



Who took my Carbon ?

Mapping spatial inequities in carbon access and allocation - A paradigm shift from global 'North-South' to local 'Urban-Rural'

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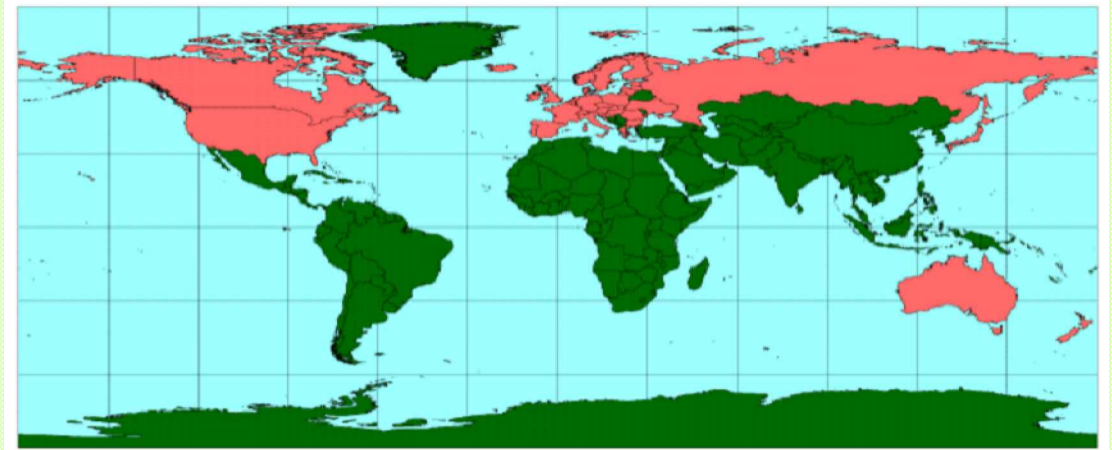
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Introduction

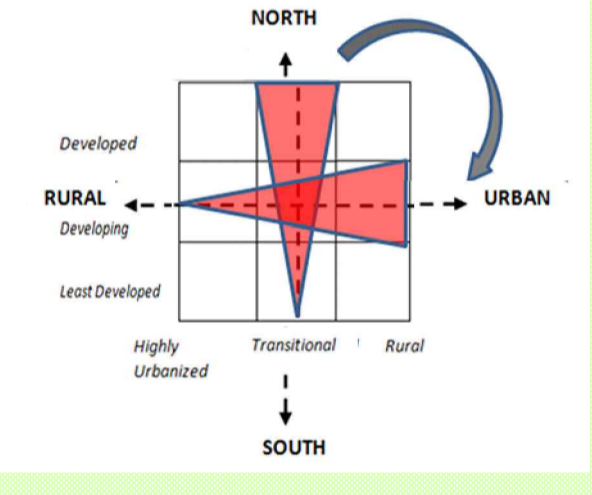
The world is said to be divided from the time immemorial ...into have and have nots, rich-poor, East-West, North-South, etc. The Climate Regime also recognizes this inequity as Annex I and the Non-Annex I countries in the Kyoto Protocol. Meanwhile, we have recently woken up to another global change...that of an increasingly urbanizing world.



Objective

Research Intent: To ascertain how fair is the access and allocation of carbon within diverse governing units at multiple scales and suggest means and measures to attain inclusive and systematic climate governance.

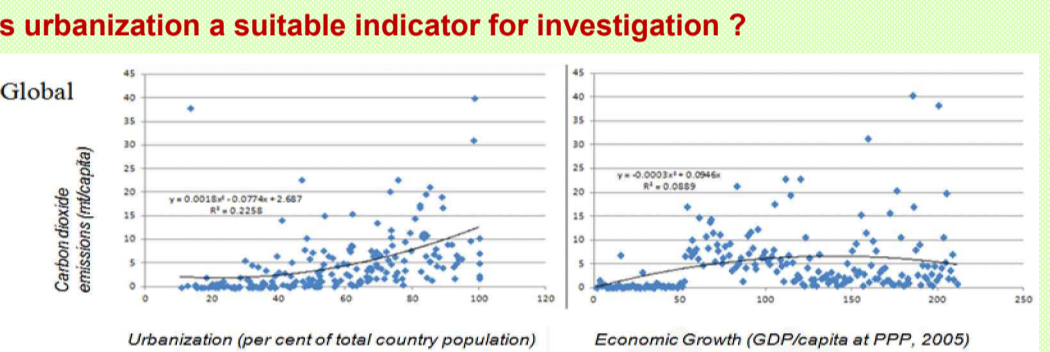
Hypothesis: The existing dualities in the international environmental governance, evident in the so called global 'North-South' divide, is an 'Urban-Rural' spatial disparity in the making.



Data and Research Methods

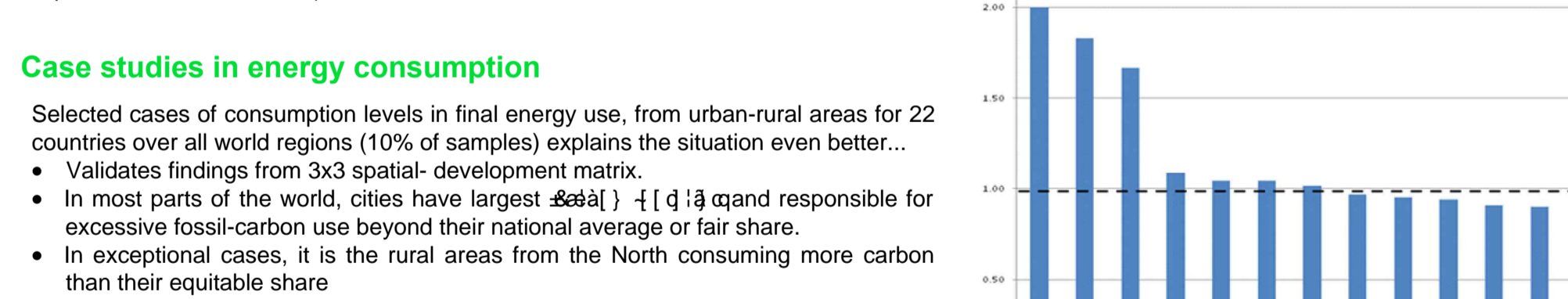
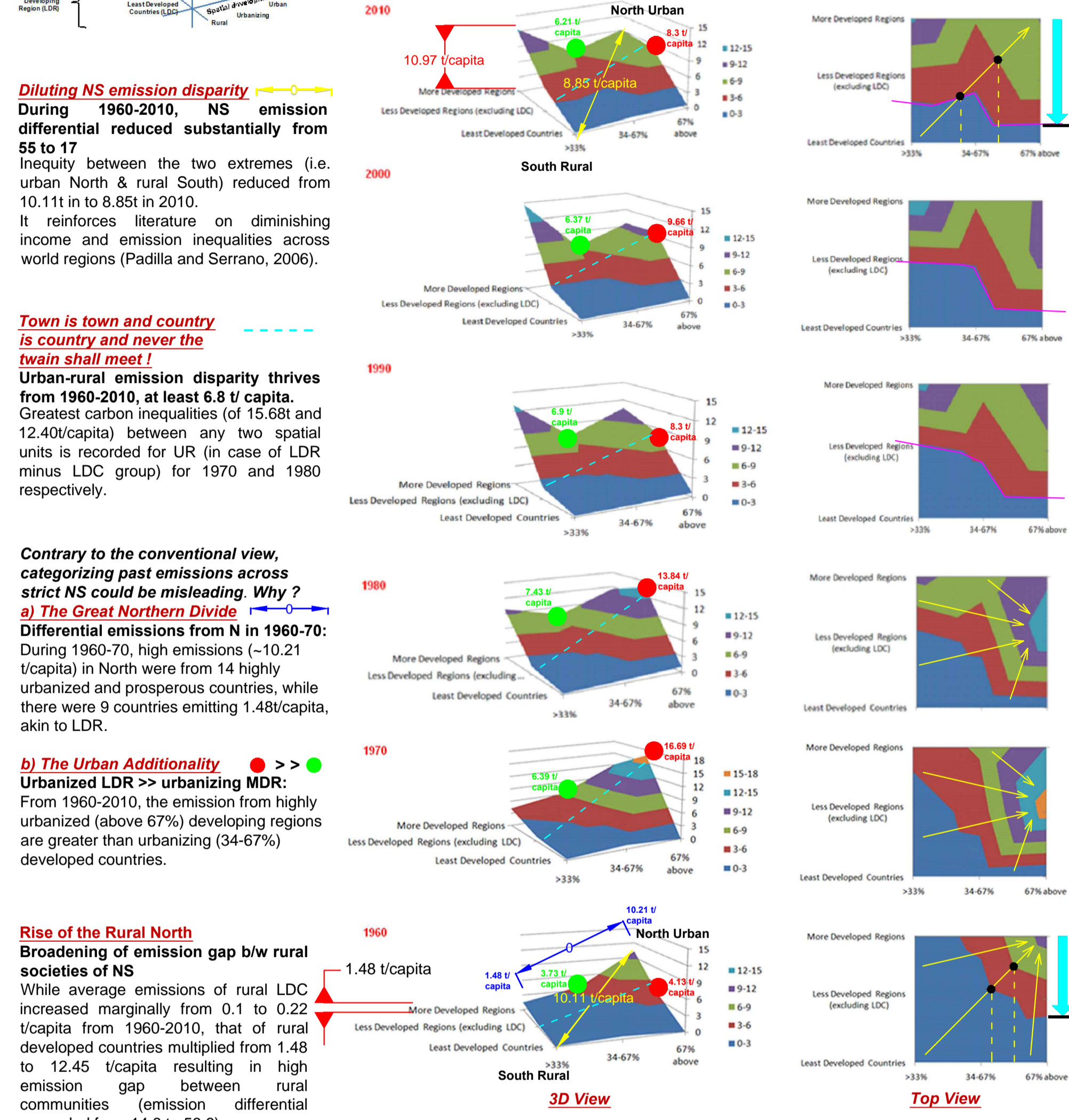
- Sample size: 200+ country/ territories following UN classification of regions
- Urban population/Urbanization for 229 countries for six decadal years (1960 –2010),World Population Prospects: The 2011 Revision (UNDESA 2011)
- Carbon dioxide emissions (metric tons per capita) for 210 countries for six decadal years (1960 – 2010) from Oak Ridge National Laboratory, Carbon Dioxide Information Analysis Center (CDIAC)
- Energy consumption (kg of oil equivalent per capita) and country GDP per capita at PPP, 2005 constant international dollars from World Development Indicators Database, <http://data.worldbank.org>.

Methodology :
Spatial Dissaggregation of Emissions
Spatial-numerical analysis involves disaggregating emissions of different nations for their economic or geo-political status (Developed / Developing/ Least Developed) and spatial/ geographical attributes (Urban/ Rural/ Urbanizing).
Based on : Sethi & Mohapatra 2013, Carney et al 2009, Satterthwaite 2008. Similar research in this area : Parshall et al., 2010, Rue du Can, 2008, Andrews 2008, VandeWeghe and Kennedy 2007, Dey et al. 2007, Lenzen et al. 2004



Is urbanization a suitable indicator for investigation ?
Economy (GDP/capita) and urbanization, both have limited association with increasing CO2 emissions, but all other things being equal, urbanization level of countries worldwide has a greater R-square value with their CO2 emissions, thrice as strong as GDP/capita
Urbanization is a sufficiently qualifying indicator for further experiment.

Discussion of Results - unfolding carbon footprints



The Earth finally breathes deep
World-wide stabilization of emissions in the recent past
Over the past half a century, per capita emissions grew throughout the world regions, MDR (6.1%), LDR minus LDC (30.2%) and LDC (34.8%), but in last three decades (1990, 2000, 2010), North has plateau its emissions -8t/capita. This stabilization is throughout the society in developed countries, but only evident in urban areas of developing countries.

South is maturing early
Early incidence to higher emission for LDR (DC+LDC)
Incidence to moderate emissions (3-6 t/capita) for developing countries on an urbanization pathway, physical and socio-economic development is much greater than ever before.
In 1960, the incidence was at national urbanization of 67%, which has reduced to 34-67% by 2010.

Melting of the North Pole
Shifting of high emissions
1960-1980 data indicates sudden shift of high per-capita emissions towards highly urbanized societies of LDR like UAE, Qatar and Brunei, although MDR countries like US, Canada, Belgium, Denmark, Australia, Sweden, UK, Netherlands also had emissions above 10t/capita.

Carbon inequity runs deep
Down South remains carbon poor
LDC continue to have a low-carbon emission profile (<3t/capita), even the urbanized middle class in Asia & Africa. Hence emissions in LDC are decoupled from spatial location of an individual (urban, rural, etc) attributable to subsistence state of economies and income.

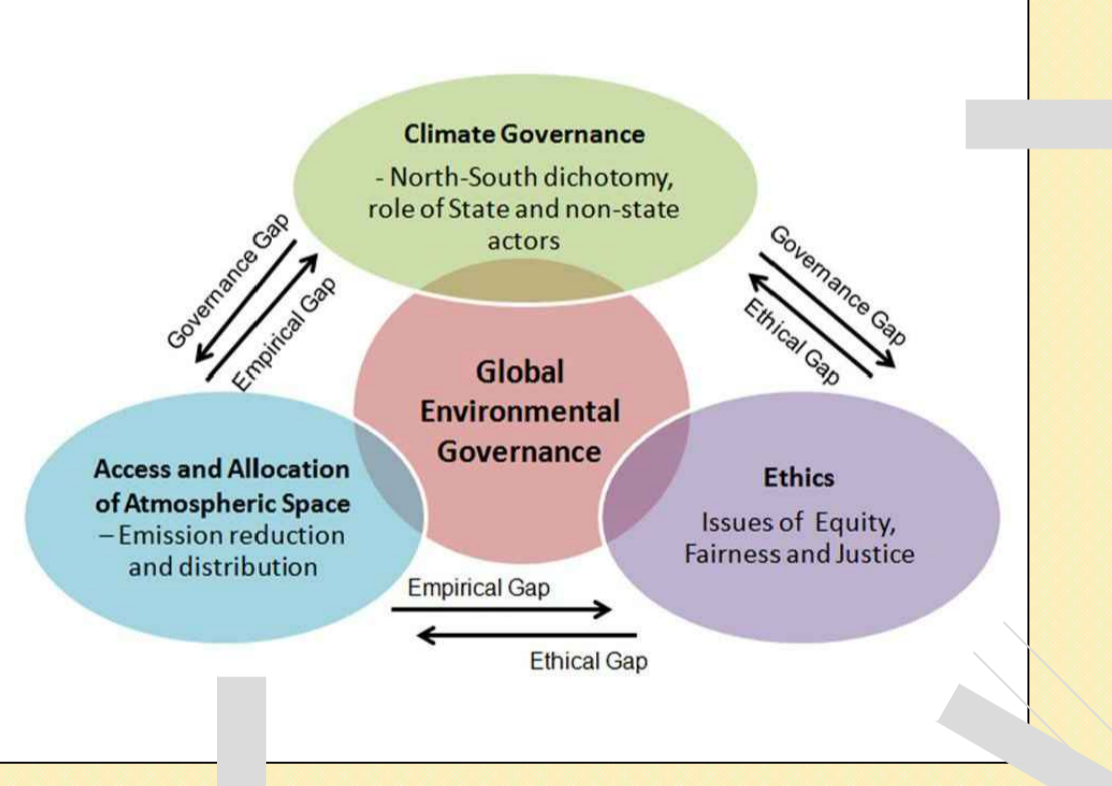
Conclusions

- This research vividly demonstrates the location of carbon-losers beyond the NS divide with inequities between and within.
- Establishes diluting NS & emerging UR carbon disparity with empirical evidence. Shows that LDC and 'rural' areas' in the developing countries are the most disadvantaged.
- High emissions are also a function of location or spatial location (urban) and not merely economic or geo-political situations, and hence can be decoupled from affluence.
- Rural constituencies in the South presently counted nowhere could lose their 'fair share' or right to use, save or bequest carbon, if their entitlement is not awarded at a scale most immediate to them.
- Developing societies could continue to develop with sustainable urbanization. Rather than high economic growth, sustainable and equitable resource utilization between urban and rural areas at the local level is the key.

Way forward...

- Acknowledge 'procedural justice'**
 - A distributive justice however scientific largely unfavourable with parties.
 - No time be lost in opening carbon space for participatory and local instruments.
- Standardize inventories at the local level**
 - To account production, consumption of materials, energy in urban and rural constituencies on principles of TCCCA.
- Sub-nationalize carbon governance**
 - Emission caps/ entitlements be distributed to cities and rural regions with regional trading markets.
 - Negotiators (states) act as regulators and create learning to upscale for a global market. Exception of LDC or Island states that genuinely require handholding.
- Ownership and trust-building**
 - Voluntary steps required from North, South in addition to commitments.
 - We cannot opt to change world instead of ourselves, WE ARE THE WORLD.

Literature Study



Climate Governance is pre-occupied with North-South debates	
North	South
Higher cumulative, per-capita and historic emissions	Lower cumulative, per-capita and historic emissions
Increasing rate of emissions from South	Large scale vulnerability to and threat from catastrophic events
Less vulnerable to catastrophic events	Issue of survival for people living on small island states and lower elevations
Higher technical, financial and institutional capacities to respond to mitigation, adaptation and catastrophic challenge	Limited capacities to respond to mitigation and adaptation and catastrophic challenge
Concern of large scale emission cuts, forcing radical shift in lifestyle, behavioral and business patterns	Failure of North in meeting Kyoto commitments
Large scale financial and technological investments at home	Subjugation of South and systematic discrimination in the past
Massive support and financial assistance to the South	Impairment to right to economic development
Fear of rising Asia and restructuring of World order	Threat to livelihood security, basic needs and energy access - issue of survival
	Issue of justice: to attain compensation from threats and impacts not caused by their own action
	Means to redistribute the world order and having greater role in decision making

Ethics - defining equity, fairness and justice		
Consequential / Teleological Theories	Deontological Theories	Areataic Theories or Axiologists
Supply aggregate criteria, speak of conditional obligations and advance material or substantive criteria.	Supply distributive criteria regulating the allocation of goods, set forth absolute obligations and propose formal or relational criteria.	Believe that justice is primarily a virtue, an excellence of human character.
For consequentialists, justice is the production of good consequences and the best distribution of resources is the one that maximizes utility.	They have a natural affinity for the idea that justice serves as an independent criterion for the rightness and wrongness of actions.	They hold that certain actions are inherently right because of the value that they intrinsically contain and not merely because of their consequences.
Teleological norms are galdered and may compromise on "means" to achieve them (Ghosh 2013).	For deontologist, unjust actions or institutions cannot be justified on the ground that they would produce good consequences.	
	Deontological norms would regard both "ends" and "means" adopted to achieve that end as equally important (Ghosh 2013).	

- Key Findings**
- A futuristic framework for emission stabilization ought to be rooted in a participatory process.
 - Foster equity and be globally inclusive : involve under-represented groups like the LDC and non-state or trans-national actors.
 - Locally Fair: 'locates' carbon AA inequities within the countries; and allocates the carbon space to 'local' or 'sub-national' agencies.

Low Carbon Pathway - Sustainable Consumption and Production

Energy consumption is polarized in urban areas
Energy consumption or fossil fuels is polarized or highly concentrated in the urbanized part of the globe, rather than just the North. Within urban societies of the world, it ranges in 3500 \$CO2E/capita to 14.8 t/capita in cities are undisputed guzzlers of carbon.

In comparison to emissions, energy consumption in North continues to be high
Emissions in North (urban) have largely plateau around 6-9 t/capita (a large part of it is due to exporting industrial activities to the developing countries), their energy consumption is 14.8 t/capita. Energy rise at home could offset emission gains from exports in future.

Transformative pathway for developing societies
LDR societies on development pathways . urbanizing in the range of 34-67% can continue to develop economically, keeping their emissions around 3t/capita, by keeping their energy consumption levels between 1000-2000 kg of oil equivalent per capita.

Contributes to six of the proposed SDGs
(7) Sustainable energy, (8) Inclusive and sustainable economic growth, (9) Infrastructure and industrialization, (12) Sustainable consumption and production patterns, (16) Inclusive societies, access to justice for all, (17) Strengthen implementation and global partnership.

Review of 29 carbon AA (emission reduction or distribution) proposals				
Access and Allocation Scheme	Equity Principle	Interpretation	Examples	Actors (in carbon governance or as beneficiary of the fair-share)
Equal per-capita emission rights, Contraction and convergence	Equity	Every individual has an equal right to pollute or to be protected from pollution	Agarwal & Narain 1991, Singer P 2002, Meyer 2000, Jamson 2001, Afanasio 2002, Guibb et al 1999	National/individual
Stabat qua, grandfathering or equal percentage reductions	Sovereignty	All nations have an equal right to pollute or to be protected from pollution, current level of emissions constitutes a status quo right	Host 1992, Pearce and Warford 1993	National
Marginal costs reduction or equalization	Horizontal/vertical	The economic burden is proportional to emissions (eventually including historical emissions)	Groot 2010, Duro & Padilla 2008, Hill and Wodon 1997, 2000, Virth & Lashor 1990, Cline 1992	National/individual depending upon Horizontal/vertical
Historic responsibility	Polluter pays	The economic burden is proportional to emissions (eventually including historical emissions)	Smith et al 1990 (National Debt), Bode S 2003, Jhaiah et al 2008, Kanifor et al 2010 (Carbon Budget), den Elzen & Höhne 1999, Den Elzen & Schaeffer 2002, Neumayer 2000, Climate Debt, ut (Bolivia proposal).	National
Multilateral	A combination of above principles		Rose A 1988, Brown 2002, Baer et al 2009 (Greenhouse Development Right), Chakraverty et al 2009, VBGU 2006	National/individual
Specific or ad-hoc	A derivative of either of the above strategies		Costa et al 2011, Blok et al 1997, Zwickel et al 2009	Variable
Kyoto Protocol	Applies common but differentiated responsibilities with respective capacities while following equal percentage reductions			National

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This is an indicative list of significant references. For an exhaustive list, refer the author.