China and India's participation in global climate negotiations

Sean Walsh, Huifang Tian, John Whalley & Manmohan Agarwal

International Environmental Agreements: Politics, Law and Economics

ISSN 1567-9764

Int Environ Agreements
DOI 10.1007/s10784-011-9161-y

Springer

Int Environ Agreements
DOI 10.1007/s10784-011-9161-y

ORIGINAL PAPER

China and India's participation in global climate negotiations

Sean Walsh · Huifang Tian · John Whalley · Manmohan Agarwal

Accepted: 29 June 2011

Abstract In this paper, we discuss a range of issues concerning developing country participation in current global climate change mitigation negotiations, especially India and China. We argue that the problem of redefining 'common yet differentiated responsibilities' in a way which allows developing countries room to pursue their individual development goals while still achieving the necessary level of carbon mitigation is central to the debate. The choice of negotiating instruments, effective technology transfer and financial support, and other related issues have been raised principally by China and India, and may also be raised by several other countries. Kyoto non-compliance by Annex 1 countries will also greatly impact the negotiating power of China and India and other developing countries. We conclude that, once basic principles are clearly defined, the greatest incentive for China and India to participate in climate change negotiations is the prospect of future negotiating rounds that can be linked to a large number of climate change related issues, such as intellectual property, the potential for financial transfers and trade/market access.

Keywords China · India · Climate change · International negotiations · Development

S. Walsh (✉) · H. Tian · J. Whalley · M. Agarwal
Centre for International Governance Innovation (CIGI), 57 Erb St E., Waterloo, ON N2L 6C2, Canada
e-mail: swalsh@cigionline.org

H. Tian
e-mail: tianvicki@gmail.com; tianhf@cass.org.cn

J. Whalley
e-mail: jwhalley@uwo.ca

M. Agarwal
e-mail: magarwal@cigionline.org

H. Tian
Chinese Academy of Social Sciences (CASS), No.5 Jianguomennei Dajie, 100732 Beijing, China

H. Tian · J. Whalley
University of Western Ontario (UWO), Social Science Building, Economics Dept., 1151 Richmond St., London, ON N6A 3K7, Canada

Published online: 10 July 2011

Abbreviations

CBDR	Common but differentiated responsibilities
CDM	Clean development mechanism
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
OECD	Organisation for Economic Co-operation and Development
WTO	World Trade Organisation
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
PPP	Purchasing Power Parity
CO_2	Carbon dioxide
GHG	Greenhouse gasses
MoEF	Ministry of Environment and Forests (India)
SME	Small and medium enterprises
IPR	Intellectual property rights
TRIPS	Agreement on Trade Related Aspects of Intellectual Property Rights
IPCC	Intergovernmental Panel on Climate Change
COP	Conference of the Parties [to the UNFCCC]

1 Introduction

In this paper, we compare China and India's participation in current climate change mitigation negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). With the Kyoto Protocol largely believed to have failed in its mitigation goals, policy makers and negotiators have sought to find a better path.[1] In the 2007 Bali meeting,[2] it was (and still is) deemed critical that, unlike the previous Kyoto agreement, the developing world should take on a significant role in order for any new emissions reduction agreement to be effective. Of these countries, China and India are particularly important due to their size and growth (for a different view on the importance of India see Massetti this issue). The 2009 Copenhagen Accord has taken the first step towards bringing these developing countries into a binding and effective climate treaty, but there is still a long way to go. The design and implementation of any post-Kyoto arrangement will be a critical factor in policy coordination over the next 20–30 years, particularly in terms of developed and developing nation coordination.

Turning our attention to China and India, the following observations are relevant in the context of future climate change negotiations. Despite spectacular economic growth rates, China is still a low-income country and the primary policy emphasis remains on achieving further growth and eliminating poverty. Developed countries of the world agree that these are important goals. However, they also fear that alleviating poverty through conventional economic growth will result in even larger carbon emissions. China has already exceeded, on a level basis per year, the United States' emissions, the highest emitter among developed countries. Nevertheless, and in contrast with Western views, China supports global environmental arrangements that would allow it to continue to grow without restrictions.

[1] For a general discussion of dealing with global externalities such as climate change refer to Barrett (2007).

[2] See UNFCCC (2008) for details.

Chinese resistance to Western views is slowly but increasingly being lessened by the growing recognition in China of the potential damage that is and could be inflicted from climate change as well as increasing awareness about the myriad ways in which improvements can be made. For example, regulation for China's large manufacturing and export sector is constantly being strengthened in terms of greater energy efficiency and stricter emissions standards. More significantly, perhaps, plans are currently underway to decommission a significant portion of small coal power generation plants and replace them with more efficient larger ones. Such projects broadcast China's willingness to participate in green initiatives, which may aid in facilitating a broader bilateral or international climate change deal.

India is in much the same position. It wants to safeguard the openness of the trading system, more for foreign direct investments (FDI) than for exports, but India's position is potentially somewhat further away from the Western stance on climate change than China. India's stated priority is to avoid unnecessary and costly emission restrictions that can reduce its ability to grow and to reduce poverty. Thus, India's official stated policy is to, at minimum, match the per capita emissions goals of developed countries indefinitely (Government of India 2008), a barrier India is not likely to be restricted by for many years.[3] That said, however, India has initiated some important changes. The recent commitment to reduce the carbon intensity of the economy by 20–25% in 2020 with respect to 2005 shows some departure from a climate policy position focussed exclusively on emissions per capita (see Shukla and Dhar this issue). India is searching for win–win options that would allow it to reduce emissions while enhancing development. India is, in fact, implementing many green projects through the clean development mechanism (CDM) of the Kyoto Protocol, thus absorbing a great deal of 'green' technology, which is expected to impact on its long-term development path.

Four issues seem likely to dominate the climate change negotiating agenda concerning China and India's participation (Tian and Whalley 2008). One is the interpretation of the 'common but differentiated responsibilities' principle agreed in the Kyoto negotiation for non-Annex 1 countries. This involves defining the scope of developing countries' involvement in emissions mitigating activities and will ultimately require defining whether poverty abatement or emissions mitigation takes a higher priority. The consensus among developing countries is clearly in favour of poverty abatement. Developed countries, while taking the same view in principle, have mixed feelings regarding their responsibility to actively support that stance in the face of global climate change, at least in the carbon-intensive business-as-usual context.

Several other contentious negotiating issues have arisen from this core principle and essentially aggregate to whether developing countries are entitled to some form of compensation for taking on environmental commitments, especially if doing so may impact poverty reduction and quality of life improving efforts. The countries that participated in the recent Copenhagen Accord do admit that some compensation is in order, but the magnitude and timing of such compensation is a matter of contention.

A second issue is the choice of the negotiating instrument (emissions intensity vs. levels) and the accountancy rules for emissions embedded in exports. A third issue is the

[3] While there is some ambiguity in this stated goal, to illustrate roughly India's commitment, two of the lowest per capita emissions in developed nations are Mexico, which held stable at roughly 4.3–4.4 tonnes/CO_2/person through 1990–2007 and Turkey (2.7 in 1990, and 4.0 in 2007), while the Indian figure for 2007 is 1.9 (only 0.6 higher than 1990 despite the country's rapid growth). Given these trends, India has several decades before hitting its stated emissions per capita ceiling. Also for comparison, the US figure for 2007 was 18.9 tonnes of CO_2/person (UN Millennium goals indicators data. http://mdgs.un.org/unsd/mdg/Data.aspx). See also Massetti (this issue).

size and form of the funds that will likely be created to facilitate adaptation and innovation. A final issue is how to deal with non-compliance by key OECD countries with their Kyoto commitments, which, in the view of the developing countries, weakens the credibility of any future commitments made by those countries.

All these issues are expected to have a profound influence on the future negotiations between developed and developing countries. In particular, China and India will be important leading actors in this process due to their growing importance in shaping global emissions. This paper examines the role of China and India in the climate change negotiating process in terms of the four issues mentioned above and the common but differentiated responsibilities principle in particular. We argue that the problem of redefining 'common yet differentiated responsibilities' in a way which allows developing countries room to pursue their individual development goals while still achieving the necessary level of carbon mitigation is central to achieving a successful global climate change agreement.

The paper is structured as follows. Section 2 presents the status of climate negotiations between developed and developing countries. Section 3 examines the role of China and India as major global emitters of GHGs. Section 4 deals with relevant open issues in the climate agenda. Conclusions with a proposal for a way forward follow.

2 Where current global climate negotiations stand between the developed and developing world

Most developing countries, including India and China, took on no environmental commitments as part of the Kyoto agreements. Russia was the notable exception.[4] This reflected an interpretation of the concept of 'common yet differentiated responsibilities' (CBDR) that developing country carbon emissions remain unrestricted by the Kyoto Protocol. Developing country participation in the Protocol was indirect through the clean development mechanism (CDM), which allowed them to voluntarily reduce emissions in ways that furthered development and then sell emissions reduction rights to producers in developed countries.

China and India are the two countries with the highest estimated trajectory of emissions growth over the coming years as their economies develop further (Sunstein 2007). China's desire is to maintain its recent ~8–10% growth rates to achieve further poverty reduction. Since a large portion of China's growth is trade-dependent, this means that a significant part of China's negotiating position is concerned with maintaining the openness of the global trading system as it impacts Chinese imports and exports.[5]

India's goal also revolves around poverty eradication through economic growth. However, India's growth strategy is much more internally focused. Specifically, India's principle aim in the UNFCCC climate change negotiations is to harness them as much as possible to further internal growth and development (see also Massetti this issue; Shukla and Dhar this issue). This takes the form of India's deep interest in CDM and similar related types of projects and also the intellectual property rights debate, arguing for fewer

[4] Russian involvement was largely a matter of necessity once the US abandoned any involvement in the Kyoto Protocol, as a necessary condition for the Protocol to take effect was 55% of Annex 1 emissions must be accounted for within the signatories to the agreement. Without Russian involvement, the Kyoto Protocol would not have come into force.

[5] This may change at some point, as the financial crisis seems to have made plain to China the risks of growth via this route. Without international trade system reform, China may slowly refocus itself on growing its internal markets.

restrictions on technology diffusion.[6] India also does not want emissions restrictions to get in the way of these goals, hence the trivial (for the next few decades) emissions mitigation goal that India will never surpass developed country emissions per capita stated in India's National Action Plan on Climate Change (Government of India 2008).

The integration into the global market achieved by developing countries, China in particular, means that developed nations, the United States especially, have a vested interest in seeing these countries recover for their own economic well-being. The current suggestion in discussion among many policymakers, especially in the United States, is that 'green' industry, valued pre-crisis at roughly 600 billion US$, may be the seed used to further forward both the economic and environmental goals. However, until (and if) this line of thought develops further, i.e. that an environmentally based industry could foster environmental protection while minimally affecting growth, the stated relatively weak emissions targets of China and India will continue to be a source of friction between them and the West.[7]

This is also not to say that China and India entirely object to environmental measures of the sort proposed by the developed nations. Both countries do acknowledge that a balance must be struck somewhere between environmental and developmental goals (Heggelund and Backer 2007). For instance, China undertook unilateral initiatives to reduce major pollutant emissions by 10% by 2010 and to increase total forest coverage of the country to 20%. Environmental measures are explicitly mentioned as necessary in both the 11th and 12th 5-year development plan to preserve China's ability to grow. India, largely through the CDM, is undergoing numerous efficiency upgrading projects, both in terms of energy consumed and emissions output. The eco-train and bus projects in Mumbai reduce emissions via energy efficiency and a switch to natural gas, respectively.[8] These and many other such initiatives will have a part to play in the negotiation and may help to ease the friction between these countries and the West. Ultimately, it will come down to how the CBDR concept is redefined and what external pressures (the financial crisis for example) will come into play to shape that discussion. And, whatever happens, it is likely that the rest of the developing world will follow the lead of the larger economies such as China and India due to a joint interest in these negotiating issues, and particularly the common but differentiated responsibilities principle.

3 Economic growth and emissions in China and India

3.1 China

China was responsible for 58% of the increase in carbon emissions worldwide from 2000 to 2006. With continued rapid growth, its emissions by 2030 would be about 25% of the global annual total but, per capita, would still be less than half that of the United States.

China is a rapidly growing, large population and relatively low-wage economy which has in the last two decades become heavily trade and foreign direct investment (FDI)

[6] See for example The Times of India (2008). And within the negotiations, IISD (2008).

[7] The largest obstacle of green technologies overcoming oil-based ones is cost. In the next few years Solar is expected to become cheaper than conventional fossil fuel power and that may be a major turning point for both green and fossil fuel intensive industries (which, it should be noted, are not necessarily exclusive of each other).

[8] More information on these projects can be found at http://timesofindia.indiatimes.com/articleshow/2162699.cms and http://www.livemint.com/2007/12/15185015/Mumbai-gets-ecofriendly-AC-bu.html, respectively (links verified as of February 28, 2011).

dependent. WTO data (2007) shows the share of imports and exports combined relative to GDP in China as 69% in 2006, up from 49% in 2000. Both are growing at ~30% per year. Foreign invested enterprises (financed by FDI flows) account for 60% of both exports and imports, and also account for over one half of all OECD FDI flows to non-OECD countries. The recent financial crisis impacted growth severely however, raising the question in China of whether more inward oriented growth would be more stable. Thus, China's position in global climate change negotiation should be assessed in light of this economic situation.

The numerical emissions implications of China's growth are the central friction between China's negotiating strategy for a post-Kyoto world and OECD objectives. China has experienced a fourfold increase in GDP/capita since 1978 and 10% growth between 2000 and 2050 implies a 30-fold increase in GDP/capita (WTO 2007). The Asian Development Bank (2007) forecast is that China will be the world's largest economy, surpassing the United States by 2025. China accounted for 17.5% of global CO_2 emissions in 2004, only second to the United States. Between 1990 and 2004, China's carbon emissions increased by 108% and China substantially underperformed the OECD countries in terms of emission intensity (emission/GDP). Although this gap is significantly reduced by using Chinese GDP in US$ at PPP exchange rates rather than at current rates, emissions intensity measures are falling much faster in China than in the OECD countries.

China's 11th five-year plan (2006–2010) set out targets for a minimum annual growth rate of 7.5% for the economy, a doubling of GDP and a 20% reduction in energy consumption over 5 years. But ecological and environmental degradation was also to be curbed, and the emissions of major pollutants reduced by 10%. In cities, 70% of wastewater and 60% of residential garbage are now to be treated. Forest coverage rate is expected to increase 20% nationally. Thus, China's development plans already embody some degree of environmental restraint, but China's modernisation and development will nonetheless increase emissions levels.

When China first entered climate change negotiations in 1990, it made no offers to reduce its carbon emissions. China's attitude has, over time, become more proactive. Abatement costs, ecological vulnerability and principles of equity are now major points of internal debate on China's position (Zhang 2006). If international negotiations could lower the abatement costs of China's internal environmental initiatives (particularly those necessary to preserve growth levels), then China's stance would shift to take advantage of this. The stress in the Chinese debate is currently on accompanying transfers of technology and funds for innovation,[9] as well as general adaptation and emissions reduction commitments.

China's size and influence in the G77 also makes it a key country in global climate negotiations from a coalition perspective (Kasa et al. 2008). As the world's largest developing economy, China will play an important role in leading developing countries in shaping a future climate regime. China will see it as inevitable that environmental commitments are made as part of a global rule regime going beyond the 1944 Breton Woods' arrangement that will span trade, environment and finance. But maintaining openness in the trade regime so as to prevent closure of markets to China on environmental grounds, as with carbon-based border tax adjustments, will be key to China.

For now, the internal debate in China on climate change negotiation positions is still largely distinct from the debate on domestic policy issues. Development priorities will

[9] To clarify, this is not necessarily in the form of a loosening of the WTO TRIPS agreement or even modifying the current IP regime as such, since China has significant intellectual property to protect as well. It may also take the form of a one-off deal as part of China's acceptance of international environmental commitments. This said, IPR remains a hotly debated issue and no approach has been entirely ruled out.

nonetheless likely frame the climate change debate in China for some time, and with China's increasing emissions and its position as a growing global economy, the pressure will also be on China to take on commitments (Zhang this issue).[10]

3.2 India

The Indian economy is one of the fastest growing in the world with a consistent average growth of about 6% over the past decade and 7–8% in more recent years. This level of growth is much needed for eliminating poverty among its population, representing 27% of the world's poor. Roughly time lagged by a decade or so, Indian GDP is following a similar growth path to the Chinese case (see also Massetti this issue).

While poverty, disparity and challenges remain, robust economic growth has already allowed millions of people to emerge from poverty. The national poverty ratio halved from 36 to 18% from 1994 to 2002 (NIRD 2003). However, higher consumption is drastically changing the nature and scale of impact on the country's environment and natural resources, thus testing the carrying capacity of India's natural ecosystems.

Growth is led by robust performance of the industrial sector. Impressive growth in manufacturing is a reflection of growth trends[11] including electronics and information technology, textiles, pharmaceuticals and basic chemicals. These industries belong to the 'red category' of major polluting processes designated by the Central Pollution Control Board and have significant (and often toxic) environmental consequences. The economic boom has also led to an increase in investments and activities in the construction, mining, and iron and steel sectors. This, in turn, is causing a significant increase in brick-making units, sponge iron plants and steel re-rolling mills that use highly polluting processes.

Accordingly, some highly polluted communities have developed. However, India's economy still remains more oriented towards services than manufacturing relative to China, with relatively lesser emissions growth over time.

A frequent (and valid) argument from the industrial community is that new investments in large industrial projects bring modern and clean technologies. In reality, the impact of industrial growth is more nuanced and complex. An estimated 70% of the total industrial pollution load is attributed to small and medium enterprises (SMEs) many of which continue to use obsolete technologies with no or primitive pollution control. With about 40% of the total value of industrial production and over 4.5 million units across the country, the SME is a major engine for growth, employment and poverty reduction, raising a dilemma of balancing economic and environmental objectives. Furthermore, even with advanced technologies minimising the impact of individual units, the cumulative impact of growth at such a scale and of such diversity is a matter of concern.

To achieve and sustain a targeted 8–10% rate of economic growth, India has to invest, to expand and upgrade its overstretched infrastructure, particularly power supply and roads, which are currently regarded as major bottlenecks to growth by investors (World Bank 2006). The capacity deficit in the power sector is already resulting in peak load shortages of 12% (MoEF 2005). According to the 2001 census, over 50% of households lacked access to basic lighting (Registrar General and Census Commissioner 2001).

[10] It should be noted, however, that China has been notoriously resistant to outside pressure attempting to influence its policies (particularly in regards to the UN), thus such outside pressure is not likely to be a major deciding factor for China about whether or not to participate in a global climate change deal.

[11] Recent data sets this at 7% annual growth over the past 10 years (Reserve Bank of India 2005).

Furthermore, per capita electricity consumption in 2003 was still low at 435 kWh.[12] To fix this, India plans to nearly double its current installed capacity (115,500 MW as of January 2005) by 2012 (MoEF 2005).

India's GHG emissions in 1994 were 1,228 million Mt (CO_2 equivalent), which is below 3% of global GHG emissions.[13] In terms of primary energy use, India's share of non-emitting energy at 36% is far higher than industrialised countries can hope to reach for many decades. This is mainly due to a large use of traditional biomass, which is carbon neutral. Since GHG emissions are directly linked to economic activity, India's economic growth will necessarily increase GHG emissions from the current low levels. On the other hand, India's policies for sustainable development, by promoting energy efficiency, low emitting energy sources (including nuclear), energy pricing, pollution abatement, afforestation, mass transport and higher growth rates of less energy-intensive services sectors results in a relatively GHG benign growth path.[14]

Climate change, on the other hand, is predicted to have adverse impacts on India's precipitation patterns, ecosystems, agricultural potential, forests, water resources, coastal and marine resources, and general health. Large-scale resources would clearly be required for adaptation measures to climate change.

4 Common principles and negotiation issues both countries face

The global environmental policy dilemmas for the Chinese and Indian governments are understandable. If they fail to respond to climate change and other environmental issues now, their economies will suffer in the medium to long run as global warming takes its toll. On the contrary, the cleaner energy options are costly to adopt and could hurt their current economic growth.

We argue that four issues may jointly dominate the two countries' negotiating positions, which were described in detail by Tian and Whalley (2008). These four issues are: the interpretation of the CBDR principle adopted in Kyoto, the choice of negotiating instruments, the form of emission commitments and the size (and form) of accompanying financial funds for adaptation and innovation.

4.1 The 'common yet differentiated responsibilities' principle

The principle of CBDR between developed and developing nations is critically important in resolving numerous outstanding global environmental issues between these two groups

[12] This compares to 1,400 kWh in China, 2,400 kWh world average and 13,000 kWh in the USA (IEA 2005).

[13] In alternate metrics this equates to 23% of the global average in per capita terms. In terms of the GHG intensity of the economy, in PPP terms, ~0.4 ton CO_2 equivalent per 1,000 US$ in 2002, which is also below the global average.

[14] According to India's National Environment Policy 2006, the following are the essential elements of India's negotiations on climate change: Equal per-capita entitlements of global environmental resources to all countries; An overriding priority on the right to development; Adherence to the principle of common but differentiated responsibilities and respective capabilities of different countries in respect of GHGs but also adaptation measures; Reliance on multilateral approaches, as opposed to bilateral, plurilateral or unilateral measures; Encourage Indian Industry to participate in the Clean Development Mechanism (CDM) through capacity building for identifying and preparing CDM projects, including in the financial sector; Participate in voluntary partnerships with other countries both developed and developing, to address the challenges of sustainable development and climate change.

of nations Walsh and Whalley (2009). In the Kyoto negotiations, it was interpreted to mean non-participation by developing countries in emission commitments. The failure of the Kyoto Protocol to deliver the desired results makes a reinterpretation of this principle a necessity for a treaty going beyond the Protocol. However, the developing world continues to emphasise the difficulty of achieving emissions reduction targets, even with the resources of the West backing the effort. In the Copenhagen meeting of the COP,[15] developing countries asked for a fund which would see 300 billion US$ per year flow from developed to developing countries. Developed countries countered with a $100 billion/year fund starting in 2020. This indicates at least some agreement on the difficulty of 'greening' developing countries and their economies.

Two potential general outcomes are likely to come of any agreed and binding treaty from the UNFCCC process. One is assigning a target, different in form than in Kyoto, for developing world countries, perhaps in terms of a per capita or per unit of GDP goal, while assigning developed nations stricter, Kyoto-style level-based goals for emissions levels. The other outcome, much as in the Copenhagen Accord, is for an interpretation that developing countries are entitled to financial compensation for environmental restraint while pursuing their humanitarian and development goals. There is already a discussion about both of these interpretations and other possibilities as well (Yoshiro 2002) but no firm decisions have been reached yet. At the very least, something would have to be worked out by the scheduled end of the Kyoto Protocol, or the entire process risks losing momentum and potentially even failing completely.

The rest of the developing world's participation will depend on whether these two more influential countries can reach an agreement. The disciplines defined by the Kyoto Protocol are insufficient to meet developing countries' needs. Likewise, the principles in the Copenhagen Accord, while agreeable to most large developing countries, do not signify deep enough verifiable emission reductions. This is the key principle underlying developed country participation and, without a firm, effective and mutually acceptable bedrock definition defining the scope and depth of developing country involvement, any truly global negotiation will almost inevitably fall apart.

4.2 The choice of negotiating instruments

A further division between China, India and other similar developing economies,[16] and the developed nations is the choice of negotiating instruments. These are agreed mechanisms to determine how to reduce carbon emissions and the time table involved and quite probably, will not be totally in the form of a simple Kyoto target, even for developed nations. Redefining dates, units of measurement, reduction mechanisms, associated supporting mechanisms and more were all on the negotiating agenda for COP16 in Mexico and, given modest progress there, beyond to COP17.

4.2.1 The format of targets and measurement issues

The use of absolute targets, as was the case for developed countries under Kyoto, is something that developing countries and China in particular, feel will cause undue harm. In contrast, a more flexible unit of measurement, such as emissions per unit of GDP or per capita may better serve high growth countries. Developed nations are resisting any move

[15] See UNFCCC (2010) for details.

[16] We refer to the group of BASIC countries: Brazil, South Africa, India and China.

away from measuring emissions on a level basis, citing the increased difficulty of using per capita or per unit of GDP emissions to make comparisons across countries, particularly due to the varying methodologies for calculating census data and GDP figures. Developing nations argue that measurement comparability is beside the point and Copenhagen ended without any clear agreement on the matter, necessitating countries to act unilaterally for now.

A related negotiating issue is whether emissions are to be calculated on an annual or cumulative basis, that is, whether or not past emissions are relevant to the current negotiation. The use of an annual basis for emissions, as the Western nations want, may greatly reduce the force of the logic behind the CBDR principle by discounting historical emissions by the developed countries, allowing greater environmental restrictions to be placed on developing nations. Therefore, developing nations strongly desire a measurement on a cumulative basis to preserve the integrity of the CBDR principle and their stance on all the issues surrounding it.[17]

4.2.2 The choice of base year and length of commitment

Also important to rapidly growing countries are the choice of a base year for emission reductions and the length of the commitment period. Circumstances within these countries change rapidly and the viability of a long-term goal for emissions reductions in the face of economic, social and political uncertainties is questionable. Thus, rapidly developing countries would ideally desire a short time frame and small incremental targets over time. Developed countries would prefer to stick with their already stated long-term goals, such as the 80% reduction by 2050 often voiced within the G8.[18]

The choice of the base date is critically important in different ways for different countries. Countries with high emissions growth (China, India, United States, Canada, Spain, etc.) generally desire a more recent base date. Russia on the other hand, which suffered economic (and emissions levels) collapses after the base date used in Kyoto, 1990, would prefer to keep that date again. Possibly, this will be resolved in the negotiation by allowing different base years for each country.

4.3 Innovation and transfer of technology

The post-Bali Roadmap process established two negotiation streams on adaptation and innovation, but both of which involve the establishment of funds. The size of the funds, where the funds come from and the criteria to be established for their use and administration are particularly key issues for India, but are also important for China. Technological issues to be negotiated include: diffusion, deployment, transfer, development and joint development. This discussion was principally set to take place in Cancun, Mexico in 2010. Given the current stages of development for both India and China, much thought has focused on a 'green development path' and what the technological requirements would be. India, especially, is taking to heart the concept of 'green development' largely through the discussions of technology transfer underway in the negotiation.

[17] Developing countries are thus adamant about preserving the Kyoto Protocol since it is based upon the cumulative emissions viewpoint.

[18] The developing country focus on the short term has ironically meant that the national level unilateralism on this matter done (rather than just planned) by developing countries has greatly exceeded that of the developed countries.

Intellectual property rights (IPR) is a source of contention between developing and developed nations. The question of whether, in the context of climate change, expedited IPR arrangements are needed remains highly debated. This was a focal point of the technology transfer discussion in COP16,[19] but while progress was made in the discussion, there were no game-changing breakthroughs. Seemingly, any agreement must also involve amending the WTO TRIPS agreement and whether that is feasible remains an issue (Harashima 2008). Any arrangement for subsidies concerning the developing countries' ability to provide them for technology transfer purposes also must be discussed and negotiated, lending further intensity to technology and adaptive funds. In the meantime, the CDM and other Kyoto Protocol mechanisms are being used more often for technological transference, particularly in the case of India.

4.4 Non-compliance with Kyoto targets

It is likely that some Annex 1 countries will be in significant violation of their Kyoto targets throughout the progression of the negotiations. In the Copenhagen Accord, these shortfalls were simply carried forward. However, this does not rule out penalties, possibly in the form of harsher targets, as we get progressively closer to 2012 so as to compensate for the shortfall and will impact positively on the developing country bargaining position.

In turn, a related issue is the lack of credible enforcement mechanisms in the Kyoto Protocol. Kyoto doesn't set out a reliable procedure for determining non-compliance, nor does the Copenhagen Accord.[20] Indeed, even the measurement of emissions is still relatively imprecise Baumert et al. (2005), allowing uncertainty into the determination of exactly how significant emissions shortfalls really are, which may complicate negotiations, particularly since the language of 'measurable, reportable and verifiable' emissions cuts already appears in draft documents, as insisted on by developed countries and adding another level of friction.

One possible method of enforcement is by the use of escrow funds. That is, at the end of the commitment period, if commitments are not honoured, the funds from those countries violating their commitments will not be returned, and will instead be divided between those countries whose commitments were met. This would likely be on a percentage or similar basis rather than in terms of absolute amounts given the gap in resources between developing and developed countries. But, regardless of the method, enforcement will play a major role in the feasibility of any binding treaty.

4.5 Internal forces affecting China and India's participation

The Chinese and Indian negotiating positions also reflect domestic policy initiatives, particularly through the use of unilateral environmental measures (often aimed at achieving some other development goal as well).[21] How these are to be treated in the negotiating

[19] Primarily developing countries are asking for expedited transfers on medicines, 'green development' and efficient emissions reduction related technologies.

[20] The post-Marrakesh Kyoto text sets out a 3 year process (if appeal processes included) for compliance determination. However, given data uncertainties and a necessary reliance on expert opinion, the analysis will likely be highly subjective and inexact save for the most clear cut cases (i.e. Canada). The Copenhagen Accord on the other hand does not set out any compliance mechanism save perhaps self-reporting by participant countries as to whether goals have been met.

[21] Shukla and Dhar (this issue) and Zhang (this issue) examine the possibility to pursue development and mitigation goals.

process is an issue, particularly since both countries are relatively inexperienced in enacting environmental policies.

In the face of the demand for 'measurable, reportable and verifiable' emissions cuts, both China and India are also actively engaged in defining how to better measure their emissions, particularly in the power generation sector, as it represents the bulk of emissions in both countries. Both China and India's primary interest in technology upgrading also relates to this sector, both for environmental and developmental reasons, and particularly India is seemingly quite willing to alter its core energy strategy as the keystone of any plan to reduce its emissions (Parikh and Parikh 2002). India's priority in the negotiations is thus in promoting favourable outcomes in areas such as IPR and in promoting CDM activity within India, while China's upgrading takes place more in terms of taking advantage of economies of scale to lower the emissions per unit of production. The transformation of the entire energy sector in either case is, however, a long-term task.

5 Concluding remarks

In this paper, we discuss a range of issues concerning developing countries' participation in the UNFCCC climate change negotiating process, especially from an India and China perspective. Central to the debate is the issue of redefining CBDR in a way which allows developing countries room to pursue their individual development goals. The choice of negotiating instruments, effective technology transfer and financial support and other related issues have been raised principally by China and India, and may also be raised by several others as well. Kyoto non-compliance by Annex 1 countries will also impact greatly on the negotiating power of China and India and other developing countries.

In the post-Kyoto round of global climate change negotiations, we see a desire to broaden the scope of action to a truly global scale. Linkage, particularly in terms of trade, finance, development policy and technological transfer, seems to be integral in these negotiations, particularly in light of the financial crisis. In the mid-term, the possibility certainly exists to broaden energy and energy security issues, including nuclear, improved renewable energy sources, regional/continental smart grids and other current technology options, which is something India will be watching for closely. Given the emissions potentially emanating from the developing world, particularly China and India, these countries would play a central role. This prospect, perhaps not of a new order, but of future negotiations, is one key factor positively contributing to the likelihood of an agreement spanning both developing and developed countries. This is particularly the case insofar as the large, rapidly growing developing countries are concerned. As the lynchpin countries of the Western and Eastern worlds, much depends on the stances of the United States, China and India for a successful post-Kyoto negotiating round to be realised, particularly one that paves the way to branch out to include future linkage to non-environmental issues such as mentioned above.

Acknowledgments The authors would like to acknowledge support from Renmin University of China and the Special Academic Fund of the Chinese Academy of Social Sciences. The authors would also like to acknowledge support from the Ontario Research Fund, the Centre for International Governance Innovation and the University of Western Ontario.

References

Asian Development Bank. (2007). *Asian development outlook 2007*.

Barrett, S. (2007). *Why cooperate? The incentive to supply global public goods*. New York, USA: Oxford University Press.

Baumert, K. A., Herzog, T., & Pershing, J. (2005). *Navigating the numbers: Greenhouse gas data and international climate policy*. World Resources Institute. http://pdf.wri.org/navigating_numbers.pdf. Accessed 27 February 2008.

Government of India. (2008). *National action plan on climate change*.

Harashima, Y. (2008). Trade and environment negotiations in the WTO: Asian perspectives. *International Environmental Agreements: Politics, Law and Economics, 8*, 17–34.

Heggelund, G., & Backer, E. B. (2007). China and UN environmental policy: Institutional growth, learning and implementation. *International Environmental Agreements: Politics, Law and Economics, 7*, 415–438.

IISD. (2008). *COP14 highlights: Saturday, December 6 2008*. Earth Negotiations Bulletin, IISD Reporting Services, available online at http://www.iisd.ca/vol12/enb12391e.html. Last accessed 24 June 2011.

Kasa, S., Gullberg, A. T., & Heggelund, G. (2008). The Group of 77 in the international climate negotiations: Recent developments and future directions. *International Environmental Agreements: Politics, Law and Economics, 8*, 113–127.

MoEF. (2005). *Annual report 2004–2005*. Ministry of Environment and Forests, Government of India.

NIRD. (2003). *Rural development statistics 2002–2003*. Hyderabad: National Institute of Rural Development.

Parikh, J. K., & Parikh, K. (2002). *Climate change: India's perceptions, positions, policies and possibilities*. OECD Working Paper, Climate Change and Development Program.

Registrar General and Census Commissioner. (2001). *Census of India 2001*. New Delhi: Government of India.

Sunstein, C. R. (2007). *The complex climate change incentives of China and the United States*. AEI-Brookings Joint Center Working Paper 07-14, http://ssrn.com/abstract=1089143.

The Times of India. (2008). *Treat climate change tech as public*. 27 July 2008. Available at http://articles.timesofindia.indiatimes.com/2008-07-27/developmental-issues/27948178_1_climate-change-shyam-saran-ipr-regime. Last accessed 24 June 2011.

Tian, H., & Whalley, J. (2008). *China's participation in global environmental negotiations*. NBER Working Paper No. 14460, National Bureau of Economic Research.

UNFCCC. (2008). *Conference of the parties to the UNFCCC 2007 (COP13)*. United Nations Framework Convention on Climate Change, Bali, from http://unfccc.int/meetings/cop_13/items/4049.php. 4 January 2010.

UNFCCC. (2010). *Conference of the parties to the UNFCCC 2009 (COP15)*. Copenhagen, from http://unfccc.int/documentation/decisions/items/3597.php?. Accessed 4 January 2010.

Walsh, S., & Whalley, J. (2009). Bringing the Copenhagen global climate change negotiations to conclusion. *CESifo Economic Studies, 55*(2), 255–285.

World Bank. (2006). *World development indicators*. Washington, DC: World Bank.

WTO. (2007). *Trade profile statistics*, from http://stat.wto.org/CountryProfile/WSDBCountryPFView.aspx?Language=E&Country=CN. Accessed 4 March 2008.

Massetti, E. (this issue). Carbon tax scenarios for China and India: Exploring politically feasible mitigation goals. *International Environmental Agreements: Politics, Law and Economics* (this issue).

Shukla, P. R., & Dhar, S. (this issue). Climate agreements and India: aligning options and opportunities on a new track. *International Environmental Agreements: Politics, Law and Economics* (this issue).

Yoshiro, M. (2002). Some aspects of the principle of 'common but differentiated responsibilities'. *International Environmental Agreements: Politics, Law and Economics, 2*, 151–171.

Zhang, H. (2006). *China's position in international climate change negotiations: continuities and changes*. China-US Climate Change Forum, University of California at Berkeley, from http://www.seoulpeaceprize.or.kr/file/zhangHaibin276-314.PDF. Accessed 24 January 2008.

Zhang, Z. (this issue). In what format and under what timeframe would China take on climate commitments? A roadmap to 2050. *International Environmental Agreements: Politics, Law and Economics* (this issue).