because almost all the emerging countries and all the least developed countries have neither the financial nor the technological means to make the transition to a low-carbon economy, which remains the prime objective of measures to combat climate change. Furthermore, for many poor countries the main challenge is to adapt to the effects of climate change, rather than combating its root causes. Their poor adaptation merely reflects their development deficit. It is consequently necessary to frame environmental and climatic policies rooted in economic and human development priorities. At the same time, and symmetrically, development policies should take into account the need to adapt to climate change.

3.2 Hypothesis for a political economy of a climate-friendly capitalism

History shows that economic or technological efficiency has very little influence over this type of transition. Moreover, such shifts are rarely controlled and harmonious. Things might work out this way if one hegemonic bloc succeeded in imposing a trial of strength capable of reversing the current, unsustainable growth path (see Figure 2). This hegemonic bloc would mainly depend on the relation between policy-makers, and manufacturers and owners of assets – with respect to the shift to be achieved in technology and energy – but also on the distribution of revenue. The way that big business has seized upon the issue of decarbonisation shows that it aims to define a form of green post-Fordism. In other words it does not want adaptation to climate change, simply a green-washed, financialised and transnationalised version of the regime of mass consumption.

Figure 2 The twin triangles of a new regime of accumulation



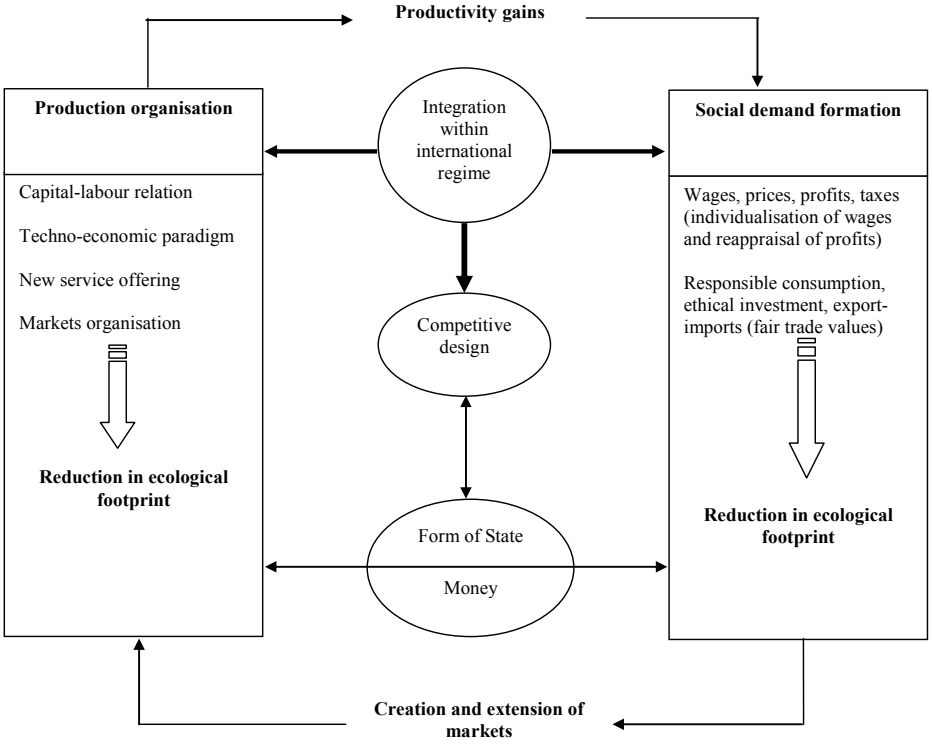
Source: Author's own composition

To combat climate change requires an overall rethink of the system of relative prices and more particularly the price which serves as a norm for this system, namely wages. Fordist capitalism was inclusive and sought to reduce inequality, not because its players were altruistic nor because of any self-organisation of markets, but because it was faced with an alternative model and a global political economy: the Cold war. If measures to combat climate change are thought to contribute an increase in wage differentials, they will not be sustainable, no more than the resulting regime. The International Labour Organization (ILO) has highlighted the risk that 'green' jobs might be less secure with lower wages than jobs destroyed by the current crisis (ILO, 2008a; ILO, 2008b). There will be no satisfactory response to environmental issues unless social issues receive fair treatment.

Pascal Petit (2005) thinks that capitalism is likely either to move towards a 'financialised regime' or a 'regime of hedonist, communitarianist growth'. The carbon constraint opens a thord way and could lead to a 'climate-change-compatible regime of accumulation', which Michel Husson (2009) calls 'green capitalism'. Husson justifiably has substantial reservations about this possibility, defining it as a form of 'capitalism which would succeed in taking charge of environmental problems, in its own (mercantile) way, while at the same time managing to open up new areas of accumulation and new outlets'. This could be taken as a description of what we call green post-

Fordism. We shall now take a closer look at the concept of a climate-change-compatible regime of accumulation. Drawing on presentations made by Pascal Petit (2005), Figure 3 summarises the key links in a regime of accumulation compatible with combating climate change.

Figure 3 Institutional changes for a climate-change compatible regime of accumulation



Source: Inspired by Petit (2005) and adapted by the author

From a global perspective, the integration to international regime will be the decisive institutional step. Three factors justify this position. The first concerns the global nature of the phenomena under consideration. Even though it has local causes, the effects of climate change are transnational. The second factor is that capitalism now operates globally. One may posit its deglobalisation following the present crisis, but it is too soon to say. The third factor relates directly to the other two: combating climate change requires a transnational response. Integration in the international regime will condition the forms of competition and modes of regulation, as well as the role of States in socio-economic dynamics.

A reappraisal of the nature and degree of globalisation will be needed, reconsidering the forms of competition, and what is involved in terms of mobility, relocation of production (and hence its organisation) and international transport systems. The shift to a low-carbon capitalism will change the structure of the world economy. As can be seen from the current tough climate negotiations, conflicts of interest and power induced by this transformation are the main obstacles to collective international action. It is all too clear that the bid to preserve a global public good does not rule out conflict over the instruments of such preservation and the means for funding it.

Integration within the international regime will lead to the establishment of a local-national-regional-global "*relation of inherence*" (Fourquet, 2004) with respect to climatic governance which will condition new patterns of production and consumption. The goal of such patterns will be to reduce the human environmental footprint, a consideration which had no place in previous regimes. Any climate-change friendly regime will be judged in relation to a goal traditionally seen as being outside the scope of economics: the reduction of its degree of entropy. This means reducing the consumption of natural resources and raw materials, switching to smart power grids, optimising environmental procedures and far-reaching changes in value-added chains and business sectors.

In view of the uncertainty as to the causes of global warming these changes are still hypothetical. But there is a growing awareness of the environment, and saving energy or improving the environmental quality of housing are positive measures on the plus-side of the discourse on climate-related hazards. Uncertainty should consequently become a principle for action, giving rise to a 'no regrets' approach by which measures (negotiated or unilaterally enforced standards, self-limitation agreements, codes of good conduct, new regulations) taken to guard against hazards associated with climate change, are virtuous in themselves.

The techno-economic paradigm underpinning this regime of accumulation will depend on the technological upheavals in materials, transport and housing. Information technology, biotechnology, environmental industry and services will be the driving forces of this paradigm. Nuclear power and renewables will be its main sources of energy, coupled with limited use of oil, technology permitting. More broadly, a complete reorganisation of the value chain, in order to reduce segments with high GHG emissions, coupled with systematic use of clean technology, is foreseeable. This paradigm will put the emphasis on the eco-design of goods and a new service offering for manufacturing and consumers, such as relational goods. In addition to new links between industry and services – yet to be developed – this regime will see the growth of an economy based on usage. The key factors involved will be qualified work, materials derived from biomass and ICT, which with its everyday domestic applications will play an important part in the sustainability of the paradigm.

Contrary to the Fordist regime, under which only a limited number of large industrial corporations were concerned, the dissemination of new manufacturing standards and best practices must involve the whole productive fabric of society, including activities in primary and tertiary sectors. Running parallel to the techno-economic paradigm is the definition of a profit strategy which enables climate constraints to be internalised. It will connect up a 'compromise in corporate government' between the main players in each firm on product policy, manufacturing organisation and relations with wage-earners (Boyer and Freyssenet, 2000), capable of meeting the requirements of a worldwide low-carbon economy.

Changing consumer behaviour (increasing their sense of responsibility, instilling a green civic sense) will be an essential part of any future climate-change-compatible regime of accumulation. Such changes will condition the cohesiveness and social reproduction of the regime, a pre-requisite for its economic reproduction. The worldwide spread of 'middle-class values', with the increasingly widespread adoption of Euro-American patterns of consumption which it underpins, is ultimately unsustainable. This is certainly the case, but what alternatives are available? The means of bringing about such a transformation in the behaviour of citizen-consumers pose huge challenges for the democratic political regimes in the West, and equally massive challenges for developing countries required to set priorities.

Greater importance will be attached to ethical, responsible behaviour in retailing, consumption and perhaps even investment. There will be increased social differentiation and individualisation of both demand and the means of its fulfilment. At the same time as well as enduring social inequality, the underprivileged and a far from negligible share of the middle classes may also suffer environmental inequality. The ability of this regime of accumulation to find answers to the lack of social inclusiveness and the problem of inequality will be decisive for its long-term survival.

4 Conclusion

The point of departure for this article was to avoid considering climate change as an environmental problem and measures to combat this phenomenon as a problem of traditional collective action on environmental conservation. Only by changing the present regime of accumulation, and the corresponding technical and economic paradigm, can we overcome the climate constraint. Such a change raises issues for the balance of power and prosperity, out of which a new world economy will emerge.

This pre-supposes a radical rethink of the form and substance of global governance in order to force it to focus on regulating relations between nations, and relations between nations and ecosystems. Given the current state of technology, of international relations and of compromise within nations, the international community has neither the means nor the will to undertake such a task. The incertainty regarding the sustainability and feasibility of a new growth regime is radical and global.

The insistence on cutting greenhouse gas emissions, and carbon dioxide in particular, derives from the awareness of our deliberate powerlessness, for who can seriously believe that this goal can be achieved?

Our scepticism is based on three observations. Firstly, to achieve a cut in CO_2 emissions involves putting a stop to the social and economic development of three-fifths of humankind and letting the *"the bottom billion"* (Colier, 2007) sink into a poverty trap with no hope of escape in the medium or long term. Such a prospect is unthinkable. Secondly, the only way of effectively reducing CO_2 emissions and their concentration in the atmosphere is to stop their main source, fossil fuel (coal, oil and gas). Does anyone seriously believe that the countries producing such fuel will agree to leave their reserves underground, unused? It seems equally implausible that if industrialised countries gave up using this type of fuel – always supposing that is possible – the rest of the international community would follow their example. Thirdly, in view of the inconsistency of public policy, at a national and international level, and the illusion that market forces coupled with eco-taxation can solve the problem of climate change, there is little prospect of the world coming seriously to grips with the problem. On the contrary there is every reason to fear it may be used to achieve other goals.

There is still a great deal of uncertainty about the origin, nature, manifestations and consequences of climate change. This uncertainty inhibits collective action. On the other hand it is surprising to see that despite the doubts, climate change has become the be-all and end-all of international cooperation.

We might even forget, as the 21st century unfolds, that mankind is suffering from famine, restricted access to drinking water, malnutrition and chronic pandemics, that illiteracy and lack of schooling concern far too many children, that unemployment affects huge numbers of people, particularly in these times of economic crisis. We might also

forget that the purpose of economic analysis is not to deliver turnkey solutions, but rather to allow the satisfaction of basic human needs in order to build an 'environment in which the species may develop' (François Perroux) founded on reasonable, humane use of ecosystems.

It remains to be seen what will happen at Rio in 2012, where they will be celebrating Stockholm+40, Rio+20 and Johannesburg+10.

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References

Bosserelle, E. (1994) *Le cycle de Kondratieff. Théorie et controverses*, Masson, Paris.

Boyer, R. and Freyssenet, M. (2000) *Les modèles productifs*, La Découverte, Paris.

Braudel, F. (1979) *Civilisation matérielle, économie et capitalisme*, 3 volumes, Armand Colin, Paris.

Braudel, F. (1985) *La dynamique du capitalisme*, Flammarion, Paris.

Castel, O. (2005) *Histoire des faits économiques. La dynamique de l'économie mondiale du xve siècle à nos jours*, Presses Universitaires de Rennes, Rennes.

Colier, P. (2007) *The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done About It*, Oxford University Press, Oxford.

Crutzen, P. (2002) 'The effects of industrial and agricultural practices on atmospheric chemistry and climate during the Anthropocene', *Journal of Environmental Science and Health*, Vol. 37, pp.423–424.

Crutzen, P. and Stoemer, E. (2000) 'The "Anthropocene", Global Change', *IGBP Newsletter*, Vol. 41, pp.17–18.

Daly, H. (1996) *Beyond Growth*, Beacon Press, Boston.

Fitoussi, J-P. and Eloi, L. (2008) *La nouvelle écologie politique: économie et développement humain*, Stock, Paris.

Fourquet, F. (2004) 'Le rapport international est toujours dominant', *L'année de la régulation*, No. 8, pp.135–171.

Freeman, C. and Perez, C. (1988) 'Structural crisis of adjustment, business cycles and investment behavior', in Dosi, G. et al. (Eds): *Technical Change and Economic Theory*, Pinter Publishers, London, pp.38–66.

Georgescu-Roegen, N. (1970) *La science économique et ses difficultés*, Dunod, Paris.

Georgescu-Roegen, N. (1979) *Demain la décroissance. Entropie, écologie, économie*, Présentation et annotation Jacques Grinevald et Ivo Rens, 2e édition revue et augmentée, Paris, Sang de la Terre.

Husson, M. (2009) 'Un capitalisme vert est-il possible?', *Contretemps*, No. 1.

ILO (2008a) *Emplois verts: pour un travail décent dans un monde durable, à faibles émissions de carbone*, OIT, Genève.

ILO (2008b) *Incidence des changements climatiques sur l'emploi et le marché du travail*, OIT, Genève.

IPCC (2001) *Third Assessment Report – Climate Change 2001: Impacts, Adaptation and Vulnerability*, Cambridge University Press.

Kandel, R. (1998) *L'incertitude des climats*, Pluriel, Paris.

Kondratieff, N.D. (1992) *Les grands cycles de la conjoncture*, Economica, Paris.

Latouche, S. (2006) *Le pari de la décroissance*, Fayard, Paris.

Pacala, S. and Socolow, R. (2004) 'Stabilization wedges: solving the climate problem for the next 50 years with current technologies', *Science*, Vol. 305, No. 13, pp.968–972.

Petit, P. (2005) *Croissance et richesse des nations*, La Découverte, Paris.

Sachs, J.D. (2008) *Common Wealth. Economics for a Crowded Planet*, The Penguin Press, New York.

Stern, N. (2006) *The Stern Review: The Economics of Climate Change*, Her Majesty's Treasury, London.

Tol, R., Fankhauser, S. and Smith, J.B. (1998) 'The scope for adaptation to climate change: what can we learn from the impact literature?', *Global Environmental Change*, Vol. 8, No. 2, pp.109–123.

Valantin, J-M. (2007) *Écologie et gouvernance mondiale*, Autrement, Paris.

Note

1 It should be borne in mind that the vulnerability of population groups depends on their conditions of hygiene, diet, access to economic resources and the satisfaction of their basic needs, in other words on water resources, and socio-economic and political factors.

Appendix A: Key dates in global climatic governance

1827: Jean-Baptiste Fourier offers the first intimation of the greenhouse-gas effect.

1861: John Tyndall identifies water vapour and carbon dioxide as the main greenhouse gases. Tyndall suggests that a change in the atmosphere may influence the climate.

1873: The World Meteorological Organization (WMO) is founded in Vienna (Austria). In 1950 it became a specialist agency affiliated to the United Nations.

1893: Svante Arrhenius (Nobel Prize for chemistry in 1903) carries out the first research into possible links between anthropogenic CO_2 emissions and the risks of global warming.

1972: The United Nations Environment Programme (UNEP) is set up at the end of the UN conference on the Human Environment.

1973: Adoption of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

1979: First World Climate conference in Geneva.

1985: Following a meeting of experts, an advisory group on greenhouse gases is set up.

1987: Publication of the Brundtland report, Our Common Future.

Ratification of the Montreal Protocol on Substances That Deplete the Ozone Layer.

By analysing air bubbles trapped in ice cores from the Antarctic, the glaciologist Claude Lorius shows that historically, when the CO_2 concentration rises, the global temperature rises too.

1988: Toronto conference, The Changing Atmosphere: Implications for Global Security.

Setting up of the Intergovernmental Panel on Climate Change (IPCC) under the aegis of the UN.

1989: Second World Climate conference in The Hague. The European Community makes a commitment to stabilise CO_2 emissions at their 1990 level by 2020, marking the start of the European Union's diplomacy by example.

The UN decides to hold a world conference on the environment and development in Rio in 1992.

1990: First report by the IPCC on the economic, environmental and social consequences of global warming. This report subsequently formed the basis of the Rio Framework Convention on Climate Change (1992).

1991: Start of five rounds of negotiations on the climate convention.

1992: Signature of the UN Framework Convention on Climate Change (UNFCCC), which was adopted on 9 May and signed on 13 June in Rio). It came into force on 21 March 1994.

1993: UN conference on the Environment and Development, Rio de Janeiro (3–14 June).

Start of the UN Commission on Sustainable Development (22 December).

1995: First Conference Of the Parties (COP), in Berlin. Publication of the second IPCC assessment report, establishing the influence of human activities on climate change.

1997: Signature of the Kyoto Protocol, the main implementing text of the framework convention.

2001: The USA pulls out of the Kyoto Protocol. Publication of the third IPCC assessment report, specifying the impact of human activities on climate and the effects of climate change.

Launch in Marrakech of the Clean Development Mechanisms (CDM), with the definition of rules for the issue of credits and the setting up of a supervisory body (CDM executive board), based in Bonn with the UNFCCC secretariat.

The OECD adopts an environmental strategy for the first decade of the 21st century.

2002: UN Conference on Financing for Development, Monterrey, Mexico, 18–22 March.

World Summit on Sustainable Development, Johannesburg, 26 August–4 September. Canada and Russia announce plans to ratify the Kyoto Protocol. China signs in August.

2003: European Commission directive setting up a community system for the exchange of GHG emission quotas, in October.

Launch of the Chicago Climate Exchange (CCX), in December.

2004: Kyoto Protocol ratified by 122 countries. Russia ratifies the protocol on 22 October.

2005: Kyoto Protocol comes into force on 16 February.

Nairobi Work Programme on impacts, vulnerability and adaptation set up, backed by an adaptation fund funded by a 2% levy on MDP projects.

Bali Strategic Plan for Technology Support and Capacity-building adopted by the UNEP board, giving the organisation a mandate to support developing countries at a national level.

2007: Publication of the fourth IPCC assessment report establishing with 90% certainty that anthropogenic emissions are the cause of climate change.

2008: Projected start of trading in emissions-reduction bonds and the corresponding application.

2009: The Copenhagen Conference (7–18 December), tasked with working out the broad lines of a future international agreement on combating climate change after 2012, fails to reach a satisfactory conclusion.

No agreement on post-2012 regulation of climate change.

2010: Resignation on 1st July of Yvo de Boer, the UNFCCC Secretary-General since 2006. Christiana Figueres, from Costa Rica, takes over.

COP16 (29 November–10 December) in Cancun given the task of reaching a consensus paving the way for an international agreement on combating climate change.