hiding behind the poor

A REPORT BY GREENPEACE ON CLIMATE INJUSTICE

hiding behind the poor

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cover image FLOODS IN BIHAR. CLIMATE CHANGE IS WORSENING THE FLOOD-DROUGHT CYCLE, WITH DISPROPORTIONATE IMPACTS ON THE POOR.
image CLIMATE CHANGE INDUCED SEA LEVEL RISE THREATENS MILLIONS OF COASTAL INHABITANTS, PARTTICULARLY IN LOW LYING AREAS SUCH AS THE SUNDARBANS.

summary

CREATING CARBON SPACE FOR THE POOR TO DEVELOP

Climate change is today accepted as the largest threat to humanity and is now taking centre stage globally with discussions in various international governmental, economic and academic fora. It has brought to focus attention on the critical question of linkages between development and environmental sustainability.

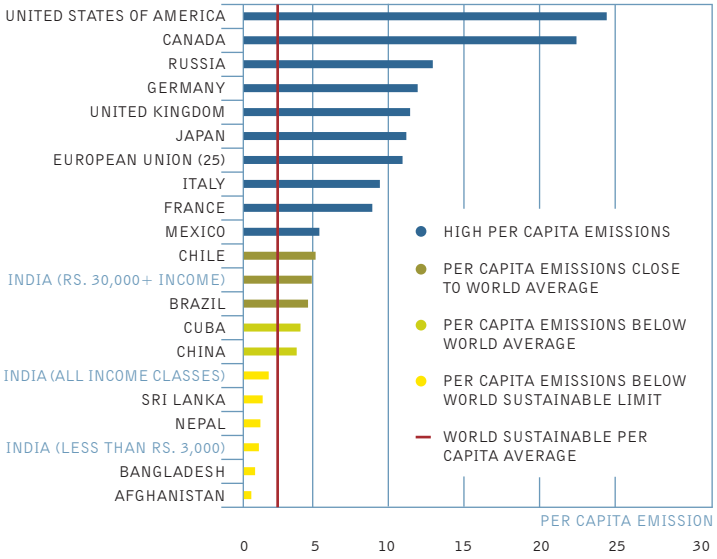
In December 2007, the world's governments will meet in Bali, Indonesia to kick-start the process leading up to the second commitment period of the Kyoto Protocol. This meeting is extremely crucial to ensure that governments commit to larger emission cuts that will keep global temperature rise to below 2 degrees. While this international meeting sets the debate for 'climate justice' at a global level this study aims at raising the same debate within the country. It asks the question – Is there climate injustice happening in India? It presents a case for the Indian government to implement the principle of 'common but differentiated responsibilities' amongst the various socio economic groups in the country.

The report is based on a first of its kind face-to-face survey across the country ranging from the metros to medium and small towns and rural areas on domestic energy consumption and transportation. The energy consumption patterns in 819 households have been converted into CO_2 emissions and then assigned to seven different income classes.

The findings plainly illustrate that the considerably significant carbon footprint of a relatively small wealthy class (1% of the population) in the country is camouflaged by the 823 million poor population of the country, who keep the overall per capita emissions below 2 tonnes of CO_2 per year. While even the richest income class in this study, earning more than 30,000 rupees a month, produce slightly less than the global average CO_2 emissions of 5 tonnes, this amount already exceeds a sustainable global average CO_2 emissions of 2.5 tonnes per capita that needs to be reached to limit global warming below 2 degrees centigrade. The carbon footprint of the 4 highest income classes earning more than 8,000 rupees per month, representing a population of about 150 million people in the country, already exceeds sustainable levels.

Graph 1 highlights how this injustice ranks in terms of international per capita emissions while at the same time showing how the average per capita emissions of the different socio economic groups in India are quite literally worlds apart.

graph 1: **average per capita CO_2 emissions (tonnes/annum) of different countries and different Indian income classes.**



While India has a right to demand a 'common but differentiated' responsibility at an international level, there is the urgent need for intra-national common but differentiated responsibility too. Developed nations need to cut their CO_2 emissions not only to prevent climate change but also to give space to the developing world to catch up, without pushing the global temperatures over the tipping point. The same is true within India. If the upper and the middle class do not manage to check their CO_2 emissions, they will not only contribute to global warming, but will also deny hundreds of millions of poor Indians access to development. The study clearly illustrates the growing schism of carbon emissions between the two Indias; the poor bearing the biggest climate impact burden and camouflaging the other India's lifestyle choices.

The prescription provided as a response to the results in the study is not that India should not develop or the wealthy should stop consuming, but to make a clear case for India to decarbonise its development. The path of 11th and 12th Five Year Plans proposed by the Indian government continues to base the future of energy production in the country mainly on coal power plants, thus further increasing CO_2 emissions. A major revision of the future of the power sector is needed, shifting investments from coal and nuclear to renewables and energy efficiency, to create the carbon space for the poor to develop. In short, an Energy Revolution is needed in India as well as the rest of the world.

introduction

CLIMATE CHANGE, THE REAL THREAT TO DEVELOPMENT

image EVEN THOUGH BABU (CENTRE) IS ONLY FIFTEEN YEARS OLD HE STILL ACKNOWLEDGES HIS RESPONSIBILITY TO THE COMMUNITY. ON THE ISLAND OF PAKHIRALAY IN THE SUNDARBANS, BABU HAS WORKED ALL NIGHT FILLING SAND BAGS WITH MUD IN A VAIN EFFORT TO SAVE THE VILLAGE RICE FIELDS FROM THE RISING SEAS.

image INDIA'S ENERGY PRODUCTION DOES NOT NEED 4000 MW COAL POWER PLANTS, BUT DECENTRALISED COMBINED HEAT AND POWER PLANTS, MANDATORY EFFICIENCY REGULATIONS AND A MASSIVE GROWTH IN RENEWABLE ENERGY GENERATION.

Globally, temperatures have already increased by 0.7 degrees centigrade over the past century. Temperatures are expected to further increase by a minimum of 1.8 degrees centigrade to a maximum of 4 degrees centigrade until the end of this century depending on our ability (or inability) to check climate change by undertaking drastic reductions in emissions of Greenhouse Gases (GHGs)[1]. Apart from a few positive impacts on tourism and agriculture in Northern Europe, increase in global temperatures will have detrimental effects in most parts of the world. Changing rainfall patterns will result in intense flooding and severe droughts, melting glaciers will aggravate the problem of fresh water shortage. The intensity and frequency of cyclones and other storms will increase, vector borne diseases will spread and rising sea-levels will eventually drown coastal low lying mega cities like Mumbai and Kolkata. Developing economies located in tropical regions will have to bear the brunt of the worst impacts of climate change; countries like India which are on a high growth path will find their development jeopardized if global temperatures rise above 2 degrees centigrade.

Climate Change is man made. The globe is heating up due to the emission of GHGs, the most prominent being carbon dioxide produced by burning fossil fuels. Historically, developed countries are the biggest contributors to excessive GHG emissions, making them the most responsible for climate change. However over the last few decades, emissions of rapidly developing economies like India and China have surged. In fact, rankings by the WRI of top GHG emitters[2] has USA on top, and developing countries such as China and India are ranked at No 2 and No 5 respectively, making them amongst the world's biggest emitters.

The next round of negotiations for the second phase of the Kyoto Protocol, covering the period after 2012 should start this December in Bali. Governments are busy debating about who to blame and who must commit to drastic emission cuts to save the world from climate change. Until now, the Indian government has maintained that the average per capita CO_2 emission of India is low (below 2 tonnes per person) compared to that of EU-25 states (10.5 tonnes) and the US (23 tonnes). This is the basis for their argument to continue on a fossil fuel driven economic development pathway[3].

Referring to the principle of common but differentiated responsibilities, India claims its right to development and thus its right to consume more energy from fossil fuels, asking developed nations to create the carbon space. Implicit in this is the notion that the developed countries need to decrease their CO_2 emissions drastically, so that developing countries can still increase theirs without pushing the planet in the direction of climate chaos.

But India at this point of time is faced by two sharply contradictory realities. On the one hand there is a rapidly growing rich consumer class which has made the country the 12th largest luxury market[4] in the world; on the other hand India is home to more than 800 million poor people on the planet who are extremely vulnerable to the impacts of climate change.

This study seeks to expose the lack of climate justice within India. Who is behind the average 1.67 tonnes of per capita CO_2 emission in India? Who really contributes to these emissions? Is the rich consumer class hiding their CO_2 emissions behind the legions of poor, most of who do not even have access to electricity? Is it not the obligation of the Indian government which demands differentiated responsibility in the international arena to establish the same within India?

references

[1]IPCC 4th Assessment Report, WGI SPM, http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_SPM.pdf
[2]Not including forest & land use change/LULUCF
[3]WRI figures: http://cait.wri.org
[4]http://timesofindia.indiatimes.com/Business/India_Business/Indian_attitude_Big_brands_are_meant_for_showing_off/articleshow/2388278.cms

Impacts of climate change on the poor

The impacts of climate change in a region are determined not only by the degree of temperature rise but also by the vulnerability of the region and its population. A combination of geographical and social factors make the poor, a majority of whom are concentrated in warm tropical regions, most vulnerable to climate change. While most areas in higher and medium latitudes will still experience an increase in agricultural production up to a temperature increase of 3 degrees, areas in low latitudes will suffer from a decline in production when average temperature rise exceeds 1 degree centigrade according to the Intergovernmental Panel on Climate Change's 2007 assessment. Decline in food production and water shortage will be most pronounced in Africa and Asia which are home to most of the poor people in the world[5].

Being unable to afford any better, the poor are forced to settle in marginal or highly vulnerable areas. Poor farmers can only afford land in regions which are drought prone, while settlements of poor in the rural and urban area can be found close to rivers and creeks, exposing their shelters and farmland to floods. This trend is very pronounced in densely populated areas of India and Bangladesh. With climate change leading to a further decrease in already scarce resources like arable land and water, poor populations are going to be pushed further to, or even over, the edge.

The poor lack the resources, and are unaided when it comes to governmental support, to adapt to rising temperatures. Infrastructure like shelters and sea walls to protect poor people from extreme weather events and sea level rise do not get funding. Economic constraints render the poor incapable of securing their future. The poor's subsistence is dictated by their daily challenges and they don't have the luxury or the facilities to prepare for future risks and to adapt to dangerous climate change.

With little access to a functional health system, poor people are also more susceptible to vector borne diseases like malaria or dengue. The aftermath of natural disasters and its impact on human health (eg stagnant standing water after heavy rainfall and floods leading to the outbreak of diseases) also affects the poor the worst because of their lack of infrastructure and access to emergency health services.

While the rich can invest in diverse assets, the poor only own one shelter and probably a piece of land and some cattle, all of which are affected by extreme weather conditions. Experience tells us that recovery from extreme weather events like floods and storms in poor underdeveloped areas takes far longer than in affluent areas. More often than not, even before they have sufficiently recovered, they are hit by the next round of disasters. This is due to two factors. Often governments of poor countries lack the capacity to effectively rebuild infrastructure and provide support and relief to the poor population to recover from the impacts. On the other hand the population has a very low potential to adapt and recover. With no access to reserves or insurance, recovery is often completely dependent on outside support from governments or from NGOs.

reference

[5]IPCC 4th Assessment Report,WGII SPM, http://www.ipcc.ch/SPM13apr07.pdf

methodology

To assess CO_2 emission levels amongst different income classes in India, quantitative structured interviews where conducted. These interviews were conducted in the four metros (Kolkata, Mumbai, Delhi, Chennai), 500,000+ population towns (Patna, Ludhiana), 100,000 to 500,000 population towns (Kolhapur, Hubli), towns with a population less that 100,000 (Chatra, Bhadravati, Baghpat, Medak) and about 200 interviews were conducted in rural areas.

Interviews were conducted with people who spent a maximum amount of their time at home so as to obtain accurate assessment of energy consumption in the house. A total of 819 interviews were conducted across various income classes (see table).

table 1: **sample size of the different income classes.**

INCOME CLASS	SAMPLE SIZE
30k+	30
15 – 30k	51
10 – 15k	92
8 – 10k	125
5 – 8k	170
3 – 5k	210
< 3k	141
TOTAL	819

The assessment in this report is restricted to direct energy consumption from household appliances and transportation and does not include outsourcing of services

The assessment was done in the following manner:

step 1: **calculating annual bill amount for electricity**
- Respondents were asked to provide their estimated bill amounts for winter months, summer months and the rest of the year
- They were asked to provide their estimates of how many months they would classify as winter months, summer months and the rest of the year
- Weighted average of seasonal bill with length (No. of months) of season was taken to arrive at the annual electricity bill amount of the household

step 2: **converting bill to units**
- Annual bill amount was converted to units using the billing structure for the city
- This gave an estimate of number of units of electricity consumed per household per annum

step 3: **validating the calculations**
- For validating this estimate at a household level, appliances used, in what numbers, and for how many months, for the number of days used in a month, and for the number of hours used per day were assessed.
- Using wattage estimates for all appliances, total electricity consumption was calculated
- Comparison of this with estimated electricity consumption showed that the two estimates were in line; in a few cases where these two had a wide variance, these cases were rejected from the analysis
- This appliance analysis was also used to assess contribution of different appliances to the total electricity consumption.

The assessment of CO_2 emissions from personal transportation was done in the following manner:

step 1: **calculating annual bill amount for personal transportation**
- Respondents were asked to provide their estimated bill amounts on travel expenses on a monthly and annual basis
- They were asked to provide their estimates of the different modes of transport they used and the distance traversed in each mode of transport
- They were also asked to provide information on leisure travel (by air alone)

step 2: **converting distance to fuel**
- Distances were converted depending on the mode of transport, to fuel consumed

image WITH A MAJORITY OF INDIA'S POPULATION STILL DEPENDENT ON SMALL SCALE, RAIN FED AGRICULTURE, IRREGULAR WEATHER PATTERNS DUE TO CLIMATE CHANGE ARE JEOPARDISING THE LIVELIHOODS OF MILLIONS OF INDIANS FROM LOW INCOME SECTIONS.

Population estimates and weighting scheme used for estimation of population in each income class

In this study people were categorized into 9 socio economic classes as well as in 7 income groups. For each economic class the proportion of economic group was determined. Taking the population of various economic classes in India from the Business World Marketing Book 2006, these were re-distributed to income classes. Then the income classes were added up from the various socio economic classes to arrive at the population.

table 2: **Population size of different income groups.**
CALCULATED FROM BUSINESS WORLD MARKETING BOOK 2006

INCOME GROUP (MONTHLY HOUSEHOLD INCOME)	POPULATION (IN 000s)
Less Rs. 3,000 per month	432,162
Rs. 3,000 – 5,000	390,796
Rs. 5,000 – 8,000	155,730
Rs. 8,000 – 10,000	69,178
Rs. 10,000 – 15,000	53,236
Rs. 15,000 – 30,000	18,804
Rs. 30,000 and Above	9,956

Conversion Factor for estimating CO_2 emissions from various energy sources in Households

Conversion factors for calculating CO_2 emissions from various energy sources were taken from various secondary sources like MNES, BRANZ Study Report SR 118 (2003) New Zealand and IEMA (Institute of Environmental Management & Assessment)

table 3: **Conversion factors used to translate various energy uses into CO_2 emissions.**

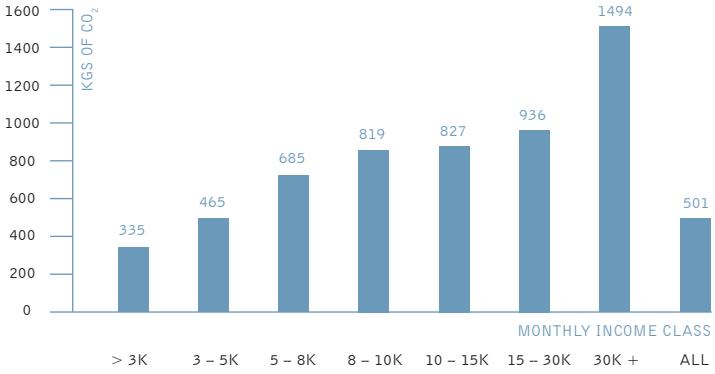
CATEGORY	KG CO_2 EMITTED PER UNIT
Electricity (per kW)	0.87
LPG (per kg)	2.78
CNG (per kg)	2.67
Coal (per kg)	2.06
Kerosene (per litre)	2.41
Diesel (per litre)	2.46
Petrol (per litre)	2.14
Air (per person/km)	0.26
Train-Diesel (per person/km)	0.13
Train-Electric (per person/km)	0.17
Firewood (per kg)	1.07
Gobar (per kg)	1.07
Gobar Gas (per kg)	2.67

results

India's overall average per capita CO_2 emission is 1.67 tonnes. The figure has been arrived at dividing the overall CO_2 emissions of India given by the World Research Institute[6], by the population size given by the CIA Factbook[7]. The average annual per capita CO_2 emission in India as assessed by this survey is 501 kg. This is 33% of the overall Indian per capita emissions, which is in line with the sectoral division of CO_2 assessed by WRI[8] Besides the assessed emissions generated from energy consumption in transport and household, the personal carbon foot print also includes CO_2 emissions generated from food and non food consumption and additional overheads due to public consumption.

The average CO_2 emissions per income group range from 335 kg for the income class below 3,000 rupees per month to an average of 1,494 kg for the income classes above 30,000 rupees per month. The richest consumer classes produce 4.5 times more CO_2 than the poorest class, and almost 3 times more than the average Indian (501 kgs).

graph 2: **Per capita annual CO_2 emissions from household energy consumption and transport of different income groups.**



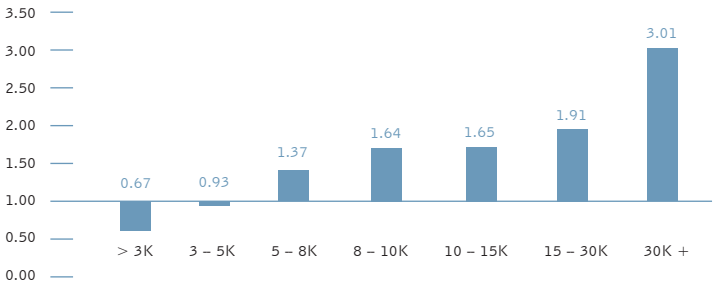
Multiplying the average per capita CO_2 emissions per income group with the respective population size gives the absolute CO_2 emissions for each income group.

While only 14% of the Indian population earns more than 8,000 rupees a month, they contribute 24% of the CO_2 emissions of the country. By dividing the absolute CO_2 share of each income group by their share of the overall population, one can calculate a Climate Injustice Quotient (CIQ).

table 4: **Climate Injustice Quotient (CIQ) calculated for each income group. Classes with a CIQ below one emit less than the average, those with a CIQ above one emit more than the average.**

INCOME CLASSES	POPN. (MM) 2007	SHARE OF POPULATION	KGS OF CO_2 P.A. IN BILLIONS	SHARE OF EMISSIONS	CIQ
All	1130	100%	566	100%	1.000
< 3k	432	38%	145	26%	0.668
3 – 5k	391	35%	182	32%	0.926
5 – 8k	156	14%	107	19%	1.365
8 – 10k	69	6%	57	10%	1.643
10 – 15k	53	5%	44	8%	1.652
15 – 30k	19	2%	18	3%	1.910
30k +	10	1%	15	3%	3.010

graph 3: **CIQ for different income classes.**



As Table 4 and Graph 2 clearly show, when it comes to CO_2 emissions, a relatively small wealthy class of 1% of the population in the country is hiding behind a huge proportion of 823 million poor people. It is the country's poor, with an income of less than 5000 rupees a month, who keep the average CO_2 emissions really low.

references

[6]http://cait.wri.org

[7]https://www.cia.gov/library/publications/the-world-factbook/geos/in.html#People

[8]http://cait.wri.org/cait.php?page=sectors

Lifestyles that heat the planet

As shown in Table 5, while CO_2 emissions from cooking fuel increases only slightly with rising income, the increase in CO_2 emissions from household electricity consumption (factor 5.5) and personal transport (factor 7.1) with rising incomes is very pronounced.

table 5: **Per capita annual CO_2 emissions in kgs of different income groups for different uses.**

CO_2 EMISSIONS BY USE	KGS OF CO2 PER CAPITA PER ANNUM							
	> 3K	3 - 5K	5 - 8K	8 - 10K	10 - 15K	15 - 30K	30K+	ALL
Total	335	465	685	819	827	936	1494	501
Electricity	198	279	445	549	521	646	1091	326
Cooking	97	130	137	147	124	131	120	105
Transport	40	56	103	131	174	159	284	70

An increasing use of electricity for lighting is already starting at low income levels and stabilizes for income classes above 5000 rupees (see Graph 4). A far sharper increase of CO_2 emission from lighting between the lower and the higher income classes has been mitigated by the use of more efficient lighting systems like tube lights and CFLs, which are not accessible for the poor because of their relatively high price. Therefore CO_2 emissions deriving from lighting only increase by a factor of 1.6 from the below 3000 rupee to the 5000 – 8000 rupee income class and then stabilizes.

The considerably low rate of increase in CO_2 emissions from household lighting clearly shows that lifestyle induced increase in electricity consumption is buffered by the use of more efficient appliances.

The use of inefficient lighting is responsible for 126 million tonnes of CO_2 emissions per year (7% of India's overall emissions). Making CFLs, tubelights and other efficient lighting systems accessible to the poor by massive price reduction and prohibiting the sale of inefficient lights like incandescent bulbs, could cut these emissions by 95 million tonnes achieving a 5% reduction of India's overall annual emissions.

The CO_2 emissions from fans, like that of lighting products, reaches a plateau in the 5 - 8k income class while that of electric geysers (water heaters) hits a plateau at the 8 - 10k income class. Washing machines only start to appear in the 5 - 8k class and peak at the 15 - 30k class indicating that the upper income class prefers using washing services/ laundries. The outsourcing of services is not factored in this assessment as it is only based on the household electricity bill, signifying that this study underestimates the CO_2 emissions of the upper income classes.

graph 4: **CO_2 emissions per capita from household lighting devices [kg/annum].**

table 6: **CO_2 emissions caused by incandescent bulbs and calculation of emission reduction replacing all incandescent bulbs by CFLs.**

INCOME CLASSES	CO_2 EMISSION [PER CAPITA [KG/ANNUM]	CO_2 PER CLASS [MN TONNES/ANNUM]	CO_2 EMISSION REDUCTION [MN TONNES/ANNUM]
< 3k	113	48.83	36.63
3 – 5k	103	40.25	30.19
5 – 8k	134	20.87	15.65
8 – 10k	115	7.96	5.97
10 – 15k	94	5.00	3.75
15 – 30k	110	2.07	1.55
30k +	131	1.30	0.98
ALL	88	126.29	94.72

image INDIA CAN REDUCE ITS CO_2 EMISSIONS BY 95 MILLION TONNES PER ANNUM IF A 100% SHIFT FROM INEFFICIENT BULBS TO EFFICIENT CFLs IS MADE.

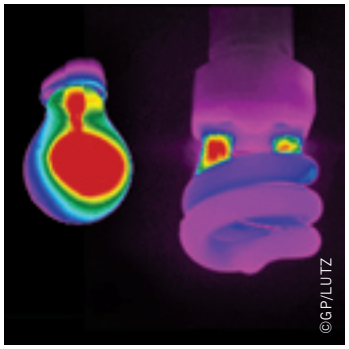


table 7: **Annual per capita emissions [kg/CO_2] of household appliances of different income classes.**

APPLIANCES	< 3K	3 – 5K	5 – 8K	8 – 10K	10 – 15K	15 – 30K	30K +	ALL
LIGHTING	134	156	214	219	188	187	218	140
FAN	40	73	120	137	135	129	142	75
ELECTRIC GEYSER	4	14	36	71	78	52	65	29
TV	16	28	45	49	42	39	44	26
WASHING MACHINE	0	0	4	16	10	58	22	3
AC	0	0	0	0	10	52	65	7
OTHERS	4	8	27	55	57	129	534	46
TOTAL	198	279	445	549	521	646	1091	326

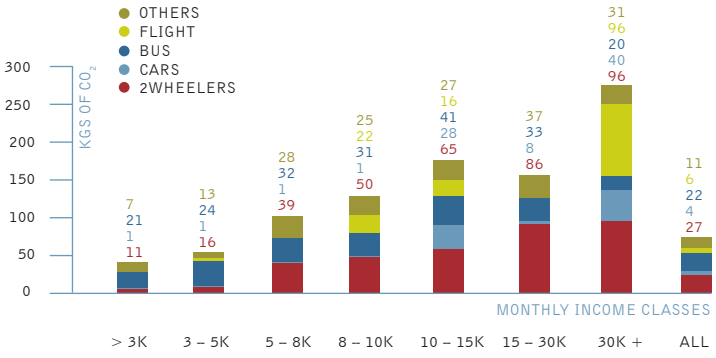
Air conditioning today only makes up a small proportion of the overall household electricity consumption. Due to its high price it only starts to be used by income classes over 10,000 rupees but remarkably enough increases steeply by 6.5 times up to the >30,000 rupees class.

But by far the most pronounced increase in electricity consumption and thus CO_2 emissions from lower income groups to higher income groups is in the use of 'Other' appliances. 'Other' appliances constitutes all the small electronic devices that make living more comfortable for those who can afford it. They range from DVD players to kitchen equipment and from mobile phones to computers. None of these products account for a really significant share of the CO_2 emissions, but together they add up to 49% of the overall household emissions of the >30k income class. The CO_2 emissions of these other appliances increases from 4 kg per person in the <3k income class to 534 kg of CO_2 per person in the >30k income class by a factor of 136. With increasing income, consumption changes from only essentials like food and clothing to a variety of life style goods including electronics. Even with an increase in efficiency of all these products, the constant addition of new goods that consume electricity would drive the life style of the >30k class over the limits of sustainability.

Individual CO_2 emission from transport were split into 2 wheelers, cars, buses, flights and other forms of transportation. Overall the increase in CO_2 from the lowest to the richest income class increased by a factor of 7.1, far higher than the increase of 4.5 times for all uses. The increase is due to 3 factors.

- There is a gradual increase in the use of two wheelers resulting in an increase from 11 kg of CO_2 to 98 kg of CO_2 per person
- The use of cars is starting at an income of more than 10,000 rupees per month
- There is a massive increase in air travel for the income class above 30,000 rupees per month

graph 5: **Annual per capita emissions [kg/CO_2] of different types of transportation for different income classes.**



The share of transport contributes to only 7.2% of the overall personal emissions assessed by this study. The WRI attributes a 4.9% share of transport to the overall CO_2 emission of the country. This is low in comparison with an average global share of 14.6%.

The transportation sector in India is witnessing a boom. A study done by TERI shows that from the 1980s to 2003, the number of vehicles on the road increased by almost 15 times[9]. This study further predicts that the number of vehicles in India will increase from today's figure of 60 million to approximately 537 million by 2030, resulting in a 9 – 13 fold increase of CO_2 emissions from this sector.

reference

[9]Study done by The Energy Research Institute, New Delhi: Transport Sector and Climate Change in India – Ranjan Kumar Bose/TERI/24th May 2006

In the absence of good fast train connectivity between cities, according to Civil Aviation Minister Praful Patel, the country will need 1,500 to 2,000 passenger planes in 10 years, up from 260[10] now. A study by DIFID[11] predicts that the overall CO_2 emissions of transportation in India could increase to 1,200 million tonnes in 2030, which is comparable to 70% of India's total CO_2 emissions today.

Three developments are crucial to limit the massive increase of CO_2 emissions from the transport sector.

- Mandatory fuel efficiency standards need to be put in place swiftly so that the new cars entering the market use as little petrol or diesel as possible. This also helps the country to reduce its increasing dependency on oil imports.
- Public transport systems like metros and efficient bus networks need to be built at least in all metros, also enabling these cities to handle the growing traffic burden.
- Last but not least, a high-speed train network between big cities needs to be established to curb the dependency on air travel within the country.

International Climate Injustice

To be able to compare per capita emissions of income classes with national CO_2 emissions of other countries, the emissions were multiplied by a factor of 3.3 to ensure that total average Indian emissions corresponded to an overall 1.67 tonnes per capita. This assumes that the sectors of CO_2 emissions, not covered in our study, would similarly increase when household income rises, as with the emissions from electricity and transport sectors. While this might be lower for the emissions linked to the consumption of food, we can assume that the growth factor in the purchase of consumer goods other than food will be far higher in the upper income classes. This is also reflected in the 136 fold increase in the consumption of other appliances in the assessment of household electricity use. Thus we assume that the average multiplication by a factor of 3.3 results in a slight overestimation of the CO_2 emissions of the lower income classes and an underestimation of that of the higher income classes.

Plotted against the average per capita global CO_2 emissions, even the CO_2 emissions of the monthly income class >30k rupees are a shade lower than the average global emissions of about 5 tonnes per person. This is less than half of the EU-25 states, given as 10.5 tonnes and 4.6 times smaller than the average emissions of the USA.

references

[10]As told the India Brand Equity Foundation in 2006: www.ibef.org

[11]DFID study: www.cleanairnet.org/caiasia/1412/articles-70656_finalreport.pdf

image TO CREATE THE CARBON SPACE FOR THE 980 MILLION POOR PEOPLE IN THE COUNTRY TO DEVELOP WITHOUT HEATING THE PLANET, INDIA NEEDS TO REDUCE THE CO_2 EMISSIONS OF ITS RICHER 150 MILLION CITIZENS.

table 8: **Per capita CO_2 emission of different income classes from this study compared with average national values from WRI and Climate Injustice Quotient (CIQ) calculated for different income classes as well as for average national values[12].**

COUNTRY/INCOME CLASS	POPULATION (IN MILLION)	SHARE OF WORLD POPULATION (%)	GHG EMISSIONS (IN MILLION TONNES)	SHARE OF GLOBAL EMISSIONS (%)	CIQ	CO_2 EMISSION IN TONNES/PER CAPITA
USA	298	4.45	6871.7	20.38	4.58	23.06
RUSSIA	142	2.12	1915.7	5.68	2.68	13.49
GERMANY	82	1.22	1013.3	3.01	2.46	12.36
UK	60	0.9	658.8	1.95	2.18	10.98
JAPAN	127	1.9	1351.5	4.01	2.12	10.64
FRANCE	60	0.9	518.4	1.54	1.72	8.64
WORLD	6700	100	33733.93	100	1	5.03
INDIA: MONTHLY INCOME >30K	9.96	0.15	49.52	0.15	0.99	4.97
BRAZIL	188	2.81	849.5	2.52	0.9	4.52
CHINA	1310	19.55	4963.1	14.72	0.75	3.79
INDIA: MONTHLY INCOME 15 – 30K	18.8	0.28	58.61	0.17	0.62	3.12
INDIA: MONTHLY INCOME 10 – 15K	53.24	0.79	146.62	0.43	0.55	2.75
INDIA: MONTHLY INCOME 8 – 10K	69.18	1.03	188.68	0.56	0.54	2.73
SUSTAINABLE AVERAGE PER CAPITA CO_2 EMISSIONS TO KEEP TEMPERATURE RISE BELOW 2 DEGREE C						2.5
INDIA: MONTHLY INCOME 5 – 8K	155.73	2.32	355.24	1.05	0.45	2.28
INDONESIA	245	3.66	504.6	1.5	0.41	2.06
INDIA	1129.86	16.86	1889.1	5.6	0.33	1.67
INDIA: MONTHLY INCOME 3 – 5K	390.8	5.83	605.13	1.79	0.31	1.55
INDIA: MONTHLY INCOME < 3K	432.16	6.45	481.85	1.43	0.22	1.11
BANGLADESH	147	2.19	122.4	0.36	0.16	0.83

Though all the Indian income classes stay below the world average per capita CO_2 emission, unfortunately such a view misses out the third dimension of climate justice. Namely that the global distribution of CO_2 emissions needs not only to be equitable, but also sustainable. Today's CO_2 emissions already lead to a steady increase of global temperature, and with a global population still rising, an average CO_2 emission of 5 tonnes would drive the planet into a state of climate crisis.

To achieve the needed reduction of global CO_2 emissions to check climate change, average world CO_2 emissions needs to be brought down to 2.5 tonnes per capita by 2030[13]. In India 150 million people who today earn more than 8000 rupees per month already emit more than 2.5 tonnes CO_2 per annum (sustainable global average per capita CO_2 emission). To create the space for the remaining 980 million people in the country to develop without heating the planet above 2 degree centigrade, India needs to find ways to reduce the CO_2 emissions of the upper 150 million people.

references

[12]http://cait.wri.org

[13]http://timeforchange.org/CO2-cause-of-global-warming

conclusions and recommendations

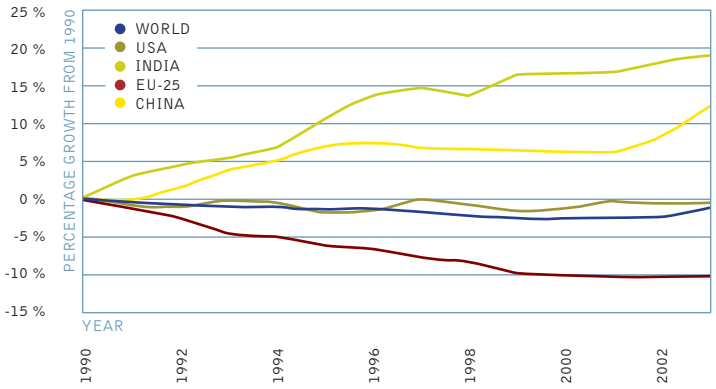
DECARBONISING DEVELOPMENT, MITIGATING AND ADAPTING TO CLIMATE CHANGE

image VILLAGER ANIL CHANDRA DAS STANDS ON THE AREA WHERE HIS HOUSE USED TO STAND ON GHORAMARA ISLAND, SUNDARBANS. TODAY, DURING HIGH TIDES HIS FORMER HOME IS SUBMERGED.

This study clearly shows that Indian climate politics fall short if it only refers to national per capita CO_2 levels. As at the international level, where there is common but differentiated responsibility, there needs to be a intra-national common but differentiated responsibility too. Developed nations need to cut their CO_2 emissions not only to prevent climate change but also to give space to the developing world to catch up, without cooking the planet. The same is true within India; if the upper and the middle class do not manage to check their CO_2 emissions, they will not only contribute to global warming, they will also deny the hundreds of millions of poor in the country, those who will be the most severely impacted by climate change, access to development. As long as economic growth is not decarbonised, the simplistic view that economic growth will automatically result in an increase in prosperity for all stands disproved. It is now accepted by scientists and economists that increasing CO_2 emissions due to economic development will destroy the foundation of millions of livelihoods[14] on this planet. In order to build social justice in the country, India not only has to put pressure on the developed world to cut their CO_2 emissions, it also needs to do its share to mitigate climate change.

So does India need to stay poor and should the burgeoning middle class stop consumption and abandon the new found upward mobility? Not necessarily, if India manages to decarbonise its development. For the year 2003 the World Resource Institute ranked India as the country with the 14th worst Carbon Intensity of Electricity production in the world (with a conversion factor of 0.81 kg of CO_2/kWh). The Indian government presently even refers to a conversion factor of 0.87 kg/kWh)[15] India is worse than China which ranks 24 with 0.71 kg/Kwh, Bangladesh ranks 44 with 0.55 kg/kWh and Pakistan with 0.41 kg/kWh. The high carbon intensity of electricity in India is due to a 67% share of coal (as the major fossil fuel) in the production of electricity. Coal produces more carbon dioxide per kWh than other fossil fuels. The efficiency of Indian coal power plants is very low (only 30%) and the quality of coal is poor.

graph 6: **Carbon intensity of energy used between 1990 and 2003 from WRI for different countries**



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[14]www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm
[15]https://mnes.nic.in/baselinepdfs/chapter2.pdf

But the high carbon intensity of energy production is not by accident, it is a deliberate decision of the government. Between 1990 and 2003 (see Graph 6) the carbon intensity of India's electricity generation has already increased by more than 15%. If the government moves according to its plans, the future will look grim. A look at the 11th and the 12th 5 year plans shows us that the Indian government is planning a major expansion of power generation through the construction of coal power plants. A revision of these plans is clearly needed. India does not need mega coal power plants that generate 4000 Mega Watts. What is needed is higher efficiency, Combined Heat and Power generation (CHP), transforming the otherwise wasted heat into cold air for air-conditioning and most importantly the switch from fossil to renewable energies like wind, solar and biomass. For a more detailed analysis of how Indian power generation could be decarbonised one should refer to the study "Energy [R]evolution, a Sustainable India Energy Outlook" by the DLR, Institute of Technical Thermodynamics Germany and Greenpeace .

With the decarbonisation of Energy production, the use of electricity in households will automatically become more climate friendly. In the EU-25 with a carbon intensity of 0.38 kg of CO_2/kWh, a consumer could watch more than twice as much TV as an Indian and produce the same amount of CO_2. But the potential to decarbonise the economy and India's consumption, does not stop with power generation in the country. As already illustrated by the proposed phase out of inefficient lighting in the chapter on 'Results' above, the adoption of minimum efficiency standards for all products needs to drive the consumer markets so as to only make available energy efficient products. As India faces up to a potential future of dangerous climate change, inefficient products should be considered hazardous and, like toxic substances, prohibited.

Last but not least, the rich income classes need to acknowledge that their wealth and freedom to consume, adds to the increasing crisis and poverty of the poor. Lifestyles with excessive carbon emissions are similar to a smoker smoking in a room: they not only affect the smoker, but others around as well. As discussed in the Introduction, it impacts mostly the ones who have contributed least to the problem.

Carbon Credits and Carbon tax

Developed nations as much as rich income classes are the major contributors to climate change and therefore, in line with the polluter pays principle, they should also carry the responsibility to check climate change. Nevertheless, quite often significant CO_2 cuts can be achieved by investments in developing economies or by improving efficiency in lower income classes.

The Kyoto Protocol established a global market in emission reduction credits. A part of that market is the Clean Development Mechanism (CDM) by which industries in developed economies can finance emission reducing projects in developing countries, and use the resulting carbon credits to help meet their own domestic reduction targets. Until today millions of US dollars have been generated to be invested in the reduction of GHG emissions. Although the mechanism is called 'Clean Development', a lot of carbon credits do little for the development of the country. For example, huge amounts of carbon credits are used to burn HFCs (very potent GHGs used in cooling systems) instead of investing the money in shifting the refrigeration industry to the usage of available climate friendly alternatives (Hydro Carbons).

Acknowledging that even with decisive action we will only be able to keep temperature rise to less than 2 degrees centigrade, some increase in climate related disasters and permanent degradations of land and livelihoods cannot be avoided. So countries not only have to invest in the reduction of GHG emission reduction, they also have to spend money to adapt to climate change. This adaptation ranges from building sea walls to adjusting agricultural production to higher temperatures and varying rainfall. It even includes the build up of insurances to balance increasing economic risk from destructive weather events. Again, wealthier developed nations will have far stronger potential to adapt than poorer countries. To facilitate a financial transfer between developed nations responsible for climate change and developing nations that require funds for adaptation, an adaptation fund has been established. The adaptation fund is fed by a share of proceeds from CDM projects and other sources.

The third pillar to combat climate change is to increase the individual adaptation potential of the public. Higher income classes usually have a higher adaptation potential to climate impacts than poor people. They are more mobile as their assets are more diversified, and are not so dependent on marginal land that can get washed away. Prosperous income classes can afford insurance to cover for emergencies and damages. Combating climate change therefore also implies the economic empowerment of the poor to boost or to build their individual adaptation potential, e.g. investing Carbon credits in poverty alleviation and building carbon extensive economies in the rural areas of India.

The Indian government should prioritize investments to mitigate and adapt to climate change that at the same time attempt to close the gap between the rich and the poor classes and improve their individual adaptation potential.

While the Indian government calls for and utilizes international carbon markets to finance mitigation and adaptation in the country, a similar financial mechanism is absent to acknowledge the differentiated responsibility of income classes within India. For an individual it is harder to predict how much CO_2 (s)he would need in a year, and distribution of carbon quota to all citizens does not sound feasible. However a system that makes people pay for the CO_2 emissions they produce, seems realistic. In other words the Indian government should develop a carbon tax system. Under this, while the use of fossil fuels will be taxed, the money will be used for clean development projects like the electrification of rural areas with renewable energy or to subsidize the distribution of efficient technology to the poor (e.g. CFLs). The money could also be used for adaptation to climate change.

reference

[16]http://www.greenpeace.org/india/press/reports/india-energy-revolution

GREENPEACE

Greenpeace is a global organisation that uses non-violent direct action to tackle the most crucial threats to our planet's biodiversity and environment. Greenpeace is a non-profit organisation, present in 40 countries across Europe, the Americas, Asia and the Pacific. It speaks for 2.8 million supporters worldwide, and inspires many millions more to take action every day. To maintain its independence, Greenpeace does not accept donations from governments or corporations but relies on contributions from individual supporters and foundation grants.

Greenpeace has been campaigning against environmental degradation since 1971 when a small boat of volunteers and journalists sailed into Amchitka, an area north of Alaska, where the US Government was conducting underground nuclear tests.This tradition of 'bearing witness' in a non-violent manner continues today, and ships are an important part of all its campaign work.

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image VILLAGERS FROM THE ISLAND OF MOLKHALI, SUNDARBANS AWAIT THE HIGH TIDE AND HOPE THAT THE RISING SEAS DO NOT BREACH THEIR RECENTLY BUILT DIKES. FLOODING BY SEA WATER CAN RENDER PADDY FIELDS INFERTILE FOR OVER 2 YEARS.