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IDSA Occasional Paper No. 34

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ISBN: 978-93-82169-41-3

First Published: July 2014

Price: Rs. 175/-

Published by: Institute for Defence Studies and Analyses
No.1, Development Enclave, Rao Tula Ram Marg,
Delhi Cantt., New Delhi - 110 010
Tel. (91-11) 2671-7983
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Cover &
Layout by: Geeta Kumari

Printed at: M/s A. M. Offsetters
A-57, Sector-10, Noida-201 301 (U.P.)
Mob.: 09810888667
E-mail : amoffsetters@gmail.com

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Introduction

Climate change as a social and scientific issue has many dimensions, with security being the top concern. Over the last few decades the subject has become part of a policy discourse at the international and national level. There are shelves upon shelves of books in libraries on the issue ranging from science, political science, economics, international law, philosophy, global governance, military etc. The topic has now also been accepted by the educators. Even children in primary schools are being made aware of this problem.

What then is the state of the climate and the status of negotiations and deliberations on the subject? This brief overview will attempt to locate the issue of climate change under the broad heads of: Why the Slow Response; UN and Negotiations; Science and Evidence; Climate Science and Policy as it Relates to India; Economics and Energy; Power Politics, Climate Change and the Military; Militarisation of the Arctic; Why Climate Change Should not be a Security Issue in the United Nations Security Council (UNSC); and India's Efforts and Position on Climate Change. I conclude for the need to revisiting and boosting public diplomacy and strategic communications to garner greater public support.

Part 1 - Why the Slow Response?

As compared to a decade ago, the debate and politics on climate change has plateaued. It is presumed that what had to be said, has been said and done. Now it is the political will that is needed. Think tanks across India and the world had debated the military,

* The author thanks two anonymous referees for their valuable suggestions.

security, economic and social implications of climate change. A number of elegant reports and articles were published, including the issues mentioned in the UNDP *Human Development Report*, The World Bank's *World Development Report* and studies of which *Turn Down the Heat* (2012) is the latest. Besides, it gets mentioned in the various forums of the UN and other groupings as a part of a ritual. The United Nations Millennium Development Goals (MDG) Report projects that climate change will have serious and social impacts which will impede the progress towards their implementation. Climate change is now routinely included in the yearly meetings of the World Economic Forum at Davos, as a major environmental risk. Statements and speeches by world leaders keep reminding us of the looming threat of climate change. The commander of US Pacific Command argues that climate change is a greater threat than Chinese hackers or North Korea. But yet, no worthwhile mitigation action is visible. What is the explanation for this pause in the urgency over the issue?

One reason which has been put forth by many scholars is that, “the mighty political power of the fossil fuel industry has so far been enough to obliterate reason.”¹ The second may be that countries are more concerned with day-to-day issues. Politicians have to survive and serve the public for short tenures measured in five year time frames. Climate change is not yet ‘high politics’. Perhaps the most plausible reason could be that no economically viable replacements of fossil fuel for the electricity, industrial, household, agriculture and transport sectors have been commercialised. It has been theorised that an energy policy based on renewable and carbon free technologies to mitigate climate change is difficult to implement for reasons such as: (a) The connection in the public mind between climate change and the need to transform the energy

¹ Bill Mc Kibben, ‘Some Like It Hot!’, *The New York Review of Books*, Vol. LX, No.8, May 9, 2013, pp.59-60.

system is very weak and, (b) The major driver of change in energy systems is local pollution.² Therefore the melting of the Arctic or glaciers is not as powerful sign, as local air pollution.

Negotiations among nations have not been successful in arriving at one common understanding. On the level of analysis, while the climate change problem is global, the national interests are selfish and local. The first reason is that the interest of the state are paramount. This highlights the reality that sovereign states, that are divided by artificial lines as borders, are more concerned with social and economic issues; rather than risking any idealistic action on the ecology which recognises no borders or boundaries. The second reason is that there is no penalty for defaulters who failed to mitigate and reduce emissions as parties to climate treaties. For example Canada has given up on the idea of meeting the Kyoto target. One reason for Canada failing to fulfill its legal obligation is that the cost of compliance would be considerable. Another reason is that unlike other agreements such as WTO, the Kyoto Protocol does not punish countries for non compliance.³ The biggest polluter, the US, has not ratified the protocol - as its policy makers feel that developing countries such as China and India-where emissions are fast rising - also need to be in the mandated emission reduction (mitigation) mode. Now Russia and Japan are showing their unwillingness, as countries which were mandated to take the lead in mitigation by emission reduction. What this means is that the developed and industrialised members of the Kyoto Protocol like Canada, Russia, Japan and New Zealand have decided to leave the Kyoto Protocol, or to remain but not to participate in a second commitment period starting 2013. Many factors explain this shift.

² Robert W. Fri and Stephen Ansolabehere, 'The Alternative Energy Future: Challenges for Technological Change', *Daedalus: Journal of the American Academy of Arts and Sciences*, Vol.141, No.2, Spring 2012, pp. 5-9.

³ Keith L. Shimko, Chapter 13, 'Global Commons', *International Relations: Perspectives, Controversies & Readings*, Wadsworth Cengage Learning International Edition, 4th Edition, 2013, p.350.

For example, in the case of Japan, Japanese scholars have no issues regarding the science of the coming threat but feel that, “in reality technology transfer will be hampered by intellectual property rights issues and will not proceed smoothly”.⁴ A sector by sector approach is preferred by the Japanese.⁵ This is obviously because Japan may be having a good lead in the technologies required for the future mitigation of climate change.

It is clear that both in the internal as also in external debates there are centrifugal tendencies that are likely to fragment the understanding of the threat. The opposite view with regard to centripetal tendencies is populated by moral philosophers and the majority of scientists and concerned citizens. The problem related to the risks, challenges, threats, dangers and disaster is mentioned in brief statements by government representatives and other environmental NGOs who argue for immediate action to address this ‘existential threat’. They keep reminding that the symptom of this affliction will visit mankind as a series of non linear and exponential disasters.

Part 2 - UN and Negotiations

The UN is now taken to be the yardstick for raising global concerns. It keeps issuing warnings in a series of reports. The UN Millennium *Ecosystem Assessment Report 2005* had concluded that the challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios, but these involve significant changes in policies, institutions, and practices that are not currently being followed. The report argues that there are many existing options to conserve or enhance specific ecosystem services in ways that reduce the negative trade-offs or

⁴ Mutsuyoshi Nishimura, ‘Climate Change Diplomacy and the Way Forward for Japan,’ *Asia-Pacific Review*, Vol.15, No.1, 2008, pp.9-16.

⁵ Ibid.

that provide positive synergies with other ecosystem services.⁶ In recent years some more reports have been placed in public domain. Some of these are:

- (a) UN High level Panel on Global Sustainability: *Resilient People Resilient Planet* (January 2012) report states that by 2030:
 - (i) For a population of nine billion - the world may need 50 per cent more food, 45 percent more energy and 30 per cent more water.
 - (ii) Need for a new political economy. Eradicate poverty, reduce inequality, ensure inclusive growth, sustainable production and consumption while combating climate change.
 - (iii) It reconfirms a new nexus between food, water and energy.
- (b) Global Environmental Outlook (GEO) -5, prior to the Rio Plus 20 conference of June 2012 the UN Under-Secretary General and UNEP Executive Director Achim Steiner warned:

If current trends continue, if current patterns of production and consumption of natural resources prevail and cannot be reversed and 'decoupled', then governments will preside over unprecedented levels of damage and degradation.

The report also calls for a greater focus on policies that target the drivers of environmental change – such as population growth and urbanisation, unsustainable consumption patterns, fossil fuel-based energy consumption and transport, and globalisation.

⁶ *Ecosystem and Human Well-Being: Synthesis, A Report of the Millennium Ecosystem Assessment*, UN Millennium Ecosystem Assessment Report, World Resources Institute, New York, 2005.

- (c) *The Future We Want* (a document published after the Rio plus 20 conference on Sustainable Development, June 20-22, 2012) reiterates the same discourse of commitment to sustainable development to ensure an economically, socially and environmentally sustainable future for our planet and for the present and future generations. The report identifies and reiterates the means of implementations as finance, technology, capacity building, trade and a registry of commitments.

UNFCC/Kyoto Protocol.

This is the key convention and with its protocols to come to grips with the issue. Appendix A has some fundamental definitions. According to Article 2 of UNFCC, “The ultimate objective of the UNFCC and any related legal instrument that the conference of parties (COP) may adopt is to achieve, in accordance with the relative provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interferences with climate system. Such a level should be achieved within a time- frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production in not threatened and to enable economic development to proceed in a sustainable manner.”⁷ The Kyoto Protocol (KP) to the UNFCC was agreed upon in 1997 in pursuit of Article 2. Its aim was to reduce Annex 1 country (industrialised countries) emissions of carbon dioxide and five other gases that contribute to greenhouse effect by 5 percent from 1990 levels during the 2008-2012 commitment period.⁸ The present situation is that The Intergovernmental Panel on Climate Change (IPCC)

⁷ Article 2, Objective, United Nations Framework Convention on Climate Change, United Nations, 1992.

⁸ Article 3.1 of Kyoto Protocol to the UNFCC.

recommended a minimum of 25 to 40 per cent reductions in emissions by 2020 compared to the 1990 levels in order to limit global temperature rise to two degrees celsius by mid-century. Important milestones like the COP/Meeting of Parties (MOP) under the UNFCCC/Kyoto protocol are:

- **COP 14 in 2007** – Bali Action Plan - two tracks. 1) Long-term Cooperative Action plan. 2) Negotiate second commitment period starting 2013. The Bali Action Plan is centred on four main building blocks: (i) Mitigation, (ii) Adaptation, (iii) Technology, with (iv) Financing, with Nationally Appropriate Mitigation Action (NAMA) forming an important part of the mitigation component.
- **COP 15 in 2009 at Copenhagen (Accord)**. The Copenhagen Climate Change Conference accorded the climate change policy the highest political significance. It was a crucial event in the negotiating process.
 - (i) It significantly advanced the negotiations on the infrastructure needed for effective global climate change cooperation, including improvements to the Clean Development Mechanism of the Kyoto Protocol.
 - (ii) Significant progress was made in narrowing down options and clarifying the choices that needed to be made on key issues, later on in the negotiations.
 - (iii) It produced the Copenhagen Accord, which displayed a clear political intent to constrain carbon and respond to climate change, in both the short and long term.

The Copenhagen Accord had several key elements on which there was strong convergence of the views of governments. These included the long-term goal of limiting the maximum global average temperature increase to no more than 2 degrees celsius above pre-industrial levels, subject to a review in 2015. There was, however, no agreement on how to do this in practical terms. It also included a reference to consider limiting the temperature increase to below

1.5 degrees - a key demand made by vulnerable developing countries. Other central elements included:

- (i) Developed countries' promises to fund activities to reduce greenhouse gas emissions and adapt to the inevitable effects of climate change in developing countries. The developed countries promised to provide \$30 billion for the period 2010-2012, and to mobilise long-term finance of a further \$100 billion a year by 2020 from various source
 - (ii) Agreement on the measurement, reporting and verification of developing country actions, including a reference to "international consultation and analysis", which had yet to be defined.
 - (iii) The establishment of four new bodies: a mechanism on REDD-plus; a High-Level Panel under the COP to study implementation of financial provisions; the Copenhagen Green Climate Fund; and a Technology Mechanism.
- **COP 16 in 2010 at Cancun: (Agreement).** The Cancun Agreement consisted of the most comprehensive package ever agreed upon by governments to help developing nations deal with climate change. It encompassed finance, technology and capacity-building support to help such countries deal with the urgent need of adapting to climate change, and to speed up their plans to adopt sustainable paths to become low emission economies, that could also resist the negative impacts of climate change. The agreements represented key steps forward in terms of capturing plans to reduce greenhouse gas emissions, and to help developing nations protect themselves from climate impacts and build their own sustainable futures. Put simply, the Cancun Agreements' main objectives include: mitigation, transparency of actions, technology, finance, adaptation, forests, and capacity building.
 - **COP 17 in 2011 at Durban (Platform).** Negotiators agreed to be part of a legally binding treaty to address global warming.

The terms of the future treaty were to be defined by 2015 and become effective in 2020. The agreement, referred to as the “Durban platform”, is notable in that for the first time it includes developing countries such as China and India, as well as the US which refused to ratify the Kyoto Protocol. The Durban outcomes looked to address these challenges in a more connected way by including a road map for implementation, over a longer time horizon than has commonly been the case in the history of the Convention. As per this map, four main areas of coordinated and complementary action and implementation, designed also to build and preserve trust among countries, were agreed upon at the UNFCCC meeting. These are as follows:

- (i) **Second commitment period of the Kyoto Protocol.** The continuation of the current international legal system through a second commitment period of the Kyoto Protocol, under which developed countries commit to greenhouse gas cuts; and which enshrines existing accounting rules and models of international cooperation that may inform future efforts,
- (ii) **Launch of new platform of negotiations.** The launch of a new platform for negotiations, under the Convention, to deliver a new and universal greenhouse gas reduction protocol, legal instrument or other outcome with legal force by 2015 for the period beyond 2020. This new negotiation, importantly, includes the finding of ways to further raise the existing level of national and international action to bring down greenhouse gas emissions,
- (iii) **Conclusion of existing broad-based stream of negotiations in 2012.** A decision to conclude within 2012 the work of the existing broad-based stream of negotiations that includes all member nations under the Convention within 2012. This included working to make existing national emission reduction or emission limitation

plans more transparent. It also encompasses the launch and long-term implementation of the comprehensive global support network that will deliver funding and technology to enable developing countries build their own clean energy futures and construct societies and economies which are resilient to climate change and:

- (iv) **Global Review.** To scope out and then conduct a fresh global review of the emerging climate challenge, based on the best available science and data: first to ensure whether a maximum two-degree rise is enough or whether an even lower 1.5 degree rise is required; and then to ensure that collective action is adequate to prevent the average global temperature rising beyond the agreed limit.
- **COP 18 in Doha in 2012 (Climate Gateway).** At the 2012 UN Climate Change Conference in Doha (Qatar), governments consolidated the gains of the previous three years of international climate change negotiations and opened a gateway for the necessary greater ambition and action on all levels. Among the many decisions taken, governments:
 - (i) Strengthened their resolve and set out a timetable to adopt a universal climate agreement by 2015, which will come into effect in 2020.
 - (ii) Streamlined the negotiations, completing the work under the Bali Action Plan to concentrate on the new work towards a 2015 agreement under a single negotiating stream in the Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP).
 - (iii) Emphasised the need to increase their ambition to cut green house gases (GHGs) and to help vulnerable countries to adapt.
 - (iv) Set a new commitment period under the Kyoto Protocol, thereby ensuring that this treaty's important legal and accounting models remain in place and underlining the

principle that developed countries lead mandated action to cut greenhouse gas emissions.

- (v) Made further progress towards establishing the financial and technology support and new institutions to enable clean energy investments and sustainable growth in developing countries.

In the second commitment period of emission reduction by KP parties effective immediately beginning January 1, 2013 it was hoped to implement the targets over an 8 year period (2013-2020). EU, the major KP Party will reduce its emissions by 20 per cent by 2020 compared to 1990. No specific targets for mid-term financing (2013-2020) were adopted. According to the former Indian negotiator Shyam Saran, the two tracks initiated at Bali stand concluded at Doha and the Bali road map is shelved. In its place the Durban platform repudiates the principles and provisions of UNFCCC. The pledges of Kyoto will only constitute an 18 per cent reduction in emissions by 2020 compared to 1990. India has not been able to uphold its key interests. Instead, the forum is for full fledged economic negotiations rather than technical deliberations on climate change.⁹

- **COP 19 in Warsaw (Poland) in November 2013.** Key decisions taken at this conference include decisions on further advancing the Durban Platform, the Green Climate Fund and Long-Term Finance, the Warsaw Framework for reducing emissions from deforestation and degradation (REDD Plus), the Warsaw International Mechanism for Loss and Damage and other decisions. As agreed at Doha in 2012 an international mechanism on loss and damage has been set up and was termed the Warsaw International Mechanism. India reiterated that it is a large country with very small carbon footprint per capita (only 1.7 tonnes per annum). That it has committed

⁹ Shyam Saran, 'Shyam Saran: Doha's 'gateway' to nowhere', *Business Standard*, December 19, 2012.

that its per capita emissions will not exceed those of the developed countries in the future and more importantly- that India is implementing the ambitious voluntary domestic goal of reducing the emissions intensity of its GDP by 20 to 25 per cent by 2020 compared to the 2005 level.

- **Forthcoming(As in July 2014) :**
 - (a) **UN Climate Summit in New York in September 2014.** This is not part of the negotiation process. It is aimed at catalysing actions by governments, business, finance, industry, and civil society. It intends to build a solid foundation on which to anchor successful negotiations and sustained progress on the road to reducing emissions and strengthening adaptation strategies.
 - (b) **COP 20 at Lima, Peru, December 2014.**
 - (c) **COP 21 in Paris, France in 2015.** This will lead to a universal final agreement.

The Green Climate Fund. The Copenhagen Accord, agreed to during the 15th Conference of the Parties (COP-15) in Copenhagen in 2009 made mention of the “Copenhagen Green Climate Fund”. The fund was formally established during the 2010 United Nations Climate Change Conference in Cancun and is a fund within the UNFCCC framework. Its governing instrument was adopted at the 2011 UN Climate Change Conference (COP 17) in Durban, South Africa.¹⁰

The Green Climate Fund (GCF) is a fund within the framework of the UNFCCC founded as a mechanism to transfer money from the developed to the developing world, in order to assist the developing countries in adaptation and mitigation practices to counter climate

¹⁰ GEO5: *Global Environment Outlook: Environment for the Future We Want*, UNEP, 2012, Box 17.2, p.466.

change. “The Green Climate Fund will support projects, programmes, policies and other activities in developing country Parties using thematic funding windows.”. Its objective is to raise \$100 billion a year by 2020. To kick-start environmental projects, a \$ 40 billion Fast Start Funding of the GCF, for the period 2010-2012 was also agreed upon.

The reality as the BASIC countries have pointed out is that as on February 2013 only \$7 billion was available.

While the theoretical work done by the UN is welcome, states continue to behave differently. The good news is that gradually the issues related to the subject of climate change with repeated efforts as framed with international consensus by the UN are now becoming part of public and academic discourse. If public opinion and party manifestos in India were to include issues relating to climate change in their election pledges, it would mean that a paradigm shift has taken place. But that will take much more time as poverty does not provide the luxury of talking about environmental and climate security in election rallies.

The November 2013 COP 19 of the UNFFCC at Warsaw may be the last base camp before the final peak of climate summit negotiations is conquered. The Conference represents the halfway mark between the Durban conference that initiated negotiations towards a 2015 climate agreement and the Paris Conference that is expected to seal the deal at the 2015 COP 21 France in December 2015. The window is small and divisive geopolitics and geo-economics dominate as each nation state seeks to outmanoeuvre the other.

Part 3 - Science and Evidence

Evidence of climate change is for all to see and experience. Natural disasters attributable to adverse climate change have impacted South Asia –such as the Leh cloudburst of 2010 and the 2011 floods in Pakistan and to a great extent the flood related disasters due to a complex linkages of human follies in the Garhwal region of Uttarakhand Himalayas in June 2013.

A study of February 2012, from the Proceedings of the National Academy of Sciences concludes that the recent decline in Arctic Sea ice has played a critical role in recent cold and snowy winters. The US science advisory committee draft climate assessment report argues that there is “strong evidence” that global warming has roughly doubled the likelihood of extreme heat events, contributing to drought and wildfires. Permafrost is melting in Alaska and the US is experiencing more extreme rainfall and winter snowstorms. Although all recent weather related disasters may not be due to just the climate change, public perception now is getting formed that points a finger to climate change being the main reason. While the scientific community may have esoteric knowledge to justify extreme events as inevitable climate variations in refereed journals or in technical seminars, it is not so in public perception. This reality of both man and nature being responsible can not be wished away.

Some evidence in public perception likewise in this category being:

- (a) Deficient South West Monsoon in India in 2012.
- (b) The power grid collapse and relapse in north India in July 2012 during a poor monsoon due to the over drawing of electricity to draw ground water for irrigation by electrical pumps.
- (c) Hurricane Sandy in the US in November 2012. The extreme weather events due to chilly winds from Arctic and freezing of the Niagara falls in winter of 2013/2014.¹¹

¹¹ This is called ‘cold-air outbursts’ and it may be premature to attribute it to just climate change. Cold air outbreaks even more severe than the recent ones affected the US in early 1960s, late 1970s and in 1983. See John M. Wallace et- al, Commentary/Letter, ‘Global Warming and Winter Weather’, *Science*, Vol.343, 14 February 2014, pp.729-730. The authors argue that to make it centrepiece of public discourse on global warming is inappropriate and a distraction. But in my research with media proliferation, public opinion which gets formed is not cognizant of the deep scientific data and theories. Conclusions are drawn instantly.

- (d) Super Typhoon Bopha in the Philippines of December 2012 followed by super Cyclone Haiyan in November 2013.
- (e) The Australian heat wave of January 2013 and the flooding of Jakarta due to annual quota of rainfall being delivered in less than a week in catchment areas.
- (f) **Heavy rainfall, landslides and flash flooding events in Uttarakhand Himalayas before the expected arrival of the summer monsoons in June 2013.** While it will be unscientific to place the blame for this disaster only on climate change,¹² the common thread may be that given that population density in remote areas has increased manifold and people are constructing unscientific buildings on flood plains and in the path of river flows; the reality is that there was a massive loss of human and animal life. Religious tourism is also a source of livelihood and in a way helps in reducing migration of hill folk to the plains. Thus, policies and plans have to take this reality into account, even if the entire climate change pattern may not be the only reason.
- (g) It has been argued that although frequency of cyclones may decrease their intensity will increase. The repeated cyclones in the Bay of Bengal in the autumn/winter of 2013 of which the cyclone Phailin which hit Odisha and Andhra Pradesh in October 2013 was the severest. This however shows that both intensity and frequency are likely to increase. Later, super typhoon Haiyan devastated and wreaked havoc in parts of the Philippines.

¹² Naresh Rana, Sunil Singh, Y.P. Sundriyal and Navin Juyal, 'Recent and Past Floods in the Alaknanda Valley: Causes and Consequences', *Current Science*, Vol.105, No.9, 10 November 2013, pp.1209-1212.

- (h) **Arctic.** The melting of Arctic sea is the real evidence. At the international level the accelerated melting of the Arctic ice caps is now being documented on a daily basis. (Geopolitics of Arctic ice melting is covered later).

Crossing the Threshold. The figure of 400 parts per million of carbon dioxide has also been breached. This increase of CO₂ from the 280 level at beginning of industrial age is due to anthropogenic reasons like the burning of fossil fuel. Humans contributed around 10.4 billion tonnes of carbon into the atmosphere in 2011. About half of that is taken up each year by carbon ‘sinks’ such as the ocean, and the vegetation on land; the rest remains in the atmosphere and raises the global concentration of CO₂. The sinks however have also clogged up thus reducing their ability to take up more CO₂.¹³ In technical language the status including allocation of the limited space for future is:

If cumulative CO₂ emissions are restricted to 1,000 Gega ton CO₂ (273 Gt C) for 2000-2050 period there is a 10 % to 42% probability of exceeding a 2 deg C rise in temperature. The world has already emitted approximately 66 GtC over 2000-2009. It is the remaining carbon space available that has to be partitioned in physical terms based on an appropriate principle.¹⁴

Another way of expressing is that the planet is heating up fifty times faster than any point in time in human civilisation when compared with temperature records dating back to 11,000 years.¹⁵

¹³ Richard Monasterrsky, ‘Global Carbon dioxide levels near worrisome milestone’, *Nature*, 497, 13-14 (02 May 2013).

¹⁴ Tejal Kanitkar, T.Jayaram, Mario D’Souza and Prabir Purkayastha, ‘Carbon budget for climate change mitigation- A GAMS-based emission model’, *Current Science*, Vol.104, No.9, 10 May 2013, p. 1201.

¹⁵ Bill McKibben, ‘Some Like It Hot!’, *The New York Review of Books*, Vol. LX, No.8, May 9, 2013, pp.59-60.

Yet some doubts have been raised with regard to the data which flies around from various sources in peer reviewed journals. The main public confusion is whether climate change is due to anthropogenic reasons or is it due to unknown natural reasons. While this debate is not new and was a very dominant one - in the 1990s and early 2000s -among 'sceptical environmentalists' public opinion, anecdotal evidence and extreme swings of weather and climate have convinced society at large that indeed there is a problem. Perhaps the Arctic meltdown is the main evidence since it is aired by the media regularly. If ships are now able to navigate the Arctic ocean, it is obvious something unusual is happening. However, the logic of climate deniers also must be debated and taken note of to which we turn next.

The Deniers

Countries, such as the Russian Federation, that are well endowed with fossil fuels, believe that they may probably benefit from climate change by way of a warmer climate for a longer agricultural season, availability of more arable land and new money earning sea routes and access to resources in the melting Arctic. The arable area would increase and the rising temperatures would ensure an extension of the growing season. This could theoretically lead to an increase in the harvest. Russian farmers would be able to grow more food, which could provide the national as well as the international market. But this has to be seen along with increased disasters like floods, heat waves, forest fires and melting permafrost.¹⁶ It must be appreciated that at no time Russian position in climate negotiations is based on any advantage that may occur. Rather, climate change issues in totality are more problematic than advantageous. According to some Russian scientists, as in a newspaper article by a well

¹⁶ Stefan Bernhardt, 'Climate change in Russian' at <http://www.objectivemind.org/en/environment/russia/climate-change-in-russian/> (accessed 21 Dec 2013).

respected Russian journalist, the theory underlying the Kyoto Pact lacks scientific basis. It is argued that, it is global warming that triggers higher levels of carbon dioxide in the atmosphere, not the other way round. The computer models of anthropogenic green house induced warming are inaccurate since the scientific understanding of many natural factors is still poor.¹⁷

Freeman Dyson is a scientist and author, best known for his book *Weapons and Hope* (1984). Freeman Dyson, is a climate change sceptic for anthropogenic reasons. He argues that some environmentalists have adopted the belief that global warming is the greatest threat to ecology of our planet as an article of faith. In a review essay “The Question of Global Warming” in the *New York Review of Books* in 2008, and his book *Many Coloured Glasses: Reflections on the Place of Life in Universe* (2007) Freeman Dyson is comfortable with being called a heretic. Science he feels is mixed up with politics. He dismisses Al Gore and NASA scientist James Hansen as alarmists. The fuss about global warming is exaggerated as computer models have ignored the dynamics of clouds, dust, and the chemistry /biology of fields, farms and forests. He suggests that in a natural cycle of 100,000 years, the ice age prevails for 90,000 years followed by a warm interglacial period of 10,000 years. The present period of warming began 12,000 years ago. Therefore the onset of the next ice age may be overdue. (William F Ruddima in an article in the *Scientific American* of March 2005 put forth the hypothesis that our ancestors’ farming practices kept the planet warmer than it would have been otherwise and possibly even averted the start of a new ice age). Recalling that the Sahara desert was lush and wet 6,000 years ago, Dyson wonders if this may again occur with global warming and that a wet Sahara may well be better. With respect to carbon sinks, he argues that proper land management like no till agriculture and “low cost backstops” like

¹⁷ Vladimir Radyuhin, ‘Challenging the basis of Kyoto Protocol’, *The Hindu*, July 10, 2008. In a high level statement at COP 19 at Warsaw in November 2013, Russia accepted the problem and made no mention of this contrary science.

genetically engineered carbon eating trees or phytoplanktons could utilise the surplus carbon dioxide in the atmosphere.

A fresh doubt is now reviving the expectations of climate deniers. *The Economist* of March 30, 2013 carried an item according to which, over the past 15 years air temperatures at the Earth's surface have been flat while green house gas emissions have continued to soar.¹⁸ The harshest frost in 50 years in Russia in March 2013, made it the coldest spring. The British Met Office in December 2012 scaled back by 20 per cent of its previously projected rise in global temperature through 2017.¹⁹ Answers to this were soon available. The recent cold wave was attributable to incoming cold air from the Arctic.

Reports indicate that there is no escaping the fact that warming has set in. Taking 1960-1990 as the base years, the average temperatures in India rose from 24.7 deg C to 25.51 deg C.²⁰ To put to rest the argument by deniers, the most convincing argument as to why the sea- surface and surface - air temperatures have not risen over most part of the decade is that much of the warming has occurred below depth of 700m, rather than on the ocean surface, and that much of redistribution is in the change over the period.²¹ But mentioning just the surface temperatures is not enough. Climate trends need to be measured and studied in 30 year brackets and not just in years and decades as is the current media driven practice. Importantly, "It is time for IPCC and other agencies to highlight changes in integrated measures of climate change, such as ocean

¹⁸ 'A Sensitive Matter', *The Economist*, March 30th, 2013, pp. 73-75.

¹⁹ Valdimir Radyuhin, 'Down to Minus 45: A Freezing Russian Spring has reignited the climate change debate', *The Hindu*, April 22, 2013.

²⁰ Nagaraj Adve, 'An Indian Winter', *The Hindu*, May11, 2013.

²¹ Letter to the Editor, 'Where's Warming', *Science*, April 12, 2013, p.123.

heat content and sea level rise to avoid confusion and controversies”.²² Or global warming will continue.

It is not possible to take positions as the actual truth is based on science and the work is still ongoing. Thus we need now to turn to what is the current work by the Intergovernmental Panel on Climate Change.

Working Group I (Science of Climate Change) of Fifth Assessment Report (AR5) Summary for Policy Makers (SPM) Released in September 2013

Intergovernmental Panel on Climate Change (IPCC) was jointly established in 1988 by World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP), with the mandate to assess scientific information related to climate change, to evaluate the environment and socio-economic consequences of climate change, and to formulate realistic response strategies. This work play a major role in governments to adopt and implement policies in response to climate change, and in particular have responded to the need for authoritative advice of the Conference of Parties(COP) to the United Nations Framework on Climate Change(UNFCCC), which was established in 1992, and its 1997 Kyoto Protocol.

IPCC every six years publishes assessment reports in three volumes - The Physical Science Basis (Working Group I), Impacts, Adaptation and Vulnerabilities (Working Group II), and Mitigation of Climate Change (Working Group III). This is consolidated as a Synthesis Report which has a Summary for Policymakers (SPM) in the beginning. It is important to note that the summary is vetted by governments before release.

²² G.Bala, Guest Editorial, ‘Why the Hiatus in global warming in the last decade?’, *Current Science*, Vol.105, No.8, 25 October 2013, pp.1031-1032.

Last such report was the Fourth (4 AR) in 2007. Now the fifth volume of the Fifth Assessment Report is being released in instalment. Working Group I (Science of Climate Change) of Fifth Assessment Report (AR5) Summary for Policy Makers (SPM) was released in September 2013.²³ Broadly it has revised three fundamental conclusions:

- (a) **Past Warming.** Warming of climate system is unequivocal.
- (b) **Responsibility.** It is extremely likely (as against very likely of 4 AR) that human influence is the dominant cause of observed warming since mid 20th century.
- (c) **Future Heat.** The world is likely to get dangerously warm. Under all but most draconian reduction in GHG it will warm more than 1.5° C to 2° C by end of century. 2° C is a dangerous level.

Adaptation and the Importance of Social Science

Scholar have identified vulnerabilities based on past experience. In one such report, sectors like water resources plans, forestry, insurance, coastal zone management have adapted to some degree. But there are serious scientific gaps such as:

- (a) Decision makers lack climate information or mean to apply it.
- (b) If knowledge exists, it is not in form or context that decision makers can assimilate or act in advance.
- (c) Engineering innovations are needed; as well as social science knowledge, to guide technology deployment and adjustments, investments and public policy.

²³ <http://www.climatechange2013.org/> (accessed on March 23, 2014). Also see Richrad A. Kerr, 'The IPCC Gains Confidence in Key Forecast' *Science*, Vol.342, 4 October 2013, pp.23-24.

A key characteristic of emerging adaptation science is that it is both basic – in that it contributes to understanding fundamental physical, environmental, and socioeconomic research questions and applied, because it is problem focused. Three broad approaches are suggested

A- **Identify Vulnerabilities.** Research challenges being :-

- (a) Improve data, methods, and scenarios for research on vulnerabilities and resilience of human and natural systems.
- (b) Identify climate thresholds in vulnerable system.

B-**Improve Foresight About Climate Hazard and Other Stresses.** Research challenges:

- (a) Understand recent and potential future changes in extreme climate events.
- (b) Improve integration of weather and climate information over next decade for risk assessment and management.
- (c) Tailor climate information to facilitate its application in decision making.
- (d) Climate information services to communicate adaptation science to public and private sector decision makers.

C- Identify Barriers, broaden range of adaptation options, promote learning.²⁴

Innovation and Role of Social Sciences. With regard to innovations, the development of technologies to build a new energy system is the penultimate step in successful innovation for a carbon

²⁴ R.H. Moss et al, 'Hell and High Water: Practice-Relevant Adaptation', *Science*, Vol.342, 8 November 2013, pp.696-698.

free economy. The final step is its deployment at a scale that makes a difference. As it has been rightly argued: physical sciences and engineering, essential for developing technology, are not the principal tools for addressing these problems. These are more the province of social scientists, and thus greater attention should be given to incorporating social science research into energy policy development.²⁵

But ultimately, whether climate change is due to anthropogenic reasons or not, lies the domain of scientists and policymakers/politicians. Importantly as it relates to politics, the international community by way of UNFCCC recognises that the problem is anthropogenic. Some countries of the world are taking the issue very seriously. In the UK a Climate Change Act has been legislated by the Parliament.²⁶

Part 4 - Climate Science and Policy as It Relates To India

No country in the world is as vulnerable, on so many dimensions, to climate change as India. Whether it is our long coastline of 7000kms, our Himalayas with their vast glaciers, our almost 70million hectares of forests (which incidentally house almost all of our key mineral reserves) – we are exposed to climate change on multiple fronts. Rigorous science based assessments are therefore critical in designing our adaptation strategies.

Availability of Data at National Level

It is now a welcome development to see the necessity of Indian specific research. In a number of official reports such as those related to climate change it has been recommend that there is a need in

²⁵ Michael Grubb, Discussions, Centre for Policy Research Climate Initiative, 'Whither Climate Governance? A Discussion of National, Regional and Global Developments', India International Centre, New Delhi, December 4, 2013.

²⁶ Ibid.

India or the capacity for the “3 M’s” – Measure, Model and Monitor – the foundation of decision-making. For this indigenous capacity has to be built. There is a realisation that we should not be dependent on external studies to tell us for example about the impact of climate change on our glaciers, on our monsoons, and indeed even on sea level rise. Indeed, recent evidence suggests the “scientific consensus” on many of these is debatable.

There is need to build our own independent and credible research capacity on these issues. The 4x4 report given below is a step in this direction. In particular, the knowledge and understanding of impacts as deduced from the Global Circulation Models and Regional Climate Models are not adequate to assess the impacts and implications for India. A need has been felt for comprehensive national as well as state level impact assessment. Indian scientists have assessed this by using the PRECIS (providing climate investigation studies) based on HadRM (Hadley Regional climate Model) to generate climate change scenario for 2030s.

For the science and policy of climate change, gathering, recording and analysing data is vital. Historic data may be the most difficult to record as no time series archival source may be available easily. Much more national effort is required in data related matters. Sharing of data between countries is at places more important than sovereign data which even may be securitised. Data for climate change is contained in the following:

- National Communications including national technical means at the disposal of the state
- Climate Change and Related Policies
- Annual State of Environment Reports
- Statements by officials in negotiations, parliament etc
- IPCC reports
- Peer reviewed literature and in academic departments of universities

- Data with governments machinery like met departments and scientific institutions
- Peoples' perception, anecdotal and generational narratives, oral history of traditional ecological knowledge. This type of data is now assuming importance. For example animals, insects, flora and fauna are more sensitive than humans and can give prior warnings if studied scientifically with imagination.

India's National Communications and Climate Science

The initial national communication (natcom) on GHG inventory submitted to the UN in 2004 was based on second generation Hadley Centre Regional Climate Model (HadRM2) of an area of 5000x5000km with 50km resolution. For assessing nature of likely future climate in India at an all-India level, eight hierarchy of coupled atmospheric models (AOGCMs) were run using IS92a and SRES A2 and B2 scenarios representing period 1860 to 2099.

For the second natcom (submitted in 2012) second generation HadM2 models were run using A1B scenario as the most appropriate²⁷. Subsequently new regional models were developed called PRECIS having 50x50 km horizontal resolution over South Asia.

²⁷ The A1 scenario family develops into three groups that describe alternative directions of technological change in the energy system. The three A1 groups are distinguished by their technological emphasis: fossil intensive (A1FI), non-fossil energy sources (A1T), or a balance across all sources (A1B) (where balanced is defined as not relying too heavily on one particular energy source, on the assumption that similar improvement rates apply to all energy supply and end-use technologies). IPCC Special Report on Emission Scenarios A1B was chosen as the most appropriate scenario as it represents high technological development, with infusion of renewable energy technologies following a sustainable growth trajectory

“4X4”, INCCA and Temperature Rise in India

India has released a major new study on climate change science in November 2010. It is called A “4X4” assessment of the impact of climate change on key sectors and regions of India in 2030s. The report provides an assessment of impact of climate change in 2030s on four key sectors of the Indian economy, namely Agriculture, Water, Natural Ecosystems and Biodiversity and Health in four climate sensitive regions of India, namely the Himalayan region, the Western Ghats, the Coastal Area and the North-East Region. The Report has been prepared by the Indian Network for Climate Change Assessment (INCCA), a network-based programme that brings together over 120 institutions and over 220 scientists from across the country to undertake scientific assessments of different aspects of climate change.

Salient Findings of the 4X4 Assessment

The 4x4 Assessment examines the implications of climate change for India in 2030s deduced from a Regional Climate Model Had RM3 (Hadley Centre Regional Model Version 3) run for A1B scenario.

1. Climate change projections

- Climate change scenarios for 2030s indicate **an overall warming for all the regions** in focus. The net increase in annual temperatures in 2030s with respect to 1970s ranges between 1.7 deg C – 2.2deg C, with extreme temperatures increasing by 1-4deg C, with maximum increase in coastal regions. The extreme maximum and minimum temperatures are also projected to increase in 2030s with respect to 2070s.
- **All the regions are projected to experience an increase in precipitation in 2030s** with respect to 1970s and the increase is maximum in the Himalayan region and minimum increase in the North Eastern region. The extreme precipitation events are likely to increase by 5-10 days in all the regions

2. Sea Level Rise and extreme events

Sea level along the Indian coast has been rising at the rate of 1.3mm/year and is likely to rise in consonance with the global sea level rise in the future. Further projections indicate that the **frequency of cyclones is likely to decrease in 2030s, with increase in cyclonic intensity.**

3. Agriculture

- **Irrigated rice** in all the regions are likely to **gain in yields marginally** due to warming as compared to the rainfed crop as the irrigated rice tends to benefit from CO₂ fertilization effect. Maize and sorghum are projected to have reduced yields in all the regions. The Coconut productivity is projected to rise in the western coast and reduce in the eastern coastal region. Observations indicate a reduction in apple production in the Himalayan region, which is likely to continue in the future.
- **In case of marine fisheries some species will gain in yields**, as the warming favours their productivity such as Sardines. Some species like Indian mackerel are likely to move upwards to the northern latitudes thus maintaining their yields. Species like Threadfin breams, may shift their spawning seasons adjusting to the season which optimally favours spawning temperatures.
- **With overall warming**, the thermal humidity index is projected to increase in all the regions, especially in the months of May and June, leading to **stress to the livestock and hence reduction in its milk productivity.**

4. Water

- **Water yield** (which is a function of precipitation, total surface run off, evapotranspiration and soil properties), **is projected to increase in the Himalayan region in 2030s by 5-20%**, however, **water yields are likely to be variable across the North Eastern region, Western Ghats, and Coastal region.**

In some places in these regions, it is projected to increase and in some places it is projected to decrease.

- **Moderate to extreme drought severity is projected in 2030s for the Himalayan region**, as compared to the other regions. **All the regions are likely to experience flooding which are exceeding existing magnitudes by 10% to 30%.**

5. Forests

- **Change is projected for 8% 18%, 56%, and 30% of the vegetation grids and increase in Net Primary Productivity by 23%, 20%, 57%, and 31% is projected** in Western Ghats, North eastern region, Himalayan region, and the Coastal region.

6. Human Health – Malaria

- **Malaria is projected to spread in new areas in Jammu and Kashmir in the Himalayan region. In the North eastern region opportunities for transmission is likely to increase for a longer period. In the Western Ghats, no change is observed between in 2030s and the trends observed in 1970s. However, in the Coastal region, especially in the eastern coast a marked decrease in number of months is projected in which that the malaria transmission window would be open.**

Part 5 - Economics and Energy

Economics

Nicholas Stern (who framed the climate problem in economic terms) has termed the climate problem as the greatest market failure in history. He has changed the findings of his original 2005 report entitled the *Stern Review*. In that he had estimated that it would take one per cent of GDP annually to mitigate climate change. Now he has upped that to two per cent.²⁸ While reviewing a book²⁹ he

²⁸ 'Q & A', *Technology Review*, July/August 2011, pp.26-28.

²⁹ Nicholas Stern, 'Climate : What You need to Know', Book Review, Bill McKibben, *Eaarth : Making a Life on a Tough Planet*, *New York Review of Books*, June 24, 2010, pp.35-37.

forecast a 5 degree C rise at business as usual (BAU). Such temperatures have not been seen on the planet for more than 30 million years (homo sapiens have been around since 200,000 years). To have a reasonable or 50 per cent chance of attaining the 2 deg C goal, a target accepted at Copenhagen conference, he argues that global annual emission of green house gases should be reduced from 47 billion metric tons (BMT) of CO₂e Co2 equivalent (CO₂e) today to 44 billion MT in 2020, to much less than 35 BMT in 2030, and much less than 20 BMT in 2050. Implying that emissions must peak before 2020. The most convincing argument he gave was that action as per an accord would only mean a reduction of 7-8 BMT by 2020; whereas what is needed is a reduction between 56 to 44 BMT. Converted into per capita, his arithmetic is simple: the world must emit, on an average, four metric tons per capita of CO₂e by 2030, and about two tons per capita by 2050, whereas the current world average is 7 tons per capita. For the US it is 20 plus, for Europe 12, China 6 and for India less than 2.

The Energy Sector

The energy sector accounts for around two-thirds of global greenhouse-gas emissions. According to the IEA Report of 2012 released in June 2013, the current trend is more likely to result in a temperature increase of between 3.6 °C and 5.3 °C. But it also finds that much more can be done to tackle energy-sector emissions without jeopardising economic growth, an important concern for many governments. The press release of June 10, 2013 of the new IEA report presents the results of a 4-for-2 °C scenario, as per which four energy policies that can deliver significant emissions reductions by 2020 are selected. These rely only on existing technologies and have already been adopted successfully in several countries. In the 4-for-2°C scenario, global energy-related greenhouse-gas emissions are 8 per cent (3.1 Gt CO₂ equivalent) lower in 2020 than the level otherwise expected. These four measures being:

- (a) Targeted energy efficiency measures in buildings, industry and transport account for nearly half the emissions reduction in 2020, with the additional investment required being more than offset by reduced spending on fuel bills.

- (b) Limiting the construction and use of the least-efficient coal-fired power plants delivers more than 20 per cent of the emissions reduction and helps curb local air pollution. The share of power generation from renewables increases (from around 20 per cent today to 27 per cent in 2020), as does that from natural gas.
- (c) Actions to halve expected methane (a potent greenhouse gas) released into the atmosphere by the upstream oil and gas industry in 2020 provide 18 per cent of the savings.
- (d) Implementing a partial phase-out of fossil fuel consumption subsidies accounts for 12 per cent of the reduction in emissions and supports efficiency efforts.³⁰

While the report is elegant, but here again the issue boils down to the technologies to construct latest power plants. The Kyoto mechanism has pledged to facilitate this – but which has not happened. Second, reduction in fossil fuel subsidies in India for mostly agricultural operations like extraction of ground water and tractor and truck mobility may not be implementable as a shock therapy. But, there seems to be no doubt that it is the energy sector that is both part of the climate problem as also the solution. Any future transition to a carbon free or low carbon, or carbon neutral energy economy will be the main challenge in negotiations and diplomacy. A country such as India also needs to strengthen its national capacity for research and development (R&D) in fundamentals followed by transfer of this knowledge to a viable and economic industrial grade model.

New Sources of Fossil Fuel and Return of Coal. Energy security today is the main pillar of national well being. At the geopolitical level, without any thought of a ‘red herring’ like the distraction of an impending climate change, power politics driven by oil is still the main driver of state to state relations. The US may soon consign

³⁰ <http://www.iea.org/newsroomandevents/pressreleases/2013/june/name,38773,en.html>

its addiction to imported oil to history when it develops its unconventional shale /tar oil and gas in the near future. It could well be the one main reason for its East Asia pivot policy of a focus or rebalance towards the Asia- Pacific from the Middle East. There is a misplaced notion that emission from the US have reduced drastically as a result of this discovery and the use of gas. More side effects are in the offing due to fracking - a necessary evil in the shale gas business which pollutes ground water and is still under studied (for example -will it led to earthquakes?).It also emits fugitive gas. On February 3, 2013, Al Gore in an interview with Fareed Zakaria on CNN, while answering a question on shale gas said that fracking leads to fugitive emissions of methane which is much more potent in global warming potential terms than carbon dioxide. *The Scientific American* report also warns that leaks and flaring of methane could undermine the benefits of cutting down carbon emission from power generation. One needs to be aware of this side effect, A satellite picture of the US at night showed areas where shale gas is being extracted being lit up as brightly as Chicago due to fugitive and uncontrolled emissions.

The Middle East or West Asia is no longer (from the fossil fuel point of view) the vital core interest of the US, though other interests of the US even if it declines in relative power would not go away like its commitment to Israel, and protecting Europe's underbelly and eastern flank as a NATO member, and the goodwill of the GCC countries, and to contain Iran. The good -or bad - news is that fossil fuel has not peaked. It is now actually available in plenty. The Arctic has huge resources, almost all African countries have discovered oil /gas reserves. Brazil and Israel have discovered off shore resources. Non conventional oil and gas will soon make the US - thus far a net importer - a net exporter of fossil fuel. Technology has helped to make more discoveries and cheaper extraction including that from the sea bed.

From the energy point of view, it is obvious that the current pledges will require very high annual reduction rates. Only carbon capture or storage, CO₂ removal (CDR) or geo-engineering could help, but will not solve the entire problem. There is a lot of scientific

uncertainty and fear over these technological solutions as humankind can never become so arrogant as to tame nature.

Along with this the use of coal in Europe has now increased. Coal is cheaper in Europe because its domestic shale gas industry is lagging and also Europe will take time to build an infrastructure to import liquefied natural gas in large volumes. The result is that in Europe renewables are displacing gas, but not coal. For example Germany, in view of its decision to avoid nuclear power is also building coal fired plants. In the UK too the use of coal is increasing.

In the case of India, coal is being imported when there are domestic stocks waiting to be exploited. But there is also a problem of coal reserves getting depleted in India. The bitter truth as pointed out by a former senior civil servant is that India's coal reserves will not last more than 20 years and thus there is a need to strategise and shift to renewables.³¹ While this may be good for climate change, but for ensuring energy security, India will need to import more coal and also natural gas import by LNG tankers; and/or through international gas pipelines emanating towards India from Iran and Turkmenistan.

It is now important to get familiar with India's unique energy problem as is given below.

Extracts from Energy Security Handbook

India's Climate Change Concerns: Energy Security³²

The threat of climate change is a new concern which has an important impact on the energy policy. India is actively engaged in

³¹ E.A.S. Sarma, 'Myopia on Coal', *Economic and Political Weekly*, Vol. XLVIII, No.44, November 2, 2013, pp.12-15. According to Perspective of Ministry of Coal in *Energy Security Handbook*, at the current level of production of about 550 million tons, the known coal reserve are envisaged to last for over 100 years. As per projections of Integrated Energy Policy Committee, the coal demand in 2031-32 is envisaged to reach 2000MT. See *Energy Security Handbook*, Ministry of External Affairs, March 2012, pp.193-195.

³² *Energy Security Handbook*, Ministry of External Affairs, March 2012.

finding a satisfactory solution which is consistent with a fair distribution of burdens and has indicated its willingness to keep per capita emissions below the level prevailing in industrial countries.

India is not required to contain its GHG emissions, at present but as a signatory to UNFCCC and a country which has acceded to Kyoto Protocol, India has been very active in proposing Clean Development Mechanism (CDM) projects. By September 2008, a total of 358 projects have been approved by CDM Executive Board from India with approximate 31 million tonnes (MT) of CO₂ reduction. Since the impact on the country's poor, due to climate change, could be serious, many of the initiatives recommended as part of the energy policy would have the effect of reducing the GHG intensity of the economy by as much as one third. These include:

- (a) Energy efficiency in all sectors
- (b) Emphasis on mass transport
- (c) Active policy on renewable energy that stipulates renewable portfolio standard
- (d) Proportion of bio-fuels wood plantation
- (e) Accelerated development of nuclear and hydro- electricity
- (f) Technology Missions for clean coal technologies
- (g) Focussed R & D on many climate friendly technologies
- (h) A Solar Technology Mission to make solar power an economic option to coal based power.

With these India will be one of the most energy efficient and GHG emission efficient economies in the world with one of the highest renewable proportion in the energy portfolios.

According to the Planning Commission, in order to eradicate poverty and meet human development needs, India would need to

sustain an economic growth rate of 8-10 percent over the next 20 years. Thus would require augmentation of primary energy supplies by nearly 4 times, an increase in power generation from the current levels of 1,88,000 megawatts to about 8,00,000 MW by 2030-31. Our energy mix currently is 53 percent based on coal, 31 percent on oil, 9 percent on natural gas and only 6 percent from hydropower and 1 percent from nuclear energy. If this energy mix remains unchanged over next 20 years then our dependence on imported fossil fuel will continue. It is estimated that by 2030-31, we would have to import 35-57 percent of our coal, 90-94 percent of our oil and 20-57 percent of our natural gas. Our dependence on imports of energy in 2031-32, will be 58-67 percent of our energy requirement if we are to sustain 9 percent annual rate of GDP growth³³

National Interests

In the light of the above reality of non renewable energy resources, it is necessary to explain what is India's national interest. The energy security policy rightly argues that there is a need to ensure external environment conducive to facilitate easy imports of energy. It also means that India will have to export as much, to pay for imports. It will be in India's interest to maintain a liberal world market free from protectionist trends. Diplomacy and foreign policy will therefore have a crucial role in ensuring an environment that promotes trade and commerce and easy flows of good and services.

Challenge to Indian Solar Mission

The underlying reason for power politics is economics. Clearly, energy is the main driver of the climate problem, nay, even the

³³ Ibid, p.302.

crankshaft of power politics and geopolitics over fossil fuel and the quest and race to develop and lead in non renewable technologies. The first jolt has been felt when in February 2014 the US trade representative announced initiating consultations with India over a World Trade Organisation (WTO) dispute pertaining to India's National Solar Mission (NSM). The dispute is that US feels that the domestic content requirement in NSM Phase II discriminate against US exports requiring solar power developers to use Indian-manufactured equipment instead of US equipment. Such practise according to the US are unfair requirements militated against WTO rules. Close to 10,000 jobs may be at stake in the solar industry if India went ahead. In response India argued that it will defend the case which only involves 375MW, a miniscule proportion of the total solar generation capacity being bid nationwide. The Indian argument was that India will respond adequately at the WTO with the US contention of India protectionism. While this paper is not on WTO and its disputes, one thing is clear is that more of this is expected and in the arena of global geopolitics and power game. India will have to play to the rules by articulating and standing firm on its national interests which also include heavy subsidies.

This section was about economics and energy politics. But there is a more fascinating interrelationship of power politics, climate change and the military which is covered next.

Part 6 - Power Politics, Climate Change and the Military

Geopolitical Alignments on Environmental Related Matters

Till now the BASIC grouping is united. In climate negotiations, India and China are good friends (in WTO, India and China are best of friends). The *upaya* (method) of *bheda* (dividing) is being employed to break this cooperation between two great Asian powers who have uneasy border relations. This break up is unlikely to happen till China foolishly antagonises India by diverting or over exploiting the Brahmaputra river before it enters Arunachal Pradesh

and constructs storage dams in Tibet. Although at Copenhagen in 2009 the EU was sidelined, but now in 2013/4 it is back with a vengeance to set the balance right. Another tricky issue is the vagueness of developed countries such as the US on the issue of the global commons. Cyberspace and the Internet are, for them, also a part of the global commons. Definitions are kept vague to suit national interests. This shifting of goalposts is also seen in the changing of the base year for measuring and comparing emissions. Earlier it was 1990, now it is 2005. Thus making it more complex and difficult for a lay reader and the public at large to comprehend or visualise. The small island countries have formed their own alliance and are not very happy with the bigger developing countries such as India. It is clear that they are more influenced by the agenda based discourse set by the developed countries.

Climate Change and the Military

India is a responsible regional and global power. The Report of the IDSA Working Group *Security Implications of Climate Change for India* (2008) has given reasons as to why the issue of climate change should not be taken as a security issue. India has the least per capita emissions. Its securitisation, in the sense of the Copenhagen School, will make it negotiations and data sharing on climate change even more difficult. Rather the green consciousness of the Indian Army has been taken as a good practice at the international level and is covered in detail in my *Environmental Security: Internal and External Dimension and Response* (2003) and *Environmental Security: New Challenges and Role of the Military* (2010). The military, for me, is part of the solution for climate change.

Environmental Stewardship

The Indian army since the 1980s, is the only army in the world, which has the ecological task force (ETF) battalions of the Territorial Army undertaking greening projects in harsh terrain. The infantry for whom the entire Himalayan border is a combat zone is not very energy or carbon intensive. Carbon neutral foot and hoof mobility is the key on which the military sustains itself in many parts of the Himalayan border. Frugality is also a virtue in war-

fighting. Climate change and the military's role has been summarised elsewhere.³⁴ An earlier work also deliberates on military operations under the threat of climate change.³⁵ But overall the military equipment of the three services is highly energy and material intensive. It is incumbent that the Indian military also must be a part of the adaptation and mitigation process of climate change and related matters such as arresting environmental degradation and restoration of natural capital with a green consciousness. The military's efforts in arresting climate change including ozone depletion is just one part of the spectrum. The Centre for Air Power Studies is at the forefront of initiatives on Montréal Protocol and ozone depleting substances, their replacement, and phase out, and banking, till suitable replacements are found. Many foreign countries have also been helped in this regard.

The UK MoD at the initiative of the CDS has begun investigating broad carbon reduction policies.³⁶ It is a good example of the practicalities behind the ability of the defence department to reduce its carbon footprint while maintaining its effectiveness. It clearly shows that the defence forces in the UK, under a single point MoD have made an inventory and have made efforts to reduce carbon emissions in accordance with the pledges they have made under Kyoto protocol. This type of integration or 'jointmanship' is conspicuous by its absence in India and must be adapted to India conditions. In India the most popular and common understanding is not carbon reduction for the sake of mitigation of climate change, but finding alternatives for the fuel that India needs to import.

³⁴ P.K. Gautam, 'Climate Change and the Military', *Journal of Defence Studies*, Vol.3, No.4, October 2009, pp.37-48.

³⁵ P.K. Gautam, 'Changing Geographical Factors in Planning and Conduct of Indian Military Operations', *Strategic Analysis*, Vol.32, No.2, March 2008, pp.245-258.

³⁶ Commander J.J. Bailey, RN, 'Is it Practical for Defence to Reduce its Carbon Emissions Without Affecting its Effectiveness?', *Defence Studies*, Vol.9, No.1 (March 2009), pp.47-84.

Alternative fuel research or ideas are animated not by the mission of mitigation climate change but on the worry - what will the military do in absence of oil in a continued era of internal combustion engine? While alternative means of propulsion and a basket of fuels for one type of equipment are nothing new and were practiced in World War II, a greater challenge is carbon reduction. In the future, ships and aircraft, presently exempt from emission reduction, may form part of the negotiations. Military equipment cannot operate in a vacuum. Be that as it may, much of the work is very innovative and original but it has not been attempted so far in India.

There is a pressing need to repeatedly emphasise and drill home the positive side of environmental security. While the Indian army trumpets its unique Ecological Task Force of the Territorial Army³⁷ and its renewable energy initiatives in remote field areas, it has failed in one acid test of ecological consciousness, bang on the highway to the international airport at Delhi. It did not construct the imposing Manekshaw Centre inaugurated by the President of India in 2010 as an ecologically sound green building; although the vision statement was “to create a modern convention centre for the army which showcases its rich ethos and glorious traditions and also the diverse and vibrant cultural heritage of India”. There are no solar panels or other green building innovations that are now seen across the world in new buildings that are constructed, with ecology in mind.³⁸ The Military Engineering Service (MES) by itself cannot go green with existing specifications of building material such as bricks, and mortar and so on that are commercially available. Even if the initial cost of construction may be more, in the medium and long run the buildings will pay for itself by

³⁷ P.K. Gautam, *Environmental Security: New Dimension and the Role for the Military*, IDSA/Shipra, 2008.

³⁸ The best example being the new building of Development Alternatives (DA) in New Delhi.

consuming less energy, water and also will be good for the health of the occupants. Ignorance to incorporate green features indicates a lack of institutional vision. Even the DRDO which constructed the building of IDSA in 2007 could not incorporate many green features like sliding windows to let in fresh air in autumn or spring, or dual piping for water recycling.³⁹

However it must be appreciated that it provided solar water heater for the kitchen. Rather than blaming and lamenting, the management at IDSA, has taken small steps at its own level. Grass root initiatives and the current history of the greening of IDSA are given in Appendix B which is based on my presentation on “The Ecological Imperatives: Our responsibility” (at the behest of the Director General in my informal capacity as a researcher on environmental security) to IDSA scholars and administrative staff in 2012 when a failed monsoon was upon us. Going green is a vision, and for this, although the rural base and the regimental system has been well explored, a tremendous effort is needed for the military to familiarise itself with ecological issues relating to architecture and concepts such as ‘reduce, reuse and recycle water’ or incorporate natural cooling systems and to take maximum advantage of ambient light.

Military Operations

All militaries plan for the worst case scenarios and contingencies. Climate change will impose more challenging tasks. Immediate

³⁹ The former DG, Shri N.S. Sisodia seeing the need for implementing common sense green features in the world class IDSA building had often mentioned that what was the point of researching the grand policy issues relating to the security implication of climate change at the regional and global levels when the level of the IDSA itself we are not setting a good example. It must be said that due to persistent efforts by him and his successors and staff, the institutional green consciousness has increased. Many improvements have been made through retrofitting and it is hoped that future projects, such as the new building of the Indian National Defence University will be a model of ecological architecture and design on the lines of the new Development Alternatives building in New Delhi.

disaster relief following natural and man made disasters (not all of which are due to climate change like a Tsunami or an earthquake) and humanitarian assistance by security forces is on the rise. The new buzz word in the US and PRC (and India) is - Military Operations Other than War (MOOTW) in out of area contingencies. Militaries justify force accretions like dual purpose transport aircraft or ships and landing craft for this mission. The IDSA Military Affairs Centre's Working Group Report *Net Security Provider: India's Out-of Area Contingency Operations* of October 2012 devotes one chapter to overseas humanitarian and disaster relief operations. The main argument for building this capability is that the, "intensity and frequency of disasters will increase;" "weak, fragile and developing countries will be most vulnerable to disasters and will require assistance" and; "India's economic rise and resources will place it in a position to undertake humanitarian and disaster relief(HADR) operations".

Another consequence of climate change is the change in weather and terrain that has an impact on military operations. Since the time of Kautilya's *Arthashastra*, the place and time for a military operation have been vital inputs in military appreciations. The *Arthashastra* gives the following guidance in the form of aphorisms (or sutras) to the king in Book 9,

Chapter 1:

Sutra 34. He should march in winter against a country which is very hot or which has little fodder, fuel and water.

Sutra 38. He should march in summer against a country with showers of snow, or consisting mostly of deep waters or dense grass and trees.

Sutra 39. He should march when it is raining against a country suited to the operations of his own army and unsuited to those of the enemy.

Sutra 40. He should march on an expedition of long duration between Margasirsa and the Paus full moon days, on medium

duration between the Caitra and Vaisakhi full moon days, on short duration between Jyestha and the Asadha full moon days.⁴⁰

Kautilya's *Arthashastra* also offers advice relating to the type of mobility and transport. This of course has now to be modified and updated for mechanical modes of transport. Thus:

Sutra 45. At a time when excessive heat is over, he should march with elephant divisions for the most part.

Sutra 46. For, elephants, sweating inside, become leprous.

Sutra 47. And not getting a plunge in water or a drink of water, they become blind through internal secretion.

Sutra 48. Hence in a region with plenty of water and when it is raining he should march with elephant divisions for the most part.

Sutra 49. He should march with donkeys, camels, and horses, in a region with little rain and mud.

Sutra 50. In regions mostly desert, he should march with the fourfold army when it is raining.

I am not the only one in recent times to have referred back to Kautilya to explain contemporary political and military-strategic events. During the 12th Asian Security Conference on Non Traditional Security Challenges held at IDSA in February 2012, Cleo Pascal argued that environmental change, and more so the impact of climate change are a very traditional threat. Referring to the three concepts of power, place and time mentioned in the *Arthashastra* of Kautilya she showed how power (*prabhav* shakti or military power) can get blunted because of environmental change

⁴⁰ The lunar months of *Margasirsa* corresponds to November – December; *Paus* to December-January; *Caitra* to March – April; *Vaisakha* to April- May; *Jyestha* to May-June, and *Asadha* to June- July.

(these are disasters of *vyasanas*). She gave the example of the melting of Himalayan glaciers and permafrost on the Sino-Indian frontier impacting military operations and railway lines and infrastructure in Tibet. It is also important to consider this third variable for the timing of a campaign, as seasons are changing due to current climate change.⁴¹

Sea level rise may make ports unfit for ship operations. Cyclones have always impacted naval operations. The Mongol conquerors failed to land in Japan due to the divine wind or kamikaze in 1274 and 1281. Today with the changing frequency and intensity of cyclones, this factor cannot be ignored. More floods may demand more surface mobility to overcome obstacles by way of helicopters or even reliance on foot and hoof mobility in the Himalayas. Melting permafrost beside adding potent methane to the atmosphere may also lead to structural problems with roads and railways in Tibet. This will impact communications, mobility and logistical preparations.

Some concepts and theoretical works relating to the impact on the war fighting capabilities of the Indian military due to climate change are already in existence.⁴² So it is not necessary to repeat those here, except to emphasise that climate change must be factored into contingency planning and war gaming as well as for qualitative requirements where necessary. In military installations, in any case, besides the architectural aspects of green building and the focus

⁴¹ Cleo Paskal, 'Environmental Change- A Very Traditional Threat', (forthcoming). You-Tube at <http://www.youtube.com/watch?v=nrxRVqivhI8&list=PLB17146BBBA7011FF&index=9>(accessed 21 December 2013).

The proceedings of the conference will be published in book form by Routledge.

⁴² See Sunil Chauhan, P.K. Gautam and Ajay Lele, 'Impact on War fighting Capability of the Indian Military', Chapter 8, in *Security Implications of Climate Change for India*, Report of the IDSA Working Group, New Delhi, Academic Foundation, 2009, pp.143-165; P.K. Gautam, 'Climate Change and the Military', *Journal of Defence Studies*, Vol.3, No.4, October 2009, pp.37-48 and P.K. Gautam, 'Changing Geographical Factors in Planning and Conduct of Indian Military Operations', *Strategic Analysis*, Vol.32, No.2, March 2008, pp.246-258.

on the three Rs for water (reduce, reuse and recycle) climate threats and risks must be taken into account in their design or for making modifications.

There is also a need not to blindly treat all that comes from the US military as the gold standard for environmental stewardship. I give an example. A trend that needs to be placed in comparative context is the comparison between the US military thinking and our own cultural green traditions. Some like author Thomas Friedman greatly praise US generals for their green consciousness in having air-conditioned tents powered by solar panels rather than by diesel operated gen-sets which raises the logistical cost of transportation of oil through an insecure and tedious line of communication strewn with IEDs and prone to ambushes by insurgents. Will anyone even think of having air-conditioned tents for the Indian army? It is well known that air conditioning in the Indian army is primarily for the equipment or hardware but seldom for skin ware. If militaries get into such comfort zones then how will they ever be able to operate outdoors in the hot summer months? While human comfort is important, the US model is fraught with danger in Indian socio economic conditions and in view of its soldier material. Another example is that of drinking water. In Iraq and Afghanistan, the US army spends nearly one-third of in-theatre costs just on transporting water, which raises the cost of water to between \$ 15 and \$ 30 a gallon.⁴³ Compare this with field engineers setting up ground based water points or water browsers for the Indian army which continues to operate on the semi desert scales of 5 litres per man per day and 10 litres for soft vehicles and 15 litres for tanks. Also the Indian military leadership has to set an example by drinking the same water as the troops and not get addicted to bottled water in the field in keeping with the moral argument put forth by Sun Tzu (6th and

⁴³ Chad M. Briggs, 'Environmental Change, Strategic Foresight, and Impacts on Military', *Parameters*, Vol XXXX, No.13, Autumn 2010, pp.76-90.

early 5th BCE) and Wu Qi (early 4th BCE): “ For soldiers to hate the enemy rather than their general, he must be with them through hazards and hardships of military campaigns.”⁴⁴

Intelligence and Climate Change

While the above issues are well discussed in open literature, the one issue that is least understood is strategic and operational environmental intelligence and its implications. Since the 1990s the Central Intelligence Agency (CIA) of the US has an environmental centre that is responsible for monitoring and assessing the role played by the environment in regional instability and conflict. The US National Intelligence Council terms climate change as a potential threat multiplier. The CIA now has its own secret climate centre. The European Union’s External Action Service (EEAS) also assesses climate security and early warning indicators.⁴⁵ The CIA has since been urged to be more open about climate change and not be secretive about the issue. The Defence Science Board in its report on the ‘Trends and Implications of Climate Change for National and International Security’ has recommended the establishment of a new agency devoted to the study of climate change that allows open access to the public.⁴⁶

The purpose of environmental intelligence, is to help identify a range of potential risk situations. While in the 1990s it was intrusive alien species like water hyacinth drying up Lake Victoria in Africa, the current examples are the struggle for water in Central Asia between countries of the former Soviet Union, of which the shrinking of Aral Sea is a good example of mismanagement. Scenario planning is now practiced world wide and is not the

⁴⁴ Col. A.Yu, Golubev (Res), ‘Training Principles in Armies of China and Japan’, *Military Thought*, Vol.21, No.3, 2012, pp.132-145.

⁴⁵ Chad M. Briggs, ‘Developing Strategic and Operational Environmental Intelligence Capabilities’, *Intelligence and National Security*, Vol.27, No.5, October 2012, pp.653-668.

⁴⁶ Suzanne Goldenberg, ‘CIA Urged to be More Open About Climate Change’, *The Guardian*, November 14, 2011.

preserve of the US alone. In India at least it has become a very popular cottage industry. Interestingly advanced economies are now studying how developing countries will quarrel over resources that shrink under impact of: climate change, population growth and migration and environmental degradation and scarcities.

Role of Think Tanks in India

Think tanks dealing with security and the military have now taken the lead and have made a beginning. A leading role has been taken by the Centre for Air Power Studies in cooperation with the UNEP for the operationalisation of policy, relating to the Montréal Protocol and ozone depleting substances; their replacement, phase out and banking; till suitable replacements are found. The Technical Group of the Electronics and Electrical Engineers (TG, EME) has also taken on the responsibility for the effective management of the ODS of the Indian army and a Joint Service Group has been formed for management of ODS. It can be said that as the ODS are crucial for military equipment as fire fighting or air conditioning equipment, this requirement of operational preparedness is a good incentive for delivery on issues related to Montréal Protocol to which India is a responsible signatory.

In section on science and evidence, the changes in the Arctic were shown to be a direct proof of climate change. We now return to the geographic changes in the Arctic and the natural tendencies of flexing of the military muscle and its implications.

Part 7 - Militarisation of the Arctic

The Arctic resources, routes and territorial claims provide us the data and a shining example of 'resource geopolitics' due to climate induced melting of the Arctic region. However there are no sound theories to explain the behaviour of an expansion of an empire for resources. In a reversal of received wisdom, new research is showing that the Mongol empire did not expand due to drought or ecological reasons. There was plenty of rainfall between 1211- 1230 and the historian Toynbee got the climate connection wrong as the 'push' factor. Abundant rain late in the 12th century led the pastoralists to

thrive and the animals, as mobile meat, were used for war. Horses and food enabled the Mongols to set out for China in pursuit of gold and silk. Around 1258 there was a return to cool and dry climate due to volcanic eruptions.⁴⁷ Surely the urge for Arctic resources can be very well understood by means of this new Mongol expansion theory.

The Brookings Institution, the New York University and Stanford University are leading a project on 'Managing Global Order: The Geo-politics of Scarcity Project'.⁴⁸ Its conclusions are that, the "prospect for continued cooperation outstrip the potential for conflict among Arctic states, and that the Arctic offers lessons, and even elements of a model, for tackling evolving challenges in other regions".⁴⁹ The *SIPRI Yearbook 2011* carries an article on resource and armed conflict and is a good survey of the literature on the linkage between natural resources and conflict on the economic, environmental, and resource geopolitics approach. It argues:

The experience of energy sector suggest that building global resource governance institutions will be a slow and difficult process. However, the recent emergence of new institutions expressly designed to manage the changing political and economic balance in the global order may help.⁵⁰

Evidence of Direct and Indirect Militarisation. Some writings in mainstream journals on the Arctic Five countries (US, Canada, the Netherlands (Greenland), Norway and Russian Federation)

⁴⁷ Mara Hvistendahl, 'Roots of Empire', *Science*, Vol. 337, Issue 6102, 28 September 2012, pp.1596-1599.

⁴⁸ Andrew Hart, Bruce Jones and David Steven, *Chill Out : Why Cooperation is Balancing Conflict Among Major Powers in the New Arctic*, Brookings, Washington, D.C., May 2012.

⁴⁹ Ibid, p.1.

⁵⁰ Neil Melvin and Ruben De Koning, 'Resource and Armed Conflict', Stockholm, *SIPRI Yearbook 2011*, pp.39-60.

point in a different direction. There is a talk of Greenland joining NATO or coming under a US security umbrella.⁵¹ The US focus on the Arctic has been initiated by policy makers, intellectuals and think tanks, that cannot pretend to be Gandhians. One example of this being the CNA's Military Advisory Board.⁵² While the US Congress may question the science of climate change, the Pentagon thinks otherwise. A 2009 study of security implications concluded that the Arctic is the key challenge for the US Navy.⁵³ Admiral James G Stavridis, NATO's Supreme Allied Commander for Europe, in a foreword to Prof Paul Berkman's 'Environmental Security in the Arctic Ocean: Promoting Cooperation and Preventing Conflict' warns that global warming and a race for resources could lead to conflict in the Arctic.⁵⁴ Writing on the subject in the *Naval War College Review*, the former US admiral with his co-author visualises the role of the US Navy to include the US Navy's Arctic Road Map and the setting up of a Task Force on Climate Change (TFCC) with a five year action plan. The authors even support the ratification of the UN Convention on the Law of the Sea (UNCLOS) by the US.⁵⁵ In September 2008, 'Principles of State Policy of the Russian Federation in the Arctic until 2020 and Beyond' were approved. They call for the raising of forces capable of maintaining military security in various military and political situations.⁵⁶ Canada has beefed up its coast guard with four armed

⁵¹ 'Greenland: Rare Earth in the Arctic', Forum for Arctic Climate Change and Security, *IISS News*, April 2012, p.9.

⁵² 'The US Security Community and the Arctic', Forum for Arctic Climate Change and Security, *IISS News*, April 2012, p.9.

⁵³ Jeff Hecht, 'US Navy Faces up to a new enemy- climate change', *New Scientist*, 10 March 2011.

⁵⁴ Terry Macalister, guardian.co.uk, Monday 11 October 2010.

⁵⁵ Rear Admiral David W. Titley, US Navy and Courtney C. St. John, 'Arctic Security Considerations and the US Navy's Road Map for the Arctic', *Naval War College Review*, Vol.63, No.2, Spring 2010, pp.35-48.

⁵⁶ Maj Gen V.I. Sosnin (Res), 'The Arctic: A Complex Knot of Interstate Differences', *Thought*, Vol.19, No.3, 2010, pp.1-8.

ice breakers. It is setting up military bases and a deep water port on the shores of the Northwest passage with military facilities towards the North Pole. It is raising forces made up of indigenous and Inuit Indians to patrol the northern borders.⁵⁷ Norway has redeployed its military HQ further north.

Will the demand for oil and gas by emerging economies in Asia, and the traditional high consumers of North America and Europe lead to another resource war? Judging by current evidence, most argue that it is unlikely that a resource war will happen. In the age of nuclear weapons, globalisation and inter-dependence, cooperation is the keyword. However, some are not convinced. In my interaction with South Asian and African academics the idea of cooperation appears a sham. It will be very hard for the Arctic Five to demonstrate cooperation. The discourse or speech act of 'Resource Wars' points more towards conflict rather than cooperation? I say this because when it comes to the object study of Asian and African countries, we are told that resource scarcities such as that of water, food and energy may lead to conflicts. The main thesis of resource conflict then became the mainstream discourse for many insurgencies and civil wars in the savage developing world. Focus also shifted on how to prevent them from happening and much academic and scholarly energies were spent on prescriptions. So influential have been these academic strategic communications that idea of 'resource conflict' has since got embedded. The boomerang effect of the tool devised by the Western scholarship is a new addition to this literature. Under the set theories of resources wars, to then say and hope, that the Arctic will be peaceful does not appear to be convincing. From a parsimonious explanation of IR, behaviour of the Arctic countries may be compared to the resource grab of the colonial expansion of the past.

⁵⁷ Ibid.

Take the example of the Cod Wars. The Cod Wars, also called the Icelandic Cod Wars have a precedent. There were a series of confrontations in the 1950s and 1970s between the United Kingdom and Iceland over fishing rights in the North Atlantic. In 1972, Iceland unilaterally declared an Exclusive Economic Zone (EEZ) extending beyond its territorial waters, before announcing plans to curtail over fishing. It policed its quota system with the Icelandic Coast Guard, leading to a series of net-cutting incidents with British trawlers that fished the areas. As a result, the Royal Navy deployed warships and tugboats to act as a deterrent against any future harassment of British fishing crews by the Icelandic craft, resulting in direct confrontations between Icelandic patrol vessels and British warships, which included ramming incidents. The dispute ended in 1976 after Iceland threatened to close a major NATO base in retaliation for Britain's deployment of naval vessels within the disputed 200 nautical mile (370 km) limit. The British government conceded, and agreed that after December 1, 1976 British trawlers would not fish within the previously disputed area.⁵⁸

What is clear is that all elements of state behaviour, of national interest and negotiations were present in the Cod Wars. Although it may seem like a footnote of history, the Arctic resources grab may go the same way. An example from *Arthashastra* can explain this behaviour. From the strategic vocabulary of Kautilya, it is clear that concept of *chakravarti* as it relates to Arctic region is developing between the *vijigishu* (would be conquerors) the Arctic five countries- the US, Canada, the Netherlands (Greenland), Norway and Russian Federation. All the Arctic five neighbours are likely competitors if not *aris* (enemies).

⁵⁸ See http://en.wikipedia.org/wiki/Cod_Wars

The Arctic Five (US, Russia, Norway, Denmark, Canada) along with the Arctic council full members (Sweden, Finland and Iceland)⁵⁹ are unlikely to give up their exclusive claims. In May 2013 at their biennial meeting the council agreed that China, India, Italy, Japan, South Korea and Singapore could become permanent observers. As India has been admitted as an observer to the Arctic Council,⁶⁰ this will demand more nuanced ecological arguments on its concerns with global commons such as the Arctic. These will have to be balanced with the national interests of India's traditional and staunch friend, the Russian Federation. The balance has to be struck between ecological and economic interests. It needs to be understood that all such arguments of preserving the Arctic and biodiversity etc by India may not amuse the Arctic Five, especially Russia and yet as in the case of the Antarctica or Tibet, the Arctic is indeed a pivotal global common. The ecological cum moral argument can not be relegated and forgotten.

The preferred solution is to put forward convincingly a global common argument for the ecologically peaceful future of the Arctic. Violent conflicts must be avoided. According to *Kurals*, the pre second century AD Tamil classic; 'Aggressive action, wherever feasible is good. Where it is not likely to be successful, try other means to attain your object'.⁶¹ International and regional regimes

⁵⁹ Arctic Council Observers are France, Germany, Poland, Spain, UK and China. Outside Institutional Framework, but having growing interests – China, EU, Japan, India and South Korea. See Figure 1, Andrew Hart, Bruce Jones and David Steven, *Chill Out: Why Cooperation is Balancing Conflict Among Major Powers in the New Arctic*, Brookings, Washington, D.C., May 2012.

⁶⁰ Sandeep Dikshit and Meena Menon, 'India gets observer status in Arctic Council', *The Hindu*, May 15, 2013 and 'A Warmer Welcome', *The Economist*, May 18th, 2013, p.54. International NGOs like Greenpeace were denied membership. EU's admittance was postponed, pending talks with Canada. EU's bid was obstructed by the Inuit, the indigenous Arctic people, who oppose the near total ban on trading seal products.

⁶¹ See K.K.R. Sastry, 'A Note on Udasina- Neutrality in Ancient India', in Charles Henry Alexandrowicz (Ed), *The Indian Year Book of International Affairs*, 1954, Vol. III, The Indian Study Grant of International Affairs, University of Madras, Madras, 1954, pp.131-134.

and institutions may be the right answer to address the serious challenges which the Arctic may face soon.

After a tour of power politics and militarization it is time now to take the next logical step. Some may point to the need for making the climate change a security issue under the auspices of the United Nations Security Council (UNSC). I argue in the next section as to why climate change should not be a security issue.

Part 8 - Why Climate Change Should not be a Security Issue of UNSC

There seems to be some confusion over three issues. First is the theoretical concept of “securitisation”, the second is the attempt to place climate change issues under the purview of the UNSC, and third the security implications of climate change at both the human /individual and state security levels. I explain the three as follows:

I-Securitisation. The concept of ‘securitisation’ which was coined by the banking system was initially transported into international relations by Ole Waever. It has its roots in the European tradition which is focused on cultural integration.⁶² The concept claims that any matter can be non-politicised (not a matter for state action), politicised (part of public policy process) and securitised (requiring emergency action beyond state’s standard political procedures by speech acts which articulate issues as existential threats). It also describes de-securitisation as a reverse process when issues are shifted out of emergency mode.⁶³ One straight forward example is the politicisation of the ozone layer protection via the Montréal

⁶² Roland Dannreuther, *International Security : The Contemporary Agenda*, Cambridge, Polity Press, 2007, p.44 and Ralf Emmers, ‘Securitization’, in Alan Collins (Ed), *Contemporary Security Studies*, Second Edition, Oxford, Oxford University Press, 2010, pp.136-151.

⁶³ Ralf Emmers, ‘Securitization’, in Alan Collins (Ed), *Contemporary Security Studies*, Second Edition, Oxford, Oxford University Press, 2010, p.139.

Protocol that came about because of its securitisation.⁶⁴ Thus 'securitisation' needs to be understood within this theoretical framework. The Montréal Protocol was directly linked to one player, that is, the chemical industry of the countries or parties to the treaty. Being single point it could be addressed and tackled with some success. But climate change is not only an industrial phenomenon, but a social one. Only emissions from some single point energy sources, such as thermal power plants can be controlled. But how does one deal with the various emission from the agricultural land being farmed by billions of farmers or use of biomass by the poor. It is thus clear that elements of climate change do not get adequately captured in the theoretical framework of securitisation. As a social and economic issue, with no enemy but mankind itself, it is best handled by the UNGA and UNFCCC.

Misuse of the Term Secrutisation in Climate Change Discourse. It is not correct to assume that if a something is being classified it is also being securitised. For example, Himalayan river flow data is not available in the public domain. Yet according to the Indus Water Treaty and the Ganga Water Treaty this data is shared by governments. This does not mean that river data has been 'securitised'. It simply means that the data has a security classification and is not for open access. Relating this, to the above mentioned concept of securitisation it is clear that the complex and many variables and drivers of climate can not be classified or measured and may be impossible to be classified, as a closely guarded secret.

II-Treating Climate Change as a UNSC Issue. In 2007, the attempts of the UK to have climate change placed under the purview of the United Nations Security Council (UNSC) were challenged

⁶⁴ Maria Julia Trombetta, 'Rethinking the Securitization of the Environment', in Thierry Balzacq (Ed), *Securitization Theory: How Security Problems Emerge and Dissolve*, London/New York, Routledge, 2011, p.xiv and p.145.

by developing countries. This aspect was covered in detail in the IDSA Working Group report. The core policy suggestion for India's negotiation position was:

India should reject the West's approach of securitising of climate change; yet it should be alert to its negative impact on human security and national security. India should use climate change as an opportunity to promote multilateralism and regional cooperation, particularly, in the SAARC region.⁶⁵

In its conclusion the report also reiterated that:

The Working Group looked at the efforts by the West to 'securitise' the climate change issue. The West's efforts to 'securitise' climate change is driven by its agenda to deflect attention from its own responsibility towards burden-sharing, equity and justice, to pressurise the developing countries to fall in line not only on climate change but on other issues as well. The Working Group agreed with the government's view that climate change should not be treated as a global security issue, and the best way to handle it is as a socio-economic issue within the framework of UNFCCC or other UN institutions, except the Security Council.⁶⁶

This position does not need to change. It was rightly argued that "India should use climate change as an opportunity to make socio-economic development sustainable".⁶⁷

Perhaps the real reason behind the politics of climate change is power. As argued by Stephen Harrison, the UK based scientist, in *RUSI Journal* in 2008 and during the 12th Asian Security Conference

⁶⁵ *Security Implications of Climate Change for India*, Report of the IDSA Working Group, New Delhi, Academic Foundation, 2009, p.164

⁶⁶ *Ibid*, p.167.

⁶⁷ *Ibid*, p.172.

at IDSA in February 2010 - it is essentially a geopolitical weapon used by certain Western economies to keep future economic competitors impoverished.⁶⁸ The power politics is not surprising. In my recent work on Kautilya, I find parallels for this power politics. For example notice how the BASIC countries grouping on climate change negotiations (Brazil, South Africa, India and China), are allied against the developed countries and trying to stall the *vijigisu* policy of the industrial countries (Annex I) of perpetuating economic imperialism by not cutting emissions for worthwhile mitigation. I have also related the *Arthashastra* concept of *chakravarti* to the developing relationship between the Arctic Five countries- the US, Canada, the Netherlands (Greenland), Norway and Russian Federation (all neighbours and likely competitors if not *aris*).⁶⁹

III- Human and National Security. In view of the increasing devastation and loss of life due to extreme weather related events, it is clear that climate linked disasters are happening. It hardly requires a positivist social science like work, with peer reviews thrown in, to provide the arguments. What further evidence is now required to show that in India the massive loss of life in Uttarakhand was to a great extent due to climate change? Both human security is impacted and so to is national security from the logistical point of view, as it is an active operational area in the Sino-Indian border zone.

Current Discourse

An update of the debate, as in 2013, shows that the issue is now being debated more and more in the UN. Some academic works also point out that historically high GHG emitting states such as

⁶⁸ P.K.Gautam, 'Getting the Science Right in the Public Domain', *Indian Foreign Affairs Journal: a Quarterly of the Association of India Diplomats*, Vo.5, No.1, January- March 2010, pp.5-16.

⁶⁹ P.K. Gautam, *One Hundred Years of Kautilya's Arthashastra*, IDSA Monograph Series, No.20, July 2013, p.60. *Vijigisu* means would be conqueror, *chakravartii* mean sovereign who rules entire circle or *mandala* of the power theory, and *ari* is enemy.

the UK, Germany and the US are increasingly supportive of the UNSC playing a role, as are states that are particularly vulnerable to the security implications of climate change, such as the small island states. It is further argued that climate change is a global problem requiring a global solution, and the UNSC's outmoded World War II composition is not suited for it. Nevertheless, the longer the UNFCCC/Kyoto regime fails to achieve the goal of avoiding dangerous climate change, the greater the impetus for UNSC and an array of other bodies and regimes to take action.⁷⁰ This is like reinforcing failure or an upward delegation due to incompetence.

Another interesting idea floated is that a World War II type of wartime mobilisation can be undertaken as a contingency plan for future emergency climate change responses. The idea is to deploy finance and technology to rapidly develop technologies for mitigation. An example of this is that from July 1940 to May 1945, American industry produced 299,300 airplanes, 86,700 tanks, more than 100,000 naval vessels, more than 20 million rifles, 2.4 million trucks and jeeps, and 41 billion bullets. Further the Manhattan project for the development of nuclear weapons cost the US, \$22 billion (2008 dollar rates). A transition to low carbon future may be undertaken on the same lines.⁷¹ That the same feat can be repeated now is fanciful, as wartimes mobilise the public for national goals and during the war there was a clear enemy (Japan and Germany) that had to be defeated. Who will be the enemy for climate change when scientists and the public are divided on the very reasons causing the climate disasters?

⁷⁰ Stephanie Cousins, 'UN Security Council; Playing a Role in the international climate Change Regime?', *Global Change, Peace & Security*, Vol.25, No.2, 2013, pp.191-210.

⁷¹ L.L. Delina and M. Diesendorf, 'Is Wartime Mobilisation a Suitable Policy Model for Rapid Climate Change Mitigation?', *Energy Policy*, Vol.58, July 2013, pp.371-380.

In this new debate in the UNSC post-2007, Germany and Pakistan are also now active.⁷² While the motivations of small island states which face an existential threat due to sea level rise the desire for UNSC stepping in is understandable; it is not clear as to what propels Pakistan to support a greater role for the UNSC?⁷³ It may lead to some future problems as both India and Pakistan are SAARC countries and India is opposed to the issue of climate change being put under the ambit of UNSC. Perhaps the greatest worry of the non-permanent members of the UNSC may be that sovereignty no longer exclusively protects states from foreign interference, and environmental security should not be based on the principles of ‘sovereignty as responsibility’ where collective action for crimes against humanity is extended to protect populations from loss of habitat, starvation and mass migration.⁷⁴ Treating climate change as a security issues under UNSC may be akin to reinforcing failure. It is unlikely that the UNSC can deliver. Rather the progress on negotiation may get hampered. Much more cooperation, is desirable including on issues of conflict resolution.

Conflict Resolution

The impacts of climate change cannot be reversed by acts of war. Only cooperation between countries can resolve issues. Until that is not done, there can never be positive peace.⁷⁵ While UNSC debates may continue, what is important is cooperative action which in one way constitutes both adaptation and in the long term, mitigation. On this issue I had argued that, besides the need for

⁷² Mukul Sanwal, ‘Why is the UN Security Council Discussing Climate Change?’, *Strategic Analysis*, Vol.37, No.6, November- December 2013, pp694-699.

⁷³ This may be under the Arria Formula which is an informal arrangement that allows the Council greater flexibility to be briefed about international peace and security issues.

⁷⁴ Mukul Sanwal, ‘Why is the UN Security Council Discussing Climate Change?’, *Strategic Analysis*, Vol.37, No.6, November- December 2013, pp694-699. .

⁷⁵ P.K. Gautam, ‘Climate Change and Security: Present and Future Challenges for Diplomacy’, *Indian Foreign Affairs Journal: a Quarterly of the Association of India Diplomats*, Vo.4, No.1, January-March 2009, pp.103-122.

countries to develop sufficiently to adapt to climate change, probable conflict can be avoided in South Asia if the correlation between climate change and conflict is understood and its future impact is approached through a cooperative regime. The operational issues that need much more cooperative work are the following:

- (a) **Joint Work on Degradation of Himalayan Eco-System** through a regional data, information and early warning ecological intelligence system to develop regional expertise and awareness. Gaps in knowledge and the related field stations for measurement need to be identified.
- (b) **Joint study of International Rivers and Treaties**
- (c) **Food Security.** Efficient use of technology and resources. The most practical method to meet this challenge is to focus on water use in agriculture and attempts must be made to change the crops according to ecological needs. This may also bring down demand for water for agricultural use which is over 80 per cent at the moment. Monoculture has made us vulnerable, as we now lack the resilience offered by water tolerant crops or crops suitable for arid conditions.
- (d) **Issue of Migration.** Socio-economic conditions which encourage people to migrate are often due to changes in climatic conditions. With sea level rise, more and more coastal areas would be inundated forcing further inland migration from the coastal areas. Both India and Bangladesh have to face this reality. It is an existential threat in the case of The Maldives for survival. The sooner a dialogue is initiated on this issue the better it is.
- (e) **Climate Related Disasters and Extreme Weather Events.** A study of drainage congestion and the neglect of flood plains will help in the development of common adaptation practices. It will also make planners more sensitive to the long-term problem. Between countries, an integrated dialogue for managing and reducing disasters needs to be conducted. Watershed restoration and bioshield restoration of coastal

areas by planting suitable ecologically friendly trees, in any case, need not be delayed and must be done in an emergency mode.

- (f) **Abrupt Climate Change.** Adaptation strategies must also be deliberated upon collectively.⁷⁶

Part 9 - India's Efforts and Position on Climate Change

National Action Plan on Climate Change

India's stand is that it will not exceed the emission levels of developed nations, but would also reduce emissions by 25 per cent by 2020. The Indian PM speaking at the Delhi Sustainable Summit in February 2013 reiterated that, "For its part, our country is committed to meeting its domestic goal of reducing the emission intensity of our GDP by 20-25 per cent by year 2020 compared with 2005 levels."

This is the seventh year of the National Action Plan on Climate Change (NAPCC). To recall, on June 30, 2008, India announced and launched its National Action Plan on Climate Change (NAPCC). The NAPCC, guided by the principles of sustainable development (SD), aligns the environmental and economic objectives. Broadly, the NAPCC is based on the following principles:

- (a) Protecting the poor and vulnerable sections of society through sustainable development strategies that are sensitive to climate change,
- (b) Achieving national growth targets by means that enhance ecological sustainability,

⁷⁶ P.K. Gautam, 'Climate and Conflict in South Asia', *Strategic Analysis*, Vol.36, No.1, January 2012, pp.32-40.

- (c) Devising an efficient and cost-effective strategy for demand-side management,
- (d) Deploying appropriate mitigation and adaptation technologies extensively and at an accelerated pace,
- (e) Promoting SD through innovative and new forms of market, regulatory and voluntary mechanisms,
- (f) Effecting implementation of various policies through unique linkages with civil society, local governments and public-private partnerships,
- (g) Welcoming international cooperation for research, development, sharing and transfer of technologies driven by external funding and facilitating a global Intellectual Property Rights regime for such a technology transfer under the United Nations Framework Convention on Climate Change (UNFCCC).

India's 12th Five Year Plan (2012-2017) has, as one of its key pillars, a low-carbon growth strategy besides other features. The Missions of the NAPCC are:

1. National Solar Mission
2. National Mission on Enhanced Energy Efficiency
3. National Mission on Sustainable Habitat
4. National Water Mission
5. National Mission for Sustaining the Himalayan Ecosystem
6. National Mission for a Green India
7. National Mission for Sustainable Agriculture
8. National Mission on Strategic Knowledge for Climate Change
9. National Clean Coal Mission (since 2012)

Implementation of the plans are the best indicators to demonstrate India's' green consciousness. Good governance, implementation and delivery on the NAPCC will be the main strength of our climate negotiators. Much more work is still needed to allocate the money to implement such schemes. India's' national circumstances in Natcom II show that:

In recent years, the government has rightly recognised the energy security concerns of the nation and placed more importance on energy independence. Various initiatives have been taken towards establishing energy efficient technologies, energy conservation measures and regulatory frameworks, while diversifying energy sources to meet national goals as well as simultaneously address climate change concerns.

The reduced energy intensity of the Indian economy since 2004, has been marked by an economic growth rate of over 9% per annum, which has been achieved with an energy growth of less than 4% per annum. This reduced energy intensity, at the relatively low level of India's per-capita GDP, has been made possible by a range of factors, including India's historically sustainable patterns of consumption, enhanced competitiveness, proactive policies to promote energy efficiency, and more recently, the use of the Clean Development Mechanism to accelerate the adoption of clean energy technologies.⁷⁷

Success Story of NAPCC. The largest contribution to CO₂ mitigation comes from energy efficiency. Shyam Saran a former lead climate negotiator and chairperson of NSAB recently highlighted that there is a good response on the solar energy mission. The National Energy Conservation Act now includes 15 industries from which nine sectors such as railways and cement have been chosen for mandatory benchmarks. A trading system is also being

⁷⁷ *India: Second National Communication to the United Nations Framework Convention on Climate Change*, New Delhi, Ministry of Environment and Forests, Government of India, 2012, pp.iv-v. The report is also known as *Natcom-II*.

put in place. What is unique to India is, unlike the rich countries, there is an overlap and mix of social and economic issues that include energy poverty. To wit: India's emissions are survival related and not lifestyle related is the fundamental issue which cannot be ignored.⁷⁸

Costs

India's *Economic Survey 2013* warns that a carbon tax of \$10 per tonne of GHG could cause a GDP loss of more than \$600 billion. Relying solely on carbon taxes may not be a viable option. The National Green Fund to finance environmental protection is also premised on bids for only international sources. About 2.3 lakh crores is required to achieve the NAPCC objectives of mitigation and adaptation. Coal already is being taxed at the rate of Rs 50 per tonne in the form of a cess. This is a minuscule amount.

This has to be seen along with the collapse of the European Emission Trading Scheme (ETS) wherein the cap and trade scheme amounting to about 16 billion tonnes- in 2013-20, or roughly half the EU's total carbon emission – are allocated to firms and then can be traded between them. Due to reasons such as the recession, which has reduced the industrial demand for the permits, and partly because the EU gave away too many allowances in the first place, there is a massive over capacity in the carbon market (the surplus is 1.5 to 2 BT or about a year's emissions). Prices had fallen from Euro 20 (\$30) a tonne in 2011 to Euro 5 a tonne in early 2013.⁷⁹

In other words, it is unfair to expect India to mitigate by mandate for climate change. India needs the efficient implementation of the NAPCC and other environmental treaties at the domestic level. As an aspiring member of UNSC, the Indian state and society need

⁷⁸ Shyam Saran, 'Welcome and Opening Remarks' and Discussions, Centre for Policy Research Climate Initiative, "Whither Climate Governance? A Discussion of National, Regional and Global Developments", India International Centre, New Delhi, December 4, 2013.

⁷⁹ 'ETS, RIP?', *The Economist*, April 20th, 2013, p.63.

to develop diplomatic, scientific (including exposing bogus science), conceptual and intellectual capacity on all environmental issues. Wider public debate in democracy is required. More multidisciplinary departments in universities need to research issues of environmental degradation, climate change, and resource scarcities.

Learning from Indian Climate History

Indian policy makers have a moral responsibility towards the people who have to be lifted out of poverty by creation of jobs in all sectors - for which energy will be the most important input. A mix of renewable and non renewable energy, both off grid with renewables, and on grid will have to be delivered. Massive efforts will also be required in the farm sector. Concerns of neighbours who share ecosystems (and the world at large) also must be taken into account. Here it must be reiterated that the per capita carbon footprint of India is the lowest. The more pressing need is for adaptation. Without energy, satisfactory levels of implementation will be impossible. As a global player India must implement climate change missions that percolate to the lower levels of states and districts. Legislation in India has mainly covered the energy efficiency aspect of climate change mitigation. More robust planning and legislation is desired on climate change adaptation in India.

Adaptation is reactive and is actually happening. We all adapt to the environment. But what is expected by developed countries is wholesale mitigation. This is unfair. As regards mitigation, some Western authors, or those with similar mindsets, urge India to be a responsible rising power, by delivering on issue of climate change, which by no stretch of imagination means adaptation but pure mitigation.⁸⁰ Surely this mitigation is too costly for a country like

⁸⁰ Manjari Chatterjee Miller, 'India's Feeble Foreign Policy: A Would-Be Great Power Resists Its Own Rise', *Foreign Affairs*, May/June 2013.

India. The moral aspect thus remains central. India has a moral responsibility to its people to get a fair deal in climate negotiations, and the advanced economies have also have the moral duty to mitigate much more seriously. This has not happened.

The second moral responsibility is to the health of the planet and its ecosystem. This presently has not dominated the policy discourse. Rather, this could best be left to philosophers, social thinkers, God men and movies. One reason could be the lack of influential and internationally respected world level statesmen and women. This can only happen if faith is more powerful than reason. I let this argument rest here and say that ideas matter; and this moral responsibility may get reenergised.

India should not get carried away by arguments, that only serve to enhance the popularity of our negotiators, at climate meetings. Warrior-like our stand must have continuity and a fighting spirit. The concept of common but differentiated responsibility (CBDR) is not a rhetorical device. If the old guard negotiators have become tired and old, a new breed of young negotiators must be recruited. This appears self evident but it is not that simple. Young negotiators- both from the scientific and civil service communities - need to have a good grasp of our history of climate negotiations. This may be the crucial missing link. I say this is important because as noted by Keith L. Shimko: “The scientific debates, which are crucial for understanding problems of global commons, differ from many of the debates — in that they do not follow the familiar perspective on international relations(IR). There is no realist or liberal position on whether the earth is warming and why”.⁸¹

When I was presenting my research proposal at the USI of India’s newly raised Centre for Research in 2001, the chairman, was the

⁸¹ Keith L. Shimko, ‘The Global Common,’ chapter 13, *International Relations: Perspectives, Controversies & Readings*, Wadsworth Cengage Learning International Edition, 4th Edition, 2013, p.323.

late JN Dixit, who as former foreign secretary had accompanied Prime Minister Narasimha Rao to the path breaking 1992 Rio Summit. J.N. Dixit, pointed out that sustainable development and environmental security are a 'status quo' tool of the rich, for the security of international economic order. He also mentioned that one has to be careful about the data generated by some environmental NGOs. He cautioned that it should be borne in mind, that most of these are funded by advanced market economies and hence should be viewed through a competitive prism, in an analytical manner.⁸² Later, in February 2006, I had the good fortune of inviting Ambassador Chadrashekhar Dasgupta to critique my paper on environmental security. He likewise was part of the negotiating team at Rio in 1992 and the notes I made then help me reconstruct this oral history. The summary of the Indian argument as he explained clearly and slowly was:

For the first time there is a human induced climate change. In the initial stages when India started negotiating over climate change, the position which the North took was that all countries emit green house gases, albeit in different proportions. Therefore all countries are responsible for dealing with the issue, though some industrialised countries had a greater responsibility than the others. The Indian argument was a bit different. We argued that climate change is not caused by emissions of green house gases per se, but by excessive high levels of such emissions. Emissions by the developing countries have not created the problem. The problem exists because the industrialised countries are using more than their fair share of the resources of the atmosphere. They are emitting excessively high amounts which have led to the problem. Therefore, they are alone responsible in taking steps to mitigate or reduce emissions.

⁸² Author's presentation of research proposals for environmental security at the United Service Institution of India, New Delhi, made to the Board of Management on 30 March 2001 of which late Shri JN Dixit was the chair.

This argument is important because essentially climate change treaty negotiates the levels and pattern of energy use. It has major implications for our development. Therefore, we must make certain that we are not saddled with responsibilities for the actions of others. We took a position that every inhabitant of the planet has an equal right to the atmosphere. The resources of the atmosphere therefore should be allocated on per capita basis. Only countries which have historically excessively high per capita emissions rates are responsible to cope with the problem. This is the basis on which we succeed in negotiations on the Framework Convention of Climate Change and later the Kyoto Protocol where only industrialised countries have to cut down emissions.

Now seven years later I find no reason to deviate from this fair and convincing argument on equity.⁸³ But of course within India, as has been pointed out by many authors, the rich can no longer hide behind the poor and must also not emit like the rich West.

This knowledge of India's well thought out arguments on climate history, is like a *smriti*. India's position, emissions and national circumstances have not changed. How come then that a slow drift is becoming evident. India should not be lulled into being led to believe that we are an obstacle or an obstruction, and stand out as the problem child, in climate change negotiations. Indian climate negotiators are right when they say that the developed countries change tracks from 'pledge and converse' to 'pledge and retreat'.

India's Climate Foreign Policy- Some Examples from Literature

In climate negotiations there is a direct linkage between domestic and external factors. How the NAPCC is progressing is an issue of

⁸³ New suggestions have been offered by a number of scholars and policy analysts. Equity remains a stumbling block. An important debate has been initiated recently by veteran climate negotiator Prodipto Ghosh who has published a paper on the subject. See Prodipto Ghosh, 'Equity in Climate Change: A Suggested Approach', *Economic & Political Weekly*, Vol XLVIII, No.12, March 23, 2013, pp.44-51.

governance within the sphere of domestic action. To show case this, good data reporting and capture is necessary. There is now a great deal of emphasis on internal issues. The very fact that India has already undertaken massive adaptation is one motivating factor for implementing domestic actions on climate change. What is the understanding of India's climate foreign policy?. I take three examples from literature:

- (a) Example 1(based on Mukund Rajan's *Global Environmental Politics*, 1997).
- (b) Example 2 (based on Kanti Bajpai's article in *Times of India* January 7, 2012 on Solutions to Climate Change Choices).
- (c) Example 3 (based on Namrata Patodia Rastogi, "Winds of Change: India's Emerging Climate Strategy", *The International Spectator*, Vol.46, No.2, June 2011, pp.127-141).

Example 1(based on Mukund Rajan's *Global Environmental Politics*, 1997). This is the only book which has covered the topic well. Though of 1990s vintage most of the principles and tendencies have not change much. The main issues examined in the book were:

I – The Policy Making Process

- (a) Autonomy of the government
- (b) Non Governmental Inputs
 - (i) Political parties and parliament
 - (ii) Environmental NGOs
 - (iii) Business and Trade unions
 - (iv) The Media

II – Tradition and Values in India Policy

- (a) Orthodoxy in foreign environmental policy
 - (i) Maintaining of orthodoxy

(ii) Prioritisation of development over environment

- (b) Foreign policy legacy. Concern for sovereignty, solidarity with third world, a high degree of self- esteem and concern for India's international image- idealism

III Strong influence of bureaucracy on policy barring a few ministries. Predominant influence of generalist bureaucrats from the MOEF and MEA.

Example 2 (based on Kanti Bajpai's article in *Times of India* January 7, 2012 on Solutions to Climate Change Choices). The main points raised were:

- India insists, wrongly, that the solution lies with Western countries
- Encourage rich to change their greedy ways
- New form of clean energy
- Cooperate in international agreements
- India is cautious about using the word “adaptation” for fear that it will weaken India's’ bargaining position. Yet to neglect adaptation is folly.

Concepts as in Example 1 theoretically have not changed in the policy making process and surely more ideas from think tanks need to be welcomed. Small steps have been taken. The Public Diplomacy Division of the Ministry of External Affairs has also done its bit. It jointly organised a seminar with the United Service Institution of India in February 2010. Besides presentations on issues relating to climate change, and the protection of the ozone layer a documentary “Negotiating Justice” based on the post Copenhagen conference of 2009 was also screened.⁸⁴

⁸⁴ *Proceedings of a Panel Discussion on Climate Change held at USI, New Delhi on 03 February 2010*, USI of India, New Delhi, April 2010.

The need for integrating regional and national action is evident. Problems will persist when we undervalue ecosystem services. Ecosystem services must be considered as the infrastructure of survival. Biodiversity preservation is key for future resilience and survival.

Example 2 is a typical instance of a social scientist's attempt to separate mitigation and adaptation. While issues relating to new forms of energy and cooperation in international agreements are crystal clear; it is unclear, whether encouraging the rich to change their ways can ever be a policy? Rather than lecturing high intensity consumers who are unlikely to lower their standards, the bigger challenge is the rising expectations and the need for material resources for rising expectations. Economists keep reminding us that domestic help in today's urban India do not want their children to continue with the same work. A survey in Bhutan on Gross National Happiness (GNH) said: "The belief that glorifies exotic poor people leading simple life as happy is not always true in the same way that more affluence does not translate into happiness.⁸⁵ For the young (the youth bulge in most developing countries) living in Thimpu, with some stress, seems preferable to living in a village because of employment opportunities, facilities like education, hospitals, and a sense of freedom.⁸⁶

Recall the slogan in China: 'It is glorious to be rich' and 'I would rather be unhappy with a SUV than be happy to have a bicycle'. Here possibly the only thing ancient civilisations can give back to mankind is their capacity to live within acceptable material means without worshipping poverty.

⁸⁵ Prahlad Shekhawat, 'The Happiness Quotient: Democratic Bhutan is Struggling to Align the nation's Gross National Happiness with increasing consumerism'. *The Hindu*, June 7, 2013.

⁸⁶ Ibid.

On the argument in example 2 that “India insists, wrongly, that the solution lies with Western countries” what can be said is that it is routine for the annual reports of the government to mention that India spends 2.5 per cent of its GDP each year on climate related disaster events like drought and floods etc. This is very much a part of adaptation. Reacting to adaptation, Dr Prodipto Ghosh, adviser to the PM on climate change has criticised reports which shift the discourse from mitigation to adaptation and the huge sums of money that can be made by risk and insurance. One example is the ‘Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation’ (SREX), commissioned by the Intergovernmental Panel on Climate Change (IPCC) of 2012.⁸⁷ He has argued that this has little policy relevance, to India’s known position on prioritising poverty alleviation, rather than adaptation. He was not comfortable with the new definition of climate change which is at variance with that of the UNFCCC, which now includes natural variations and is not purely anthropogenic any more. He sums up by saying that the shifting of the limited resources available with the government or opportunity cost to spend on disaster mitigation is not possible and impracticable.

Example 3 (based on Namrata Patodia Rastogi, ‘Winds of Change: India’s Emerging Climate Strategy’, *The International Spectator*, Vol.46, No.2, June 2011, pp.127-141).

The author shows that India’s approach to climate change has shifted dramatically in the span of a few years. She describes India stance as that of a “deal maker” and not a spoiler, as is the received

⁸⁷ Deliberations of a Seminar ‘Discussion on Managing Climate Extremes and Disasters in Asia: IPCC SREC Report’, New Delhi, May 2-3, 2012. The Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX), is commissioned by the Intergovernmental Panel on Climate Change (IPCC).

wisdom. This has happened due to India's economic and development aspirations and the changes in the geopolitical landscape. Proactive engagement, on climate change also furthers India's main driver of development - energy security and access. At the Major Economic Forum (MEF) in L'Aquila, Italy in 2009, it appeared that India as well as other emerging developing countries, would need to undertake mitigation action. India pledged at Copenhagen to voluntarily reduce its emissions intensity (emission per unit GDP) to between 20 to 25 per cent below 2005 levels by 2020. Another important development was India's pre-Copenhagen alliance with Brazil, South Africa and China (BASIC). BASIC and the US brokered the Copenhagen Accord which was a political agreement to limit temperature increase from pre-industrial levels to 2 deg centigrade. There were significant and acrimonious arguments for transparency of mitigation action as 'measurement, reporting and verification' (MRV). The impasse continued till Cancun. India's offer for a process of 'intentional consultation and analysis' was applauded by the developed countries. Though domestically the rival camps of negotiators and active NGOs were divided.

Not much has changed since. There is no national consensus. This is possibly due to the fact that the basic science to understand what constitutes the issue of stocks and flows has not been well articulated. In stocks India has the least contribution. But in flows India is among the top five emitters. If stock is like ground water then flows are surface water. Most of the discourse of industrialised countries takes into account only what they can see, as for instance fresh river flows. This has been articulated very forcefully and simply by two scholars, to whom I now turn.

Stocks and Carbon

One key observation is that most Indians, or people of Indian origin, serving or teaching abroad in think tanks and universities of advanced economies as a rule never support India's position as articulated by its negotiators. Attempts are made to make India look irresponsible. To add an internal dimension, the plight of the

poor is also included.⁸⁸ Earlier in 2009, Dilip Ahuja from National Institute of Advanced Studies, Bangalore observed that that many analysts, both Western and of Indian origin, reject the Indian position. He further pointed out that: “Even in the Inter-governmental Panel on Climate Change, the outgoing message about what and how much to do was carefully controlled within Working Group III, where most analysts from developing countries were content playing secondary roles”. He provides a picture which may be very familiar to the academics in Delhi, but hardly gets challenged. “Many Western political operatives, whether currently in power or retired, come to Delhi wanting to talk to the Prime Minister on Climate Change”.⁸⁹

I found that there were only two cases, where scholars of Indian origin understood the Indian predicament. Surely, there are others that I am not aware of. Kishore Mahbubani has stated that though the Western media often pretends to defend global interests; in reality its actual role is to defend Western national interests. He explains the science and logic of stocks and flows, that is vital to come to grips with the debate. Global warming is not happening today, because of the new ‘flows’ of GHG in recent decades. It has happened because of the ‘stock’ of GHG emissions that the Western industrial countries have deposited in the atmosphere since their industrial revolution. Global analysts are absolutely right in saying that the only way to prevent global warming would be to reduce GHG emissions. We cannot reduce the stock. This is true. It is also true that the only way to reduce the flows of GHG is to put an economic price on new flows of GHG. Both these propositions are true. However, there is a third proposition which

⁸⁸ Two recent examples being Manjari Chatterjee Miller, ‘India’s Feeble Foreign Policy: A Would-Be Great Power Resists Its Own Rise’, *Foreign Affairs*, May/June 2013 and Arun Mohan Sukumar, ‘Change the climate for India’s poor’, *The Hindu*, June 7, 2013.

⁸⁹ Dilip R. Ahuja, ‘Multiple Pressures on India on Climate Change’, *Current Science*, Vol.97, No.10, 25 November 2009, pp.1414-1415.

is equally true, but is never mentioned in any Westerns analysis: if India and China are to pay an economic price for the new flows of GHG emission, should not the Western industrialised countries also be made to pay an economic price for the stocks of GHG that they have released into the atmosphere? This is a fundamental principle of justice.⁹⁰ He then argues for India to develop its own comprehensive analysis of the global warming problem. He cites Professor Jagdish Bhagwati of Columbia University, who has calculated that damage from the stocks or accumulated fossil fuel emissions attributable to China and India from 1850 to 2004 is 10 per cent, while the EU, Russia, and the US jointly account for nearly 70 per cent. Jagdish Bhagwati says that, “we should address the stock problem separately from the flow problem. We should expect India and China to assume flow obligation but part of that solution has to be that the stock obligation is fulfilled by the West.”⁹¹ Perhaps the future may look something like what Jagdish Bhagwati has suggested. It is just and acceptable.

Co-Benefit Approach

Navroz K Dubash, D Raghunandan, Ashok Sreenivas and Girish Sant have provide a workable framework for co-benefit approach. They argue: “Internationally, a well-specified co-benefits approach is a necessary first step to articulating how India’s domestic co-benefits-based policy approach links to its international stance based on the centrality of the principle of “common but differentiated responsibility and respective capabilities” (CBDRRC) as articulated in the United Nations Framework Convention on Climate Change. At the moment, this linkage is imprecise and unclear, and leads to a disconnect between domestic and foreign

⁹⁰ Kishore Mahbubani, “Warming up against India”, *Sunday Hindustan Times*, August 10, 2008.

⁹¹ Narayan Lakshman, interview “India Should accept climate change flow obligations, ask for superfund: Jagdish Bhagwati”, *The Hindu*, August 4, 2009,

policy on climate change.”⁹² The authors suggest that this problem can be addressed with three lines of argument. They argue:

- (a) First, India is not in a position to accept caps on greenhouse gas emissions in the short or medium term, because India does not bear responsibility for the problem of climate change as compared to developed countries, and because caps would place unacceptable limits on India’s development.
- (b) Second, for reasons of self-interested politics, ethics and prudence, India should explore ways of addressing climate mitigation, but in a manner consistent with, and one that ideally enhances, development objectives.
- (c) Third, a co-benefits approach is a useful way to walk a line straddling both our development interests and effective climate action.

It is suggested that “There is a growing body of climate-related policy in India; at the same time, there is no clear and consistent approach or framework that directs and guides these efforts.” They propose and develop a methodology for operationalising a co-benefits approach to climate policy formulation. They hope that structured tools proposed by them would hopefully contribute to more informed and deliberative decision-making on climate-related issues.⁹³

New Challenge and Issues

There are attempts by the West for a proposal to transfer HFCs from the Kyoto to the Montréal Protocol. India and other developing countries have objected to this as it is contrary to established

⁹² Navroz K Dubash, D Raghunandan, Ashok Sreenivas and Girish Sant, “ Indian Climate Change Policy: Exploring a Co-Benefits Based Approach”, *Economic & Political Weekly*, Vol XLVIII, No 22, June 1, 2013, pp.47-61

⁹³ Ibid.

principles of international law and defeats the purpose of Montréal Protocol which is meant to deal only with ozone-depleting gases. This is the new challenge in negotiations. The second is the issue of short lived climate pollutants (SLPCs) as given below.

Recent Suggestion on Short Lived Climate Pollutants (SLPCs) in Mitigation Policy⁹⁴

SLPCs are methane (CH₄), black carbon (BC), troposphere ozone and Hydroflourocarbon (HFC). They contribute 1/3rd to anthropogenic climate change GHGs. Reducing SLPCs using available technology can reduce projected warming by about half and sea level rise by 25% during this century, relative to scenarios in which only CO₂ emissions is reduced. SLPCs reduction can achieve climate benefit in generational time scales, in contrast, CO₂ reduction requires deep transformation of world fossil fuel energy dependence and will avoid tipping point. Both CO₂ and SLPCs are interrelated and reduction is mutually inclusive.

It has been argued that parallel strategies to reduce SLPCs and CO₂ need to be thought of. SLPC reduction will improve public health due reduced air pollution like diesel exhausts and cleaner cooking technologies. In the past at COP8 at Delhi in there was a great controversy over the release of a report by UNEP on 'Asian Brown Cloud (ABC)' which was changed by UNEP to Atmospheric Brown Cloud on India's objection. It was clear that the attempt was to side track rich countries burden to mitigate carbon emission by shifting the focus away from fossil fuel and carbon. Yet now it seems that there is a lot of sensibility in reducing SLPCs under NAPCC without any pressures via international treaties. Why this is vital for India is because (let us not forget) there is energy poverty

⁹⁴ J.K. Shoemaker, D.P. Schrag, M.J. Molina and V. Ramanathan, 'Short Lived Climate Pollutants in Mitigation Policy?', *Science*, Vol.342, 13 December 2013, pp. 1323-1324.

and 30-40% Indians live off biomass burning and biomass burning is carbon neutral. However burning of rice husk after harvest in north west India in autumn is a live national problem and so is the smog and pollution in Chinese cities and also in India. INCAA is preparing to publish a report on India's Carbon aerosol (black carbon) programme.

Kautilya's *Arthasastra* on Perception Applied for Climate Change Issues

Climate change is also a problem of perception. Here I want to introduce a topic based on indigenous historical knowledge along with some practical 21st century ideas. This example may help to see the problem through another perspective.

In Book 1 of the *Arthasastra*, Kautilya divides the perceptions of top policy makers into three categories:

- directly perceived
- unperceived and
- inferred

For climate change issues clearly the three levels are in operation. While disasters such as floods are directly seen from helicopters or by real time remote sensing, most important are the unperceived aspects like loss of biodiversity. The most contentious are those inferred. Policy makers have their own ontology and hunches. Yet they also need to take into account the findings of the many state sponsored reports and commission. With the ICT, environmental discourse – both genuine and that financed by 'vested interest' needs to be taken into account. There is a need to master skills like Napoleon's eye for ground (coup d'oeil) to understand issues through theory, practice, experience and field work. Yet a lot will be unperceived and inferred.

One complex issue is how to do more work in this multidisciplinary field. Here I refer to two warnings (X and Y) relating to some trends or attitude that have gone unchallenged.

It shows the importance for the Need to connect with grassroots and reality

Example X.

We seem to have forgotten that science is not wholly based on theory and models: more tiresome and prosaic confirmation by experiments and observation plays just as important a part. Perhaps for social reasons, science has in recent years changed its way of working. Observation in the real world and small-scale experiments on Earth now take second place to expensive and ever-expanding theoretical models... Our tank is near empty of data and we are running on theoretical vapour.

- James Lovelock, *The Vanishing Face of Gaia: A Final Warning*⁹⁵

Example Y.

Economists, by and large, do not study the workings of the actual economic system. They theorize about it. As Ely Devons, an English economist, once said at a meeting, 'If economists wished to study the horse, they wouldn't go and look at horses. They'd sit in their studies and say to themselves, "What would I do if I were a horse?'

- Ronal Coase, *The Task of Society*⁹⁶

Both Examples X and Y are important. I see very bright young scholars attempting to analyse farming practice in India but not even questioning why farmers report the absence of earthworms today. This disconnect with the grass roots is one big problem.

⁹⁵ James Lovelock, *The Vanishing Face of Gaia: A Final Warning*⁹⁵, Allen Lane 2009, Penguin, 2010 as quoted by P. Balaram, 'Editorial', *Current Science*, Vol.98, No.4, 25 February 2010, pp.463-464

⁹⁶ As quoted by Lyold. I .Rudolph and Susanne Hoeber Rudolph, *Explaining Indian Democracy: A Fifty-Year Perspective, 1956-2006, The Realm of Ideas*, New Delhi Oxford University Press, 2008, p.130.

Another survey by urban educated scholars, showed that they interviewed hundreds of people of the Sunderbans to come to a conclusion that the sea indeed is advancing and eroding the coast. But why did this research not emanate from the people of the Sunderbans themselves? The same is true with regard to Himalayan glaciers. Government scientists and subordinates enrolled on an all India basis find it very tough to monitor Himalayan glaciers: but the Bhotias or people of the Himalayan belt have been living next to them since childhood. One good example, is that of Chewang Norphel, the glacier man of Ladakh who is using innovative methods to make artificial glaciers for the lean season. The locals need to be empowered and charged with studying local ecosystems. Urban researchers may use the best methods taught, but will always fall into the trap of the economist and the horse quoted above.

Traditional Ecological Knowledge. It is said that today children do not listen to their parents and grandparents. The same is happening in the field of knowledge on ecology and climate. Wisdom cannot be junked. Two instances will show how a turnabout is taking place. The first is work on local knowledge about climate change in eastern Himalayas where it has been found that their knowledge conforms to the findings generated by modern science in different parts of the world.⁹⁷ Scientific knowledge is now challenging the earlier (and wrong) assumption that traditional lifestyles as practiced by Tibetans were backward, irrational and unsustainable.⁹⁸

⁹⁷ Pashupati Chaudhary, Suman Rai, Siddhant Wangdi, Akai Mao, Nishat Rehman, Santosh Chettri and Kamaljit S. Bawa, 'Consistency of Local Perceptions of Climate Change in the Kangchenjunga Himalaya Landscape', *Current Science*, Vol.101, No.4, 25 August 2011, pp.504-513.

⁹⁸ Katherine Morton, 'Climate Change and Security at the Third Pole', *Contemporary International Relations*, Vol.21, No.3, May/June 2011, pp.34-55

Conclusion

From this survey, it is clear that as we approach a danger mark, the collective urgency to deliver has reduced. The problem of climate change negotiations is now more about conflict management as against over the science, economics and politics. It has drifted away from being taken as a climate security problem.

The driving urge of nations is geopolitical -disguised as economics. While geopolitics and power equations amongst nations may continue to be the main drivers of statecraft, climate change will be an important intervening variable. Its impact has just begun to have effect. Delay may lead to further rise of temperatures, which in any case will continue to rise due to the momentum of climate change even if all emissions, theoretically become zero.

The matter of climate change is applicable wide across the entire range of society and ministries in government. One way is to let things go on the way they are – in other words - business as usual. The other is to be proactive both at the domestic and international level so as not to be controlled by the climate and human follies.

A good theoretical framework at global level which is appealing to me in its simplicity is based on the work of Ramez Naam. It demands answers to four questions that are fundamental to understand climate change. These are:

- (a) Is the planet warming?
- (b) Are humans causing the warming?
- (c) Does the warming really matter?
- (d) Is there anything worth doing about it?⁹⁹

⁹⁹ Book Review by C.R. Bhatia of Ramez Naam's *The Infinite Resources: The Power of Ideas on a Finite Planet*, *Current Science*, Vol.105, No.11, 10 December 2013, pp.1615-1617.

Based on the four questions, this paper in one way attempted to provide answers which can be summarised thus:

- **Is the planet warming?** Yes, the planet is warming.
- **Are humans causing the warming?** Yes, to a very high degree of my understanding, humans are causing the warming. However this is still work in progress. What ever may be the reason, warming and changes are occurring rapidly.
- **Does the warming really matter?** Yes it does. For India the negative impacts will be much more than any positive ones.
- **Is there anything worth doing about it?** Yes. Domestically polices need to be with no regret option, precautionary principle and co-benefit approach. For international negotiations India has to be alert to the international consensus of the policy community based on science.

The vital matter is now the linkages of domestic with the international.

More Efforts Required on Public Diplomacy and Strategic Communications

The Indian Executive, in my opinion, is one of the most powerful executives in the world. It can sign any document anywhere. It can commit to anything anywhere. It can do so without any mandate or even without any subsequent ratification from anybody. This is unique characteristic of the system. It is within this broad context of nature of Indian legislature that we should understand the significance of the debates of climate change in Parliament.

- Suresh Prabhu¹⁰⁰

¹⁰⁰ Commentary by Suresh Prabhu, 'Climate change and parliament: Excerpts from Lok Sabha and Rajya Sabha debates', in Navroz K. Dubash(ed), *Handbook of Climate Change and India: Development, Politics and Governance*, New Delhi, Oxford University Press, 2012, pp.230-245.

According to the Indian constitution, the executive can negotiate and sign international treaties. It is only later that they may be discussed in the Parliament. In the case of climate change although there is an existing discourse on the ills of climate change and the evidence of it in extreme weather events and increasing disasters, the public at large is not kept in the loop. In an age of social media, both public diplomacy (PD) and strategic communications to impress, communicate and shape both foreign and domestic audiences is vital. A foreign policy that has the support of the majority of the Indian public is thus a strong way of projecting our case. Public support also gives it a moral authority. The Indo-US nuclear deal from 2005 onwards although negotiated by the executive, was later debated in the parliament in an acrimonious atmosphere. The climate change discourse also appears to be a closed door affair, without the involvement of the Indian public opinion. In an earlier work I had argued that attributing, almost anything and everything to climate change may also become a handy tool and a justification for the inability to deliver and govern. Some policy makers and officials then may deflect their failure, incompetence, corruption or bad governance on to climate change. There is thus a need to get the science and the politics right into the public domain.¹⁰¹ Accordingly, the problem must be approached from a scientific and governance point of view, for long term sustainable delivery to be effective.

While our negotiators are very capable and keep national interest in mind, one thing that can be said is that the Indian stand and position is only known after the negotiations through media reports. There is thus a need to have a suitable PD and strategic communication policy to project our principled position right at the beginning of climate negotiations.

¹⁰¹ P.K.Gautam, 'Getting the Science Right in the Public Domain', *Indian Foreign Affairs Journal: a Quarterly of the Association of India Diplomats*, Vo.5, No.1, January-March 2010, pp.5-16.

Within India two issues are crucial. First is the consistency in developing and explaining India's stand and position. The second is a cohesive feedback loop response. People supporting what the state spells out; or what the state spells out being backed by public opinion. As India climate negotiators gear up for the next round, the issue gets more complex.

It is clear that seen through the prism of consequentiality, Kautilya's *Arthashastra* (modified and updated for climate change) offers the following guiding principle:

What produces unfavourable results is a bad climate policy i.e. a policy (on climate and environment) is to be judged by its results and diplomacy is not concerned with ideals but with achieving practical results for the state.

Kautilya also advises the king on issues relating to the wellbeing of the people in Sutra 1.19.34: This principle continues to be the operate in our struggle to balance the drivers of the issue of climate change:

In the happiness of the subjects lies the happiness of the king and in what is beneficial to the subjects his own benefit. What is dear to himself is not beneficial to the king, but what is dear to the subjects is beneficial (to him).

APPENDIX A

Fundamentals

A- In IPCC usage climate change refers to change in the state of climate that can be identified. It refers to change in climate over time, whether due to natural variability or as a result of human activity. This usage differs in UNFCCC where climate change is directly or indirectly attributed to human activity (anthropogenic).

B - UNFCCC aims at stabilizing the green house gas concentration in atmosphere safe levels that would prevent dangerous anthropogenic interference with climate system.

C - **Greenhouse Gases (GHGs)**.The gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation within the spectrum of the thermal infrared radiation that is emitted by the Earth's surface, by the atmosphere and by clouds. This property causes the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3). Moreover, there are a number of entirely anthropogenic GHGs in the atmosphere, such as halocarbons and other chlorine-and bromide containing substances that are covered by Montreal Protocol. Some other trace gases, such as sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbon (PFCs), are also GHGs.

D - The UNFCCC covers anthropogenic emissions of green house gases not controlled by the Montreal Protocol. The Kyoto Protocol of the UNFCCC covers the baskets of greenhouse gases carbon dioxide(CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbon (PFCs) and sulphur hexafluoride (SF_6).

The Montreal Protocol on Substance that Depletes Ozone Layers controls the production and consumption of following

halocarbons: chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, hydrobromofluorocarbons (HBFCs), carbon tetrachloride (CCl₄), methyl chloroform (CH₃CCl₃), methyl bromide (CH₃Br) and bromochloromethane (CH₂BrCl).

E- Ozone-depleting substances (ODSs) also affect climate system being green house gases. Some ODS substitutes, in particular hydrofluorocarbons (HFCs), perfluorocarbon (PFCs), are covered under the UNFCCC and its Kyoto Protocol. Options chosen to protect the ozone layer could influence climate change. Climate change may also influence the ozone layer.

GHG Inventory of UNFCCC: Global Warming Potential (GWP) for calculating CO₂ equivalent (CO₂ eq.)

Gas	GWP	Atmospheric Life Time in Years
Carbon dioxide(CO ₂)	1	50-200
Methane (CH ₄)	21	12+/- 36
Nitrous oxide (N ₂ O)	310	120
Hydrofluorocarbon (HFC -134a)	1300	14.6
HFC-23	11,700	
Tetrafluoromethane(CF ₄)	6500	
Hexafluoroethane(C ₂ F ₆)	9200	
Sulfur Hexafluoride (SF ₆)	23,900	3200

The Ecological Imperatives: Our Responsibility at the IDSA

**A Presentation by
PK Gautam on August 7, 2012¹⁰²**

Background

1. On July 30 and 31, 2012, a massive grid failure took place in Delhi and several states. Simultaneously, several states in India have been witnessing a severe deficiency of rainfall, which may result in drought-like conditions. The moment has come to take on this challenge by ideas and action. There is thus a need to spread consciousness and motivate all, as individuals and citizens to contribute to conservation measures. This is not a one way traffic and specific suggestions on the greening of the IDSA are welcome.

Why is IDSA Unique

2. Delhi is a semi arid region. IDSA is on the famous and beautiful Aravali ecosystem full of rocky outcrops and probably the most ancient mountain system stretching to Mount Abu in Rajasthan. The IDSA is sitting on an excellent piece of real estate on a secure defence land. It is fortunate that it has all the resources and budgetary support for uninterrupted power supply including a captive generator and water. The ambient temperature is much less

¹⁰² I thank Gopal Avasthi of the estate management and project cell of IDSA in helping me compile and update this data. He is also the point person in suggesting and facilitate implementation of all green ideas.

than surrounding areas of urban Delhi as there is no 'heat island effect'. Rather it is an island of greenery and serenity ; and yet it is a few minutes drive away from malls, *haats*, bazaars, and PVR cinemas (The proof is that last week there even was a message to photograph the birds in the campus a la Salim Ali). Its occupants are like the scholars, both national and international, of Taxila or Nalanda university of our past and are the intellectual elite (not in business and economic terms) of India and the world. There could be no other critical mass of such excellent people in one map square.

Ecological History at IDSA Campus: Milestones in Ecological Thinking and Action

3. During its initial construction stage, the building was not planned on a total eco friendly basis, though the DRDO did install a solar heater system for the kitchen and did not install glass face on the southern arc of the library, but only on north facing side in the shadow to avoid direct sunlight. That IDSA needs to be a role model in green consciousness was very clear to the management. After shifting to the building from the old JNU in 2007 efforts by the administration have enabled progress to be made on this aspect of environmental stewardship. . This involves modification, retrofitting, and no regret life style changes. To that end, efforts have been made in the past and now need to be sustained. At the Monday morning meet post Copenhagen summit in December 2009 I proposed 'Project Harit' which was accepted by AD (Adm) for circulation. That notice is at Annexure 1. Now I need to briefly list the milestones as on August 2012:

4. **Arbiculture.** The arbiculture is a mix of mostly ornamental, and few local plants/trees (less jamun of the *Jambu dweep*). It must be made very clear that the green lawn (like some golf courses) are technically more water intensive than even rice crops grown in semi arid Punjab. This is because they are watered with approximately 20,000 litres of potable water per day supplied by Military Engineering Service (MES) and if there is shortfall by pumping up ground water. The issue is that: should IDSA have a thorny Aravali landscape with *ber* and other local species which need no watering;

or continue the existing area of green lawn and flower garden (which also being used for important activities as playing cricket, yoga or just the pleasure of the energy with feel of the grass on the human body and mind). The consensus has been for the latter. Aesthetics and environment are important but that comes at the price which needs to be addressed (covered under Water)

5. **Electricity.** We have made a beginning, by installing separate switches for lights in research rooms and windows for fresh air in autumn/spring/mild winter rather than using the central plant thus saving on energy and also to ensure fresh circulation of air in the rooms that can get claustrophobic.

6. In May 2007 the Indian Government announced The Energy Conservation Building Code (ECBC) for new commercial buildings. The IDSA earlier, at the behest of former DG Shri NS Sisodia had invited tenders and in August 2010 six private firms had made presentations to a committee of IDSA scholars, accounts officer and administrators. We realised that their focus was only on electricity and not on water. Thus holistic thinking was necessary to link everything - electricity, water, biodiversity, arboriculture and waste. The consultant's output was like the pathological lab report of a diagnostic clinic. They could only tell what was wrong, but for treatment we had to go elsewhere to search for contractors, architects, material and labour. Later the Bureau of Energy Efficiency carried out an audit – that was free of cost being government-to-government - ,and in its report presented in January 2012, the BEE advised a change in the AC plant(the top most source of electricity consumption being for space cooling in summer) itself as according to their analysis, bulk of the electricity load was due to the plant which needed to be modernised. A decision on this is pending with IDSA management as a cost/benefit analysis for the short/long term is still to be undertaken.

7. All residents were given a one page handout by the administrative staff along with their monthly bill on energy use. The switching off of lights on Earth Day have also found many takers in cities in India. To my mind they are the most hollow and artificial

manifestations of the urban middle and upper class trying to wash their sins off as a ritual. There is no sustainability in this.

8. **Solar Energy.** An economic analysis of solar water heaters needs to be conducted all over the country. If there are cheap PV cells available in the market then the IDSA building has 220 sq yard space on its roof to generate electricity without battery banks. That may need some patience as cheap nano solar cells are likely to become available in the future. As a pilot a solar heater is being installed at Director General's residence in the campus. One floor of the library is planned to be illuminated by solar power as another pilot project. This 10 Kilowatt pilot project will generate about 15,000 units per year. It will have no carbon emissions and will save about Rs One Lac at current rate in one year.

9. **Water.** This is the crux of the issue. Serving army officers from next door, Anuj Vihar complain that at times they do not even get drinking water and carry it home from IDSA. Rough data available with the administration is as under:

- (a) **Supply.** Water Supply per day by MES - 60,000 litres of potable water and 30,000 litres of ground water pumped under arrangements IDSA (no national/state law exist on extracting of ground water as yet). Thus there is a total of 90,000 litres of water for office and domestic use.
- (b) **Demand.** This 90,000 litres per day is linked to supply. Its broad usage as mentioned above at Arboriculture is as under, which I repeat:
 - (i) AC plant (9 months cooling in summer and 2 or 3 months heating in winter) – 20,000 litres per day
 - (ii) Gardening/Arboriculture – 20,000 litres per day
 - (iii) Office – 10,000 litres per day
 - (iv) Residence – 40,000 litres per day
 - (v) Total - 90,000 litres per day

- (c) **Reduce, Reuse and Recycle.** This is the kernel of the problem. “Reduce” relates to life style changes and consciousness. Cleaning of cars (now being done with the least water courtesy the Deputy Director General’s initiative), setting the flush water in toilet to 7 litres if cisterns of old large size etc are on an individual basis. Silently, most residents are contributing towards reducing water use without much publicity. We thank all of them for their understanding - this includes their families.

10. Reuse and recycle is the agenda of the future. I find that there is some confusion on terminology. Rainwater is harvested (in tanks or in ground) from where it falls on built up areas. Two rainwater harvesting pits Nos 1 and 2 are in the library lawn for the recharging of ground water. The flow from storm water drains goes inside the well to recharge ground water (This has nothing to do with the pipes and drains related to water supply). The storm water drains which are covered with cement blocks along the road in IDSA need to be cleaned and maintained regularly. This year due to absence of sufficient rain, the pits are dry and even the underground parking lot has not got flooded (its drainage in extreme weather event and cloudbursts, was not catered for. But flooding will happen in future and some energy by way of pumps is wasted to carry out this minor disaster operation).

11. Out of the total supply of 90,000 litres per day, water for the AC plant is circulated/evaporated (20,000 liters) and 20,000 litres goes for the maintenance of the lawns /garden. The MES sewer for human excreta is a separate pipeline which flows to the MES plant. Thus the target water from kitchen and bathroom (less WC) may be about 20,000 to 30,000 litres per day. For reuse/recycle the solution is a sewage treatment plant (STP). Its total cost roughly will be Rs 50 lakhs and it will be set up in a corner of the library lawn and its monthly operating cost including manpower will be around Rs 39,000 per month. Presently this grey waste flows to the MES and we need to check if they are doing any thing about it. I leave it to the administration. I suggest that in long term we must deploy STP to reduce ground water extraction and use of potable

water for arboriculture. The STP will also provide the sludge as fertilizer.*

12. Data on Ground Water. As in research, the absence of data is the absence of evidence for analysis. There is no proper instrumentation, organisation/format for capturing/measuring data.

The rough and approximate data is that in the year 2008 and 2009 it was 120 feet deep. In 2010 it was 140 feet and in 2012 it is at a depth of 120 feet. It is not sure if this was taken before or after monsoon and whether any log is maintained. However I can bet that ground water is being depleted as we are not on a flood plain and the geological formation is partly rocky. For all we know we may be mining paleo or fossil water as it is reported that the water is sweet and potable. I must mention that ecology is as difficult as rocket science as it has much to do with both social and natural science.

13. Waste. Kitchen and electronic waste are looming threats and opportunities. E waste is a massive problem. Poisonous mercury from old CFLs goes into the waste stream, unregulated. But at IDSA we need to reward our waste/safai karamcharis who cheerfully remove waste every day. We need to segregate it at home into bio and non bio degradable bags. Ideas are also emerging on how to reuse paper waste. The DG informs us that the PRC has designated recycling as the next big industry (article in *Beijing Review*). This is called ‘urban mining’ and the future will depend more and more on recycling and reusing material in a big way.

A lot of discarded plastic wrappers, bottles and sachets are found in the lawns or stuck in bushes or grass. We need to clean them up and teach the younger generation the value of waste disposal. On October 2, each year till about the mid 1970s, ‘shramdan’ was undertaken where all participated to raise awareness. Now that can be revived focused on waste disposal.

* This problem has since been overcome by 2014. See paragraph 14.

14. **Effluent Treatment Plant.** IDSA had initiated plans to treat the effluents and a project report was prepared. Later it was learnt that the Military Engineering Service (MES) responsible for waste treatment in the cantonment area was also planning the same thing in a centralised manner. The MES plant has been installed and a pipeline has been laid and one point will be provided for IDSA. The expected year of completion is 2014.

15. **Personal Ecology.** While gym, yoga and sports are good for health, we also need to see that we eat ecologically suitable food. Hydrogenated oils must be blacklisted. In schools there is a huge debate underway on the banning of junk food and drinks. This is also applicable at IDSA. The caterer may like to plan alternative menus of organic or locally grown stuff including getting used to less water intensive and nutritious grains, like millets etc. Till the urban consumer does not demand it, how will farmers in Punjab, Haryana and West UP wean themselves away from water intensive rice. We request all grandparents and parents of scholars to provide us the secret recipes for this dying knowledge of traditional foods in our homes.

16. **Miscellaneous.** A Car pool may be a good idea for scholars who commute.

Conclusion

17. ‘Charity Begins at Home’ or ‘Be the change you want to see’ Through this mission of green (harit) we can all contribute, locally, to solve a national and global problem. This project will also give us the courage of our convictions. After the 1966 drought, the national slogan was to ‘miss a meal’. We also need to do that to share the hardships of farmers. Other issue about which we need to think and care are:

- (a) Transplanting old full grown trees
- (b) Learning from success stories
- (c) Innovative idea on paper waste

Finally to act local and think global or to understand and implement the principle of *glocalisation* – the interplay between global and the local we can apply this idea:

“For my material needs, the village is my world, for my spiritual needs, the world is my village” – Mohandas K Gandhi

ANNEXURE

Mission Green IDSA (Harit) of December 2009

1. The IDSA has begun a green mission to adopt green practices in a sustainable way.

It is planned to do the following:

(a) **Water**

- (i) **WC.** Readjustment of water amount in WC flush systems from 20 to 10 litres in main building and residential block. Plumber will visit each residence and cooperation is requested.
- (ii) **Ground Water recharge.** A pit is being maintained and drains leading to it will be cleaned by IDSA's conservancy/housekeeping staff as incentive.
- (iii) **Reuse.** Water saved as above will be used for lawns.
- (iv) Proposal for metering is being suggested in residential blocks.

(b) **Electricity/ Reduction of carbon footprint.** Conscious effort by individuals to use staircase instead of lifts and switching off lights when required is appreciated. It has been reported that individual blowers have reduced electricity consumption as the main heating plant is not switched on for entire building. The following is also being planned:

- (a) Provision of separate switch for lights in research rooms.
- (b) Installation of solar thermal water heaters, where feasible, in residential buildings with external piping.
- (c) Mutual and community watch to ensure lights are not left inadvertently

The problems caused by climate change have been recognised as one of the greatest concern of this century. The subject is futuristic, relevant and multi-disciplinary with many stakeholders. The matter encompasses not only the health of the planet itself, but also that of nations and individuals. This paper attempts to consolidate the issues under debate and discussion and provides explanations for some such as: the slow response for its mitigation; the UN and the discourse in the UNSC; its implications for science, economics, energy, politics, military implications; the militarisation of the Arctic; and, India's principled position on the common but differentiated responsibility and equity. The paper argues for revisiting and boosting public diplomacy and strategic communications to garner greater public support.



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workshop convener of the IDSA working group on security implications of climate change for India in 2008/9. He authored *Environmental Security: New Challenges and Role of Military* (2010). Since 2012 he has initiated research on indigenous historical knowledge with a focus on Kautilya's Arthasastra. He has contributed and is involved with a number of working group and task force reports at the IDSA. He has authored a number of articles, occasional papers, issue and policy briefs, edited chapters and single author monographs and books. The latest being IDSA monograph *One Hundred Years of Kautilya's Arthasastra* (July 2013).

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