VISION FOR RIO + 20:
TRANSITION TO A LOW CARBON ECONOMY AND SOCIETY: CLIMATE CHANGE, ERADICATION OF POVERTY AND SUSTAINABLE DEVELOPMENT

Patterns and Trends from Stockholm to Rio 1992 and Rio + 20

Mukul Sanwal[*]

Rio + 20 should be about big thinking and a re-shaping of current processes if we are to effectively deal with the two greatest challenges of our times, climate change and eradication of poverty. There is an emerging consensus that transition to a green low carbon economy and society is necessary for achieving sustainable development, and the outcome of the United Nations Conference on Sustainable Development (2012) will include a global consensus on its elements and steps in moving towards that aim. The reappraisal of current approaches is an acknowledgement that the paradigm shaped twenty years ago has not been able to deal with the forces unleashed by the industrial revolution. The expected synergies from multilateral environmental agreements and the program of action agreed at the Rio Summit in 1992, Agenda 21, have not been instrumental in changing patterns of consumption and production. The biophysical limits to growth agreed at Cancun means that the global goal of shared prosperity cannot be considered only in terms of environmental damage and must give equal emphasis to eradication of poverty. The transformative impact of the rise of China, by modifying growth pathways, is shaping the new paradigm at the Rio + 20 Summit, with very different relationships between the state, market and citizens, to focus on patterns of resource use that can in principle be adopted by all countries.

The Report of the Secretary General of the United Nations, Objective and Themes of the United Nations Conference on Sustainable Development (A/CONF/216/7), to the Preparatory Committee observes that "the main challenge facing humanity now is to sustain the process of poverty eradication and development while shifting gears. Developed countries must shrink environmental footprints as fast and as far as possible while sustaining human development achievements. Developing countries must continue to raise their people's living standards while containing increases in their footprints, recognizing that poverty eradication remains a priority. This is a shared challenge with a goal of shared prosperity". For implementing this vision the Report stresses that public policy for a green economy must extend well beyond the current reliance on "getting

[*] Mukul Sanwal has held senior policy positions in the Government of India, United Nations Environment Programme and in the United Nations Climate Change Secretariat. He was closely involved with the Rio Conference, 1992, and the World Summit on Sustainable Development in 2002. He is currently associated with the South Center, Geneva, and with think tanks in India. These are his personal views.

prices right" to fundamentally shift consumption and production patterns onto a more sustainable path.

However, the Report does not move away from the narrow policy focus on securing environment-economy synergies and win-win opportunities in certain sectors like renewable energy and a concomitant decline in the growth of energy and resource intensive activities, while not taking into account the scale of the infrastructure needed to ensure eradication of poverty and the fact that 1 billion poor lack access to modern energy (total infrastructure investment worldwide is estimated at about $7 trillion per annum by 2020 of which $1.5 trillion is energy related, more than half of which will be in developing countries). The Report argues that whether countries derive poverty reduction benefits from their green economy efforts depends on sustaining and deepening conventional social spending, on health, education and targeted income support for the poor, ignoring the energy dimension of poverty. The major criticism of governments at the inter-sessional meeting convened to discuss this Report was also that the social dimension of sustainable development has not been adequately addressed in the Report.

The Report points out that the biggest challenge ahead will be to move from small-scale demonstration projects to policies and programmes with broad benefits at national and international levels as long-term simulations of a green economy have only just begun to be made. Current research trends on how to meet global challenges focus on societal dynamics as both the root of environmental problems and the potential solution to them (IHDP, 2007). Environmental problems are no longer defined as discrete problems, but are increasingly being understood as symptoms of a particular development path. For example, despite the scientific evidence that climate change is really a problem of the ecological burden of human activity (Parry, 2009), the issue continues to be framed in terms of assessments of damage and the attendant emissions targets and timetables that pits old against new emitters, and the Report of the Secretary General also looks only at the environmental impact of future growth that will take place largely in developing countries.

As the Report points out, climate change alone has been thoroughly investigated, and this paper is based on a synthesis, analysis and assessment of such research. It offers an interpretation of patterns and trends in multilateral decisions on climate change over the past forty years, informed by the global goal of securing human wellbeing, and suggest broad principles for shaping an agenda for change. A related objective is to rethink the conceptual basis of conventional approaches to studying climate change and global sustainability from the perspective of developing countries, as the developed countries have not been able to control the forces the industrial revolution has unleashed. For example, the emerging paradigm focuses on a more scientifically and politically appropriate framework for international cooperation based on stocks rather than flows of greenhouse gas emissions, because global warming is caused by the concentration of these gases in the atmosphere, a fact that is recognized in the Objective of the Climate Convention. It also moves away from a somewhat arbitrary 450 parts per million limit of the level of carbon dioxide in the atmosphere and the attendant narrow focus on burden

sharing and mitigation to recognize that we need to deal with the adverse impacts and patterns of resource use.

The paper is organized as follows: First, it examines the political, and not just the environmental, underpinnings that shaped the way the issue of the climate change was framed. Next, it considers the various dimensions of the structure and institutions under which climate governance has evolved. Then it analyses the implications of the Copenhagen Accord, and related Cancun Agreements, in the context of the changing global balance of power. Finally, it outlines a strategic shift with new forms of international cooperation, shaped by the transformative impact of the rise of China, to support the global transition to sustainable development.

A paradigm shift, giving centrality to human wellbeing, serves to clarify our understanding of a very complex issue and impact on the climate negotiations in the run up to the Durban Conference as well as the Rio + 20 Sustainable Development Conference, the Summit to be held in 2012 to commemorate the 20th anniversary of the Earth Summit in Rio de Janeiro, that had led to the United Nations Framework Convention on Climate Change, and the current paradigm for sustainable development.

I

Background

Climate change first came onto the global agenda in the Stockholm Programme of Action in 1972. At the World Summit on Environment and Development (the Earth Summit at Rio, 1992), the Climate Convention (1992), and later its Kyoto Protocol (1997), framed the issue as a response to international emission reduction commitments that pitted old against new emitters leading to inconclusive debate on the rules and architecture of a long term climate regime. The World Summit on Sustainable Development (2002) began to explore social development and alternative approaches based on consumption and production patterns, partnerships with the private sector and development of new knowledge through networks that were not based around multilateral environmental agreements. The subsequent Copenhagen Accord (2009) and the agenda for the Rio + 20 World Summit, to be held in 2012 (also agreed in December 2009), have the common theme of transition to a low carbon economy in the context of eradication of poverty and sustainable development, signifying a shift away from international environmental law as the basis for both international cooperation and national policies to meet the challenge.

The United Nations Millennium Development Goals, and the Copenhagen Accord, as well as the on-going negotiations under the Climate Change and Biodiversity Conventions, recognize that eradication of poverty remains the overriding priority of developing countries. A new poverty index recently developed by the United Nations also stresses lack of services such as electricity as a key factor in determining poverty (UNDP, 2010). This underlines the importance of defining the transition to a low carbon green economy and society in terms of access to energy services and services provided by the ecosystem to enable the eradication of poverty. Global carbon management provides an integrating theme bringing together all natural resources - energy, water, food and

biodiversity. Therefore, an equitable allocation of the global atmospheric resource into national carbon budgets will link climate change (patterns of resource use), biological diversity (ecosystem services) and the Millennium Development Goals (conservation through local development). National carbon budgets are also the most appropriate indicator for measuring sustainability - sustainable use of atmospheric and terrestrial natural resources, and assessing national strategies for making the transition to sustainability.

The shared vision of the Cancun Agreements (2010) recognizes the substantial opportunities from a paradigm shift towards building a low carbon society. Instead of the multilaterally agreed emissions reduction targets of the Kyoto Protocol, there is now a shared target for all countries, where nationally determined cuts in greenhouse gases are required according to science. Developed countries are to take the lead in cutting greenhouse gases with low carbon strategies. New rules, in the form of guidelines, will assess domestic action in developing countries. While the principle of common but differentiated responsibilities and respective capabilities will continue to provide the framework for international cooperation it will no longer be the policy driver, and a global goal is now to be agreed at the multilateral level, linking the climate negotiations and the negotiations on the elements of a green economy, in the context of sustainable development.

The politics of sustainability

The basic assumptions of global environmental sustainability that were laid out forty years ago no longer hold. This common understanding was based on the historical responsibility of developed countries for causing the pollution – they would do whatever has to be done and support developing countries through provision of financial resources and technology. The modest scale of pledges at Copenhagen, accounting loopholes in the Kyoto Protocol and continuing lack of political support for modification of longer term trends in developed countries -"the American way of life is not up for negotiation" - has been a cause of concern at the climate negotiations. Recent analysis also establishes that market mechanisms will not lead to the required technological transformation for a sustainability transition (IEA, 2010; UK CCC, 2009); a combination of technology development, market mechanisms and government policies will be needed to influence the actions of millions of energy consumers, from large factories to individual households (IEA, 2010a). Setting the price signal and emissions cap at the right level has proven difficult, and the effectiveness of the European Trading Scheme in promoting low-emissions investment is questionable (Morgera et all, 2010). Japan has concluded that an emissions trading scheme will hamper investments in key industries and that forcing companies to accept allocated emission caps, as in Europe, would not work in Japan. The United States has also deferred a discussion on a 'cap and trade' system, and emissions reduction commitments. In industrialized countries, when policies focused on economic growth have confronted policies focused on emission reduction, it is economic growth that wins out every time (Pielke Jr, 2010).

In the period 1990-2005 developed countries emissions rose by 1.35 Gt (United States emissions grew by 18 percent), and what is worse show an increasing trend, and overall

emissions remained limited only because of the reductions of 1.76 Gt in the Economies in Transition following the economic collapse of the Soviet Union (WRI, 2010). While global emissions remained constant in 2009, for the first time since 1992 because of the drop in economic activity, they could again increase as developed countries grow out of recession (PBL, 2010). The European Union, which has been at the forefront in meeting the challenge of climate change, is unlikely to achieve its target of reducing energy consumption by 20 per cent by 2020. The developed countries have not modified longer term trends, or their lifestyles, as they had agreed to do under Article 4.2(a) of the Climate Convention.

At the same time the impact of the transformative power of the rise of China, now the second largest economy, in decoupling emissions from economic growth has largely been ignored. A recent comparison of Copenhagen emission pledges concludes that China would contribute over 40% of total abatement by all countries, more than the total abatement by all developed countries combined, and more than 2.5 times the amount of abatement undertaken by the United States and over five times the European Union's Kyoto commitment, driven by concerns for energy security and industrial policy (Ecofys, 2010; See also WWF, 2010). As its per capita emissions are one-fifth those of the United States, China, while moving away from notions based on historical responsibility of developed countries for causing the problem, is stressing that the differentiated commitments of countries at different levels of development continue be maintained, the developed countries should do more and eradication of poverty remains the overriding priority of developing countries (Jotzo, 2010). The changing role of China in driving global growth and international relations has the potential to set new rules with sustainability conceptualized in terms of strategies to modify patterns of resource use rather than in terms of legally binding commitments that will determine a balance of rights and obligations.

The current framework of climate governance with its focus on burden sharing needs to be revisited for three reasons. First, it has now become clear that international cooperation based on multilateral agreements around long-term issues, like climate change, is different to sectoral issues like the ozone problem, because alternative patterns and processes in the human use of nature in developed and developing countries result in trade-offs for socio-economic systems that are very different to those focusing only on environmental systems (Levin and Clark, 2010). For example, different energy economies and greenhouse gas emission profiles lead to different economic and environmental impacts for countries in pursuing a harmonized policy approach (NRTEE, 2011).

Second, ecosystem services delivered outside national boundaries – by the atmospheric and terrestrial natural resource - have been ignored, effectively setting their value to zero in decision making. As the Nobel Prize winner Joseph Stiglitz pointed out in his address to the International Economics Association, held in Istanbul in June 2008, in the case of carbon management the key problem is how to allocate emission rights, currently valued at about $2 trillion annually, that is 5% of global GDP, and the "only serious defensible principle is equal emission rights per capita, adjusted for past emissions…. as a process

of slowly easing in emission rights would increase inequities associated with past emissions". Even if this entails large redistribution, it is not clear why this should be treated differently than other property rights. Stiglitz goes on to argue that the transition to a low carbon economy will require a new economic model – changed patterns of consumption and innovation, as "only through changes in patterns of demand will adverse effects of climate change on developing countries be mitigated".

The atmosphere is a strategic resource needed for the establishment of infrastructure to enable the eradication of poverty, climate governance cannot be considered only in terms of environmental damage, and has now become a part of the political, economic and security debate because of the competition for scarce resources. As there are limits to the total ecological burden the planet can sustain, the global policy issue is what form international cooperation should take for eradication of poverty in the context of the slow pace of modification of longer term trends in developed countries in making the transition to sustainable development (Sanwal, 2009).

Third, a rethinking is taking place of the science, policy, society nexus to bridge the gap between the scientific understanding of environmental degradation and government action to reverse it. Hypothetical scenarios bear no relationship to the real options confronting policy makers now (Perring et all, 2011). Existing models focus on specific policy areas and sectors such as energy and transport. They cannot capture fully the impact of resource use on ecosystems, enterprises, the economy and society as a whole, or the interdependence of policy measures (EC, 2011). For example, while the International Energy Agency points out that individuals' access to electricity is one of the most clear and un-distorted indication of a country's energy poverty status (it further breaks down energy access into incremental levels of basic human needs, productive uses and modern society needs), 'basic human needs' is the level that is commonly used for forecasts of costs, and growth in emissions from, universal energy access. Consequently, the United Nations assumes that the 1.4 bn rural poor without access to electricity will each need only 75 kwh annually - a floor fan, two compact fluorescent bulbs and a radio - for about five hours each day, which would, therefore, increase developing country emissions by a negligible 3 per cent till 2050, rather than aim to achieve the developed country average in per capita electricity use (1000kwh) and recognize the higher level of emissions inevitable for the eradication of poverty (AGECC, 2010).

This dichotomy related to the energy dimension of sustainable development will have to be settled by the Summit. The Millennium Development Goals (MDGs), agreed in 2000, did not include energy as a basic need and ignored its essential role in establishing infrastructure necessary for the eradication of poverty. One arm of the United Nations - United Nations Energy – has now called for a commitment to two complementary goals of ensuring universal access modern energy services that are affordable and combine basic needs and productive uses to 2-3 bn people as well as reducing global energy intensity by 40 per cent by 2030 (AGECC, 2011). However, another arm of the United Nations - the Intergovernmental Panel on Climate Change – acknowledges that its energy, or emissions reduction, scenarios do not take into account lifestyle changes in developed countries, effective putting the burden of improving energy intensity onto

developing countries (IPCC, 2007). Placing the MDG's in the framework of sustainable development will require a focus on the role of energy and ecosystem services in the eradication of poverty and human wellbeing.

Reconciling competing resource needs with respect to maintaining lifestyles and eradication of poverty is at the core of the climate negotiations and at the centre of the deliberations on modification of longer term trends for the transition to global sustainability.

The lifestyle versus poverty issue

Greenhouse gas emissions are driven ultimately by consumption. Over two-thirds of global emissions of carbon dioxide occurred in the period after 1970, caused by the demands for infrastructure and urban lifestyles, rather than from industrialization (TISS, 2010). Not surprisingly, it was only in the 1980's that global emissions of carbon dioxide began to exceed the capacity of the planet to absorb them, and their increasing concentration assumed dangerous levels. In developed countries, while industrial emissions have remained steady since 1990, over two-thirds of carbon dioxide emissions are now coming from the services, households and travel sectors, they account for more than half the increase in global emissions since 2005, and it is expected that emissions from transportation (largely for leisure) will exceed half of global emissions in 2050 (IEA, 2009).

Developed countries are seeking to maintain their energy use per capita, as they do not want to modify their lifestyles by increasing the cost of energy or through regulation. Instead they are stressing consensus on a carbon price applied across all countries; including market based cooperative frameworks, for sharing marginal costs of measures, as they define them, with developing countries (Stern, 2007). They, therefore, consider the economic potential of countries and adjustments only in developing countries, ignoring the required changes needed in their country economy and society. For example, they suggest that avoiding emissions from tropical deforestation can be done at relatively low cost, reducing carbon prices for measures taken in developed countries by up to 40% in 2020 (OECD, 2009), rather than ranking measures across all countries. Consequently, in the world energy related carbon dioxide abatement scenario up to 2050, prepared by the International Energy Agency, most of the reductions come from developing countries – China 27%, India 12%, US 11%, OECD other than Europe 10% and OECD Europe 7% (IEA, 2010), and developing countries are expected to reduce their projected consumption of energy by 1 Gt – *i.e.* five times the OECD target in order to meet the 450 Scenario (IEA, 2010a). Not surprisingly, all policy scenarios for proposed emissions reductions show relatively larger reduction in GDP growth for developing countries than for developed countries (German Federal Environment Agency, 2010). This approach based on environmental impacts of future growth of developing countries, rather than on consumption patterns that led to the global crisis in the first place, is the cause of the impasse in the negotiations on how best to deal with the challenge of climate change.

The policy problem is that current scenarios of the future, up to 2050, focus on 'flows' of greenhouse gases, whereas climate change is caused by their 'stock', or, concentration in

the atmosphere. For bending the curve from a reference line to acceptable global emissions pathway international cooperation, in the form of sharing the costs, requires a peaking year. However, defining the reference line and the assumptions about national and global economies remains controversial, and even the IPCC is moving towards considering a global carbon budget, which is a physical quantity, easily determined and more transparent.

Moving from prices to quantities and the economics of human development as the basis for international cooperation will require agreement on quantitative limits by sharing the global carbon budget. Even though cumulative per capita emissions are correlated to cumulative per capita GDP, and the cumulative emissions of an average Chinese in the period 1850 – 2005 are less than one-tenth, and since 1990 less than one-fifth, those of an average American[*] (WRI (a), 2010), developing countries will have to make do with the budget currently available to a mid level developed country, like Portugal or Spain, and also move away from debates around historical responsibility by sharing the global carbon budget only for the period 1970 – 2050, when the issue first came onto the global agenda. The principle of common but differentiated responsibilities and respective capabilities will then be interpreted in terms respective capabilities, and should have wider acceptability and legitimacy.

Developing countries recognize that the context in which sustainability is being discussed at the multilateral level has changed since the Climate Convention was negotiated in 1992. In 2005, for the first time since the dawning of the industrial age, developing countries accounted for more than half of global GDP at purchasing-power-parity (PPP). Their growth prospects suggest that the challenge lies in devising national strategies for development of infrastructure necessary for eradication of poverty that will also move to a low carbon economy and society. However, at current levels of technology developing countries will have to follow similar trends as in developed countries. Therefore, the key issue for deliberation in the climate negotiations, and in the Sustainability Summit, is human wellbeing, making energy available to those who do have it at present, or the eradication of poverty, in an environmentally sustainable manner.

The deliberations at the multilateral level should really be seen as an opportunity to discuss options for making the societal transformation to modify production and consumption patterns. The global community would then ask a very different set of questions, instead of the current narrow focus on mitigation, adaptation and burden sharing, and frame the issue differently in terms of patterns of resource use. They would, for example, need to identify which longer term trends should be modified, and the best way of doing so at the national level. At the international level, they would need to lay out a time-table for joint research and development of new technologies, as well as mechanisms for their transfer, to meet the scale and speed of the response. They would also measure the access to electricity by the poor. In this framework equity would not be

[*] India is often compared with China, despite the former having lower levels of emissions, higher poverty levels and lower economic capacity relative to China. India's per capita emissions of 1.5 tonnes CO2 eq are far below the world average. With 17% of the world's population, India contributes only 4.6% of the world's GHG emissions. However, India is the third largest GHG emitter in absolute terms. Since 1990, emissions have grown by 65% and they are projected to increase by 70% by 2020.

conceptualized in terms of a controversial ‘ecological debt”, but redefined as patterns of resource use that can in principle be adopted by all countries.

II

Flawed legal framework

The nature and scope of the problem of global sustainability has long been recognized along these lines, but not acted upon because of political considerations. The report ‘US Priority Interests in the Environmental Activities of International Organizations’ prepared by the Committee on International Environmental Affairs of the State Department, in the run-up to the first United Nations Conference on the Human Environment, noted in 1970 that

> “Long range policy planning to cope with global environmental problems must take account of the total ecological burden. This burden tends to increase with population growth and with the level of economic activity, whereas the capacity of the environment to provide essential inputs to production and to absorb unwanted outputs from consumption is fundamentally limited. The problem with managing total ecological burden will remain even after world population is stabilized. Controlling that burden by systematic reduction in per capita production of goods and services would be politically unacceptable. A concerted effort is needed to orient technology towards making human demands upon the environment less severe” (State Department, 2005).

This approach of ignoring the impact of patterns of resource use embodied in growth pathways has shaped deliberations since the Stockholm Conference on the Human Environment, held in 1972.

The United States also initiated the process of setting up the Intergovernmental Panel on Climate Change (IPCC), in 1988, with ‘official experts’ as the politically favored means of climate change assessment, with the express purpose of engaging developing countries. The First World Climate Conference, held in 1979, did not make any calls for policy action and only initiated a series of workshops, and the one at Villach in 1985, first recommended exploration of ‘alternative polices and adjustments’. The hasty conversion of the outcome into an intergovernmental mechanism was motivated by the desire of the United States to buy time and delay a potentially costly political response, in addition to involving developing countries, as they were absent in the earlier deliberations (Agrawala, 1998).

Subsequently, at the Rio Conference on Environment and Development, in 1992, the ‘grand bargain’ with developing countries was based around international environmental law as the framework for governance in order to reconcile the differing and competing concerns of developed and developing countries. The framework was conceptualized in terms of mutual rights and obligations of polluting and victim states. It was argued that interdependence in terms of contributions and solutions required cooperation, and the response was to build multilateral treaty-based regimes.

The use of law to produce global collective benefits raised the important question of burden sharing. However, the principle of common but differentiated responsibilities that emerged at the Rio Conference, in 1992, did not specify what is to be done and paid for and by whom and for what purpose. The Oxford Handbook of International Environmental Law has recently raised the important issue of legitimacy, that "international environmental law continues to struggle with the complaint that it reflects the concerns of developed countries more than those of developing countries…..in the ongoing debates over whether developing countries, for example, should preserve biological resources of global concern or should reduce their greenhouse gas emissions and, if so, how much financial support developed countries should provide for such efforts" (Bodansky, 2007). Even after intensive deliberations in each of the annual meetings of the Conference of the Parties, since 1992, the principle of common but differentiated responsibilities and respective capabilities remains undefined, and has been a continuing source of considerable tension.

The continuing focus on ending differentiation

Over the last twenty years the deliberations under the climate regime have focused on ending differentiation rather than discussing alternative policies to deal with the challenge of sustainable development. The gap between the stated concern for the environment and the nature and scope of the design and implementation of the actions – the way the problem has been defined, implementation sought through the market and cooperative action designed around workshops – has led to a situation where evolution of the climate regime has focused on institutional arrangements seeking a balance between the thrust of developing countries, in the statements of the G77, on developed countries implementing commitments related to means of implementation – finance, technology and capacity building, and the efforts of developed countries to shift the deliberations on international cooperation away from their commitments, which were never specific in the first place, to policy shifts in developing countries, through three distinct but related tracks.

Initially, developing countries refused to recognize that they should contribute to meeting the challenge because they had not caused the problem, and looked upon the negotiations as something that the developed countries had to deal between themselves. The lengthy negotiations on the Kyoto Protocol and its rules (1994 – 2001) were dominated by largely successful efforts of developed countries to shift the focus to flows rather than stocks of carbon, reduce the scope and costs of measures they would be taking through offsets, like the Clean Development Mechanism projects (CDM) and now tropical forest sinks (REDD), securing accounting loopholes (in the way emissions limits were assigned and in the definition of terrestrial sinks) and a weak compliance system (where shortfalls would be met in the next commitment period). Consequently, the total amount of surplus emissions credits, or 'hot air,' currently available is large enough to allow these countries to follow a business-as-usual pathway until after 2020, while still complying with the emissions targets announced at Copenhagen (Ecofys, Climate Analytics and Potsdam Institute, 2009). Recent estimates also show that the loopholes alone would allow

developed countries to increase actual domestic greenhouse gas emissions by 7 to 10 percent, that is, 2 – 3 Gt., and their actual overall reductions in emissions would be only 3 per cent below 1990 levels in 2020 (Ecofys, Climate Analytics and Potsdam Institute, 2009). Moreover, even after one year, the majority of developed countries have announced, rather than legislated, their emission reduction pledge made at Copenhagen, and until mechanisms are adopted to carry out these emission reductions there is a chance that even these low pledges will not be met, as in the past.

The second track has been to keep developing countries engaged in setting up new institutions to support capacity building projects (Global Environment Facility, Green Climate Fund), expert groups (technology transfer, Least Developed Countries and national communications) and programmes of action (adaptation, forests) whose only tangible result has been to increase awareness and provide limited resources to the Least Developed Countries. Adoption of new energy or agriculture technology has not been provided incremental costs promised in the Convention, despite countries submitting projects and lists of technologies they need. The various funds are not technically adequate for responding to developing countries' needs for adaptation, both because of the complex design of the funds and the poor implementation of the guidance provided by the Conference of the Parties (Mohner and Klien, 2007), and there is no visible effect of the Kyoto Protocol on technology transfer (Dechezlepretre, 2008). The European Policy Institute assessing the extent to which the European Union has lived up to existing financial commitments made for supporting implementation of the Kyoto Protocol has concluded that there is lack of clarity in defining what is new and additional, the information communicated to the United Nations is unreliable or not provided, and the amount provided to multilateral funds (about $4bn in grant funds) falls well short of the commitment (Pallermaerts, 2009). Such inaction must be seen in the context of the recognition that consideration of development can no longer be left to other forums and but must be addressed through institutions in an integrated manner through measures to deal with climate change (WESS, 2009).

The third track, since the ratification of the Kyoto Protocol, has focused on an agenda that would blur the differentiation between developed and developing countries with respect to emissions reduction commitments. In the annual meetings of the Conference of the Parties the negotiations for the second commitment period of the Kyoto Protocol have come to an impasse, despite a specific commitment in Article 3.9 of the Protocol. The Parties to the Protocol argue that they will take commitments only if the United States does so, and the latter will take commitments only if China, now the largest emitter, takes on legally binding commitments, despite China's per capita emissions being one-fourth those of the United States.

The aim now is to discuss, or negotiate, policy issues in an incremental manner amongst a small group of countries outside the United Nations framework, with the role of the Convention limited to implementation. Following its rejection of the Kyoto Protocol, the United States led the formation of alternative forums outside the multilateral framework, such as the Asia Pacific Partnership on Clean Development and the Major Economies Meetings, later to evolve into the Major Economies Forum. The G8 Summit at

Heiligendamm, in 2007, with a new US President, (relying on, as we now know, controversial assessments in the IPCC) called for a new framework and global goal for emissions to be halved by 2050, with further action to be based on the principle of common but differentiated responsibilities and capabilities. It set up a dialogue process (2007 – 2009) to build trust with, and recognize the role of, the major emerging economies (Brazil, China, India, Mexico and South Africa) for developing a common understanding on climate change, and initiated analytical work on technology cooperation and energy efficiency through the OECD and the IEA.

These deliberations prepared the ground, at the G8 Summit in L'Aquila in 2009, for leaders of all major emitting countries to reiterate the importance of keeping the increase in average global temperature below 2 degrees Celsius. However, the developed countries also agreed, but did not share with their developing country partners, the strategy to develop a text outside the UNFCCC framework for a political agreement, as a treaty where developed countries took on legally binding commitments and developed countries had voluntary commitments was not acceptable to the United States (Danish Foreign Policy Yearbook, 2010). This set the stage for intense political pressure at Copenhagen, later in 2009, for the internationalization of mitigation action and symmetry of obligations. The subsequent stress, in the Cancun Agreements, on international consultation and analysis of national actions in developing countries has the objective of negating the current agreement that poverty eradication is the overriding priority of developing countries, with environmental effectiveness, in terms of a peaking year, being proposed as the benchmark for review of national policies and strategies, as in the case of the developed countries. The principle of common but differentiated responsibilities and respective capabilities is now being interpreted as common commitments with differentiated reductions.

This reappraisal of their interests and how to achieve them has led the United States and China to reframe the issue, and the climate regime, away from historical responsibility to respective capabilities, obviating the need for a specific legal arrangement to balance rights and obligations of countries. The United States climate envoy Todd Stern said in a speech in October 2010 that a "new paradigm" was needed since developed nations now account for just 45 percent of world emissions, a share that is set to fall to 35 percent by 2030. China is now prepared to take responsibility corresponding to the development level of the country (Chen Jiang, 2010). Consequently, in the Cancun Agreements, agreed on seeking shared prosperity, rather than burden sharing, as the objective of multilateral cooperation. For example, the Academies of Sciences of the United States and China have recently intensified their cooperation in renewable energy technology development, cost reduction or deployment outside the climate treaty (NAS, 2010 a).

III

Copenhagen and the shifting power balance

It was widely reported that at Copenhagen China rejected unilateral cuts in greenhouse gas emissions by developed countries. A UK Minister wrote in the Guardian that "we did not get an agreement on 50 per cent reductions in global emissions by 2050 or on 80 per

cent reductions by developed countries. Both were vetoed by China, despite the support of a coalition of developed and the vast majority of developing countries" (Miliband, 2009). A furious Angela Merkel, German Chancellor, is reported to have demanded "why can't we even mention our own targets?"(Lynas, 2009). A recent report explains the Chinese position in terms of safeguarding equity, pointing out that, cuts of both global greenhouse gas emissions by 50 percent and that of industrialized countries by 80 percent by 2050, amounting to a partitioning of the atmospheric resource, would mean that emissions in developing countries are only allowed to increase by 15 percent by 2050 relative to their 1990 levels (SEI, 2010). Developing countries, led by China, now have the power to resist imposition of rules that are detrimental to their interests.

It is also being argued that the challenge of climate change is too complex for the 'cumbersome' current institutions to deal with. Informal institutions outside the Climate Convention decision making structure and an evolutionary process where legally binding commitments would enfold over time are being advocated as politically the most promising way forward (Bodansky, 2010). The UN Secretary General has set up a Panel on Sustainability charged with recommending how a fifty percent reduction in global emissions can be brought about by 2050; a target first proposed by the G8. While this Panel, as a part of the United Nations framework, has more legitimacy than other groupings, like the G 20 and the Major Economies Forum, but still does not represent the interests of all developing countries.

Similarly, the Panel on Climate Finance set up by the Secretary-General of the United Nations has not been able to come with an agreed approach to transaction based sources of international finance to provide the $100 bn promised at Copenhagen, largely because developing countries have opposed the measures under consideration, as they will have a greater incidence on developing countries than on developed countries (Economist, 2010)

Future negotiations under the climate regime and the Rio + 20 Sustainability Summit will require developing countries to make policy choices on the evolution of climate governance. The safeguards in the Climate Convention that developing countries were able to wrest at the last minute in 1992 are in danger of evaporating. Under Article 4.7 of the Climate Convention, which was the last Article to be negotiated, legally binding measures taken by developing countries for mitigation are contingent on the provision of financial resources and technology, and this requirement was waived in the Copenhagen Accord, with voluntary pledges by developing countries. The second safeguard that eradication of poverty remains the overriding priority of developing countries is at risk of being negated by the focus of the Cancun Agreements on international monitoring of developing county mitigation actions ignoring the infrastructure needs for eradication of poverty, and the attendant inevitable increase in emissions of carbon dioxide. International analysis of national actions, or NAMAS, can only be done against an agreed benchmark shaped by assured access to sustainable development. Therefore, the new rules should not be in terms of environmental effectiveness, but rather how best developing countries can eradicate poverty while making the transition to sustainable development, for them to have legitimacy.

In this strategic shift national actions have become the central issue. With broad agreement on limiting increase in global temperature to 2 degrees Celsius at Cancun, developed countries are now insisting on a global goal of halving emission levels by 2050, continuing to focus on flows rather than stocks of carbon. The Convention requires that developed country emissions should have peaked at 1990 levels by the year 2000. As developed country emissions continue to grow, developing countries see that global goal, with its implications for a peaking year, as a threat to their future economic growth and overriding priority related to eradication of poverty (The Climate Group, 2011).

This approach, even if controversial principles and provisions of the Convention are not taken into account, will adversely affect developing countries. First, it is argued that since emissions from developing countries will account for half of global emissions by 2050, they must take on commitments now. Global attention is sought to be focused on the increasing emissions from China (and India), where three quarters of the electricity generated goes for industrial production and any reduction in emissions will have a direct impact on economic growth and eradication of poverty, unlike in developed countries where consumption by households' accounts for two-thirds of the electricity generated, and reductions will impact only on (wasteful) lifestyles. Moreover, while the major share of emissions in developing countries is from food production, mobility (for leisure) has the largest share in emissions of developed countries. As developing countries still have to build their infrastructure and need carbon space for it, peaking of emissions using available technologies will impact on eradication of poverty, and global leaders should really discuss how their economic growth can take place in an environmentally sustainable manner.

Secondly, the current framework ignores the fact that energy and ecological services are directly related to human well being. Development of infrastructure, urbanization, manufacturing and food production all need carbon space, are essential for economic growth, and for alleviation of poverty. For example, the per capita generation of electricity in India is one-fifteenth that of the United States. Estimates suggest that currently, worldwide 1.6 billion people lack access to electricity. The key global climate policy – or equity - issue is that without developed countries sharply reducing their emissions immediately other countries cannot get their fair share of the carbon budget for eradication of poverty.

A third shortcoming is the current international approach of setting emissions targets at the point of production rather than consumption, amidst increasing globalization of the world economy. For example it is estimated that China's export-related emissions account for one-third of its emissions (Pan,2008). It has, thus, become easier for developed countries' to slow the growth in their emissions and meet their targets at the expense of developing countries - in effect, exporting their emissions.

At the same time, all scientific assessments conclude that developing countries, rather than developed countries, will bear the adverse impacts of climate change with huge economic costs. According to recent research agricultural output in developing countries is expected to decline by 10-20 per cent by 2080, while a considerable percentage of the

population in developing countries will continue to derive their livelihood from agriculture. Agricultural growth has also been found to be four times more effective in reducing poverty than growth in other sectors. As the main determinant of a countries' adaptive capacity is economic wealth, such unprecedented adverse impacts of climate change will severely constrain development and lock the poor in long term poverty traps. Meeting this challenge will require major new investments, for example, in agricultural research to develop new drought resistant crop varieties and insurance schemes. UNDP has estimated the annual costs of adapting to climate change to be $86 billion in 2015, while the amount pledged to date for adaptation (cumulatively, not per year) is around $300million.

A large share of this burden will inevitably fall on national budgets of developing countries, and they have to accept this responsibility. For example, India already spends about 3 per cent of its GDP on adaptation. However, such an international understanding should be contingent on the developed countries providing funding for natural disaster insurance, a provision that exists in the Climate Convention, and joint research for the development of drought resistant seeds etc. on the lines of the green revolution. This framework would allow countries to move onto a new era of global cooperation on a common concern, rather than remain bogged down in details of how much of the increasing severity of current drought, floods and cyclones are caused by climate change.

There are three dimensions of the equity implications of a new paradigm framed in the context of patterns of resource use. First, criteria for allocating the global carbon budget, or limits on national emissions, among countries need to be agreed at the multilateral level. Since the available carbon space is part of the global atmospheric commons, every country's fair share of carbon space is proportional to its share of the global population. Second, it needs to be recognized that the poor in all developing countries, and not only in the least developed countries, will suffer disproportionately from the adverse impacts of climate change, particularly in marginal lands, and carbon space needs to be reserved for the assured growth of countries whose per capita emissions are below the global average. Third, carbon management will raise the price of energy at the national level and impose the greatest burden on poor households as energy related goods and services make up a larger share of their expenditures. The adverse effects of climate change and the increased energy costs need to be minimized through both the transfer of technology and provision of financial resources on concessional terms.

These findings bring a new perspective to the international debate as the United Nations struggles to find a global consensus, and suggests that a broader focus on new rules centered on patterns of resource use will be needed.

IV

Global goal of human wellbeing

A new agenda is needed for ensuring human wellbeing because the global goal of keeping increase in temperatures to below 2 degrees Celsius requires 14 Giga tonnes (Gt.) of emissions abatement by 2020, whereas the firm pledges made after the

Copenhagen Conference amount to only around 9 Gt, with developing countries already contributing more than the reduction commitments of the developed countries (Den Elzen, 2010). Moreover, the countries with per-capita emissions and incomes below the global average collectively would need at least as much carbon budget as the developed countries are about to take up from now until 2050, if the poor countries were to merely reach average global greenhouse gas emissions of 4 tonnes per capita by 2050, that is recognized as a legitimate aspiration in the Copenhagen Accord (WRI, 2010).

Therefore, the climate negotiations must recognize that both global temperature and greenhouse gas concentration limits are needed as the basis for long term co-operation to meet the climate challenge. A report of the National Academy of Sciences of the United States, on limiting the magnitude of future climate change, published in May 2010, also concludes that the "policy goal must be stated as a quantitative limit on domestic GHG emissions over a specified time period – in other words a GHG emissions budget …… national shares of global emissions need to be agreed at the multilateral level as the basis for developing and assessing domestic strategies" (NAS, 2010). The United Kingdom already has legislation establishing a national carbon budget (UK, 2009).

Recent research in the United States assumes that 200 Gt. of carbon dioxide equivalent will be available in the period 2012 – 2050; while for 2008 annual emissions from the United States were 7 Gt! The scientific analysis is unambiguous, and notes that this budget is "based on 'global least cost' economic efficiency criteria for allocating global emissions among countries, and using other criteria, different budget numbers could be suggested (for instance, some argue that based on global 'fairness' concerns, a more aggressive U.S. emission reduction effort is warranted" (NAS, 2010). Post Cancun, with agreed limits on increase in global temperature, global policy requires early agreement at the multilateral level on the global goal of quantitative limits on emissions and allocation criteria for the scarce atmospheric resource.

Outside of the multilateral process, China and India have begun to take the first steps for an alternate policy framework for sustainable development, and in this manner re-defining the nature and scope of national actions away from a narrow focus on percentage reductions in emissions to transition to a low carbon green economy and society. Their focus on activities that generate global change, placing resource conservation, environmental protection and economic development on equal footing, is showing good progress. The 11th Five year Plan of China (2006-2010) has set a target to reduce energy use per unit of GDP by 20 per cent by 2010 compared to 2005, which is going to be achieved. China has also pledged to reduce its carbon intensity by 40 to 45 percent by 2020 compared to 2005, and the government is likely to include the target in its 12th five-year plan from 2011 to 2015 and could outline fledgling market-based steps to curb carbon emissions from burning fossil fuels. Further steps to promote the burgeoning clean-tech sector are possible under a $1.5 trillion plan to boost strategic sectors.

China has already launched a major effort to boost hydropower and helped drive rapid expansion of wind and solar power to wean industry off fossil fuels and to meet an insatiable appetite for electricity. China has more efficient coal fired plants than the

United States and is becoming the major world market for such plants, as well as for renewable energy (IEA, 2009). In 2009 it approved a national target for increasing the use of renewable sources to 15 per cent of energy use and committed to lowering carbon dioxide emissions by 40-45 per cent of 2005 levels by 2020, and $36.4 bn was invested in renewable energy in 2009 (which is much more than the investment in the US). China has in the past five years become the undisputed global leader in renewable energy. It has more than twice as much solar thermal capacity as the rest of the world combined; it is the global leader in solar PV manufacturing; and it has both the world's largest wind energy market and total installed capacity. Renewable energy installed capacity, including hydro electricity, will increase to 47% of total capacity by 2020. China will install 10 million charge stations for electric cars by 2020.. China will invest €57 billion in grid infrastructure allocated to ultra high voltage (UHV) transmission lines by 2015, and more than €460 billion in "smart grids" in the next decade.

China's fundamental shift in growth pathways will make it the first country in the world to decouple economic growth from energy use even while having large numbers of poor. Green growth has been officially adopted by China to be part of the core strategy for the coming decade. The 12th 5-year plan will put emphasis on economic and industrial restructuring towards greener, more efficient and lower carbon growth. The steps include extraordinarily strong efforts within wind, solar, hydro, nuclear, electric cars, smart grid, infrastructure and high speed rail, continued efforts to increase energy efficiency, tough regulation and huge investments. Public spending in these sectors will be increased to 2-2.5% of GDP by 2015. It is expected that an emission trading scheme will soon be introduced, as well as a national resource tax. Experiments with 'low carbon zones' in 8 cities and 5 provinces, covering over 300 million people, have already been started. China's forest cover increased 1.6 per cent annually in the period 2000 – 2010, the largest in the world. China accounts for a third of all output by developing countries, and total factor productivity has consistently shown a rising pattern since 1995, and growth in labour productivity exceeded 8.7 percent in 2012, which was the highest in the world, impacting on global trends in resource consumption (Conference Board, 2010). On World Environment Day, June 2009, China issued a nationwide call for a "low carbon lifestyle".

The National Action Plan on Climate Change developed by India, in 2008, also seeks shifts in development growth pathways to achieve sustainable development through demand-side management, renewable energy, and conservation of forests and water resources. India plans to cut carbon intensity by 20 – 25 per cent below 2005 levels by 2020, and aims to raise renewable-based capacity to 72,400 MW - or 15.9% of total capacity - by 2022, when the country will have 450GW of total capacity. The government is to launch a mandatory national energy efficiency trading scheme in April, 2011, that will help it achieve its pledge to reduce India's emissions intensity by 20 to 25 percent by 2020 from 2005 levels, and further underpin investment in clean technology. The Perform, Achieve and Trade scheme will cover more than 700 companies in nine sectors, such as iron and steel, cement and thermal-power plants, that together are responsible for 65 percent of industrial energy consumption. The government says the scheme, with full trading from 2014, could be worth $15 billion by 2015. The scheme

design is still being finalized but companies are likely to be allocated energy intensity targets based on historical performance. Reductions will be credited after the fact and firms that don't meet their targets will pay a penalty, or buy credits from companies able to do better than their target. An acceleration of investment in solar power to achieve the government's target of 20 gigawatts by 2022, an investment estimated to need between $40 billion and $50 billion in capital.

Announcements by developing countries at Copenhagen to change the trajectory of their growth amount to 5 Gt. which is more than the 4 Gt. reduction mitigation commitments of the developed countries (Project Catalyst, 2010). As national actions to meet the climate challenge shift away from legally binding commitments the outcome of the World Sustainability Summit in 2012 in defining the global goal will have great relevance in building trust.

Transition to a green economy and society

Developing countries must now set the sustainable development agenda in the climate negotiations, and the related World Sustainability Summit, because in the coming years they will be making increasing demands on ecological resources, as they consume vast quantities of steel, cement, aluminum, chemicals and fertilizers needed for infrastructure, urbanization and food security essential for the eradication of poverty. The building blocks of global sustainability will need to ensure a transformation in the way we use natural resources, in five areas.

First, the growing importance of the service sector and consumer demand in economic growth worldwide requires a shift beyond modifying production patterns seeking greater efficiency in resource use, to modifying consumption patterns for ensuring conservation of resources.

Second, recognition of the value of ecological and energy services, and their contribution to eradication of poverty - infrastructure, job creation, food security and pharmaceuticals - will support new growth pathways.

Third, new market based employment opportunities need to be provided for the rural poor to shift activities away from relying on, and causing harm to, natural resources to augmentation of local ecosystems.

Fourth, the focus of international cooperation would then shift from multilateral environmental agreements to networks for "innovation" supporting, for example, joint development and sharing of energy technologies, agricultural seed varieties and medical benefits of biodiversity.

Lastly, national accounting systems need to measure the significant human welfare benefits, or services, national and global ecosystems provide, and develop an economic yardstick that is more effective than GDP for assessing the performance of an economy. In the interim, national carbon budgets are a good indicator for developing and assessing national strategies, the sustainable use of natural resources and the transition to global sustainability.

The new rules to secure human wellbeing must be more representative to have legitimacy, rather than just reshape existing ones. National carbon budgets, based on equitable allocation criteria that are legally binding for all countries, will safeguard the ecological health of the planet, ensure policy space for developing countries to eradicate poverty and focus on the transformation of the world economy and human activity, leading to patterns of resource use that can in principle be adopted by all countries. International cooperation in this framework would be based around three measurable goals of reaching multilaterally agreed national carbon budgets, development of innovative renewable energy technologies and bringing energy services to those in developing countries who do not have access to it at present, including the development of infrastructure necessary for the eradication of poverty.

At the Rio Summit, in 1992, the emphasis was on containing environmental damage from industrialization, and it was assumed that the common concerns would be integrated in economic policy guided by multilaterally agreed norms. Learning from the evolution of the climate regime, the new paradigm that will emerge at the Rio + 20 Summit, in 2012, must re-balance the roles of the state, market and the citizen, and focus directly on consumption and production patterns. Shifts in growth pathways need to be discussed for the eradication of poverty in the context of sustainable development. Consequently, at the multilateral level, the focus will no longer be legally binding decisions that regulate national activities, but rather new cooperative mechanisms to ensure human well being, as well as rules for monitoring progress towards the global goal of moving towards patterns of resource use that are common for all countries.

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