Infrastructure Development of West Bengal: Roads and Energy

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Some Comparative Demographic and Macro Economic data for West Bengal		
	All India	West Bengal
Total Area (thousand sq. km.)	3287.6	88.752
Total Population (in million)	1144.7	86.99
Density of population (number per sq km)	348	980
PCNDP at 2004-05 prices for 2008-09 (Rs)	31801	27928
Growth rate of economy (GDP/GSDP) 2004-05 to 2008-09	8.92	7.00
Elasticity of WB income w.r.t. Indian GDP	-	0.81

State\UT	PCNSDP at (2004-05) prices for 2008-09	Rank	GSDP Grth rate (%)	Rank	elasticity	Rank
A & N islands	55266	5	10.81	4	1.254	5
Andhra Pr.	34716	18	8.95	16	1.018	16
Arunachal Pr.	34826	17	8.81	17	1.021	15
Assam	19063	29	5.49	30	0.694	30
Bihar	10985	32	10.65	6	1.302	3
Chandigarh	88284	2	9.95	9	1.214	7
Chattisgarh	23926	24	10.20	7	1.210	8
Delhi	82777	3	10.66	5	1.242	6
Goa	90801	1	8.77	18	1.017	17
Gujarat	44861	9	9.91	10	1.148	10
Haryana	51016	7	9.80	11	1.139	11
Himachal Pr.	46019	8	8.32	20	0.981	20
J & K	25421	23	5.75	29	0.695	29
Jharkhand	19735	28	5.27	32	0.624	32
Karnataka	37177	15	8.95	15	0.992	18
Kerala	42646	11	8.54	19	0.990	19
Madhya Pr.	18540	30	7.06	26	0.818	26
Maharashtra	53640	6	11.11	3	1.259	4
Manipur	21169	27	5.47	31	0.673	31
Meghalaya	29633	21	7.29	23	0.889	22
Mizoram	31921	19	9.97	8	1.156	9
Nagaland	38921	13	7.86	22	0.881	23
Orissa	22465	26	9.69	12	1.091	14
Pondicherry	69760	4	9.64	13	1.091	13
Punjab	40839	12	7.90	21	0.913	21
Rajasthan	23101	25	7.15	25	0.846	25
Sikkim	35398	16	12.72	2	1.594	2
Tamil Nadu	42939	10	9.43	14	1.110	12
Tripura	31156	20	6.77	28	0.769	28
Uttar Pradesh	15613	31	7.18	24	0.852	24
Uttarakhand	38624	14	14.36	1	1.596	1
West Bengal	27928	22	7.00	27	0.812	27

- Role of Infrastructure in growth and poverty alleviation.
- Infrastructural Index of the Eleventh Finance Commission, Poverty and level of Development
- Infrastructural Index based on eight major sectors classified under economic (agriculture and irrigation, banking, electricity, transport, communication), social (education and health) and administrative (civil administration).

States	Index of Infrastructure 2000	Rank for infra index	Per Capita Net State Domestic Product for 2004-05	Rank for pcnsdp	Poverty Headcount Ratio (%)	Rank for poverty ratio
Andhra Pradesh	103.3	11	25321	12	29.9	7
Arunachal Pradesh	69.71	19	27719	9	31.1	8
Assam	77.72	16	16782	16	34.4	13
Bihar	81.33	14	7914	19	54.4	18
Goa	200.57	1	76426	1	25	5
Gujarat	124.31	6	32021	6	31.8	10
Haryana	137.54	5	37842	2	24.1	4
Himachal Pradesh	95.03	13	32564	5	22.9	3
Karnataka	104.88	10	26804	10	33.4	11
Kerala	178.68	3	31871	7	19.7	1
Madhya Pradesh	76.79	17	15442	17	48.6	17
Maharashtra	112.8	7	35915	3	38.1	15
Orissa	81	15	17380	15	57.2	19
Punjab	187.57	2	33103	4	20.9	2
Rajasthan	75.86	18	18565	14	34.4	14
Sikkim	108.99	9	26693	11	31.1	9
Tamil nadu	149.1	4	30062	8	28.9	6
Uttar Pradesh	101.23	12	12950	18	40.9	16
West Bengal	111.25	8	22649	13	34.3	12

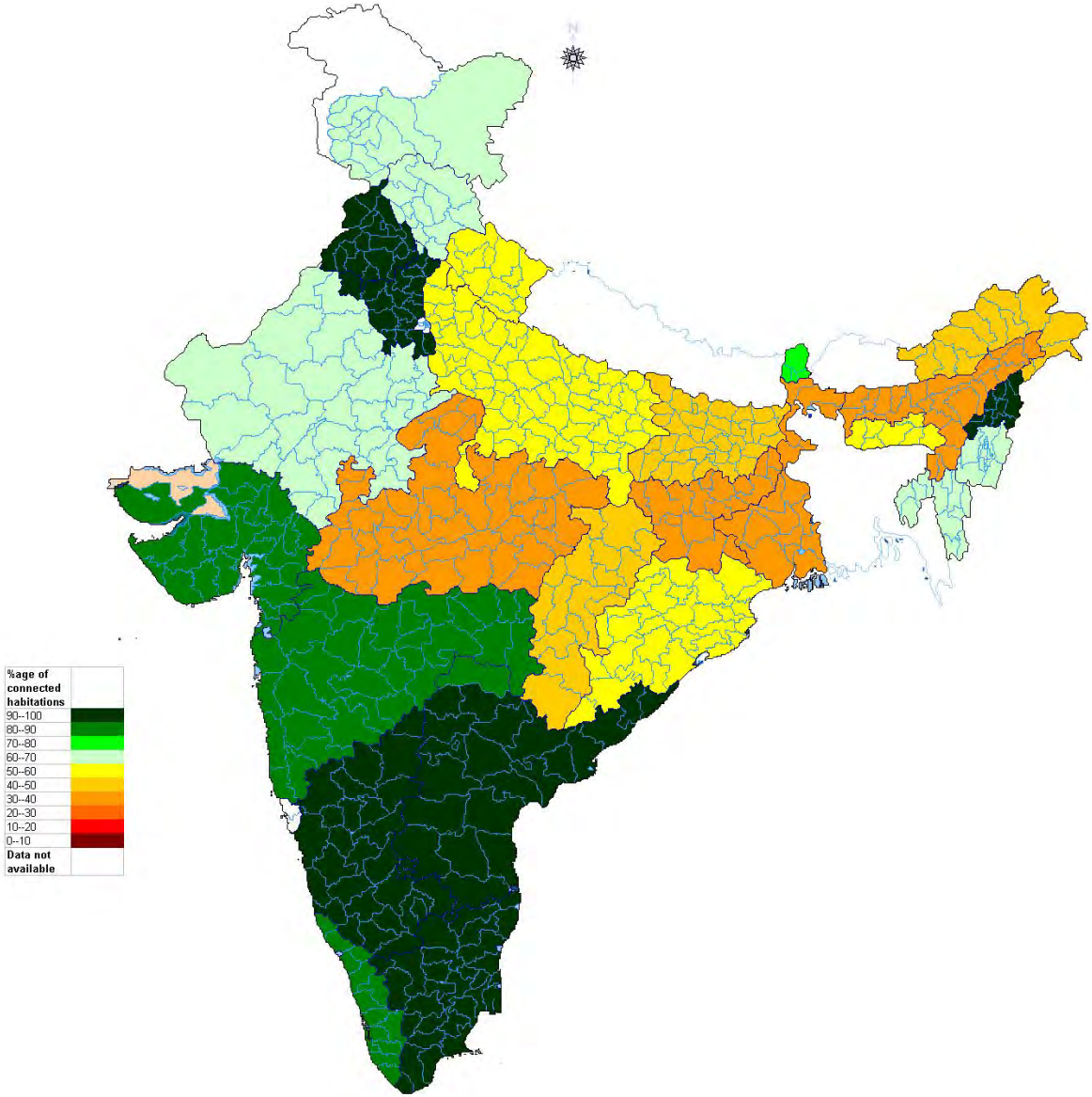
- Rank Correlation between Infrastructure and the Per capita NSDP for 2004-05 is 0.71

- Rank Correlation between Infrastructure and Poverty Headcount ratio is 0.62

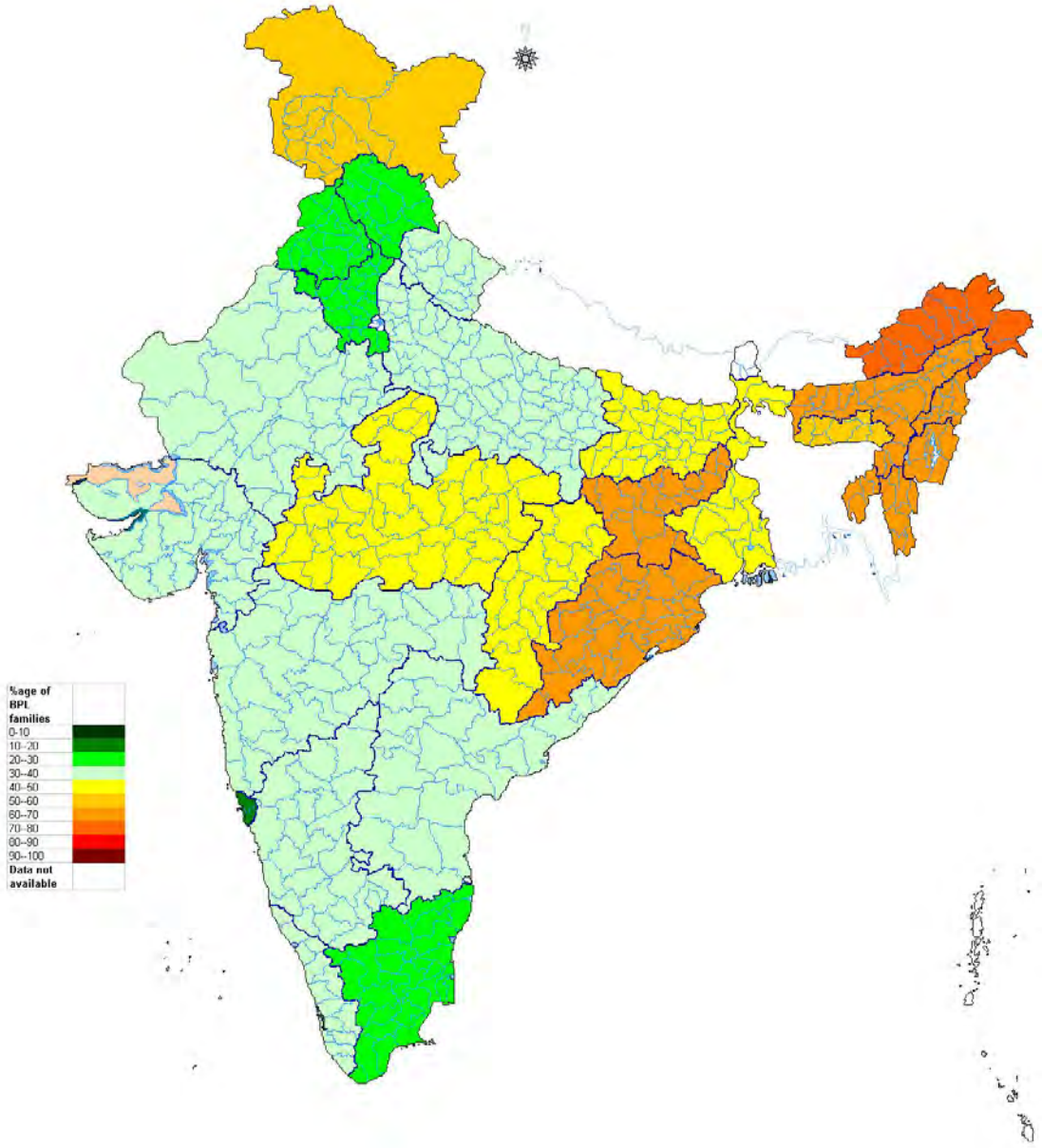
- Critical Infrastructural Sectors:
  1. **Water**
  2. **Roads and Highways**
  3. **Power and Energy**

- We now focuss on (2) and (3).
- Accessibility, Poverty and stage of development
- Comparative map of Poverty and Accessibility of West Bengal vis-à-vis All India

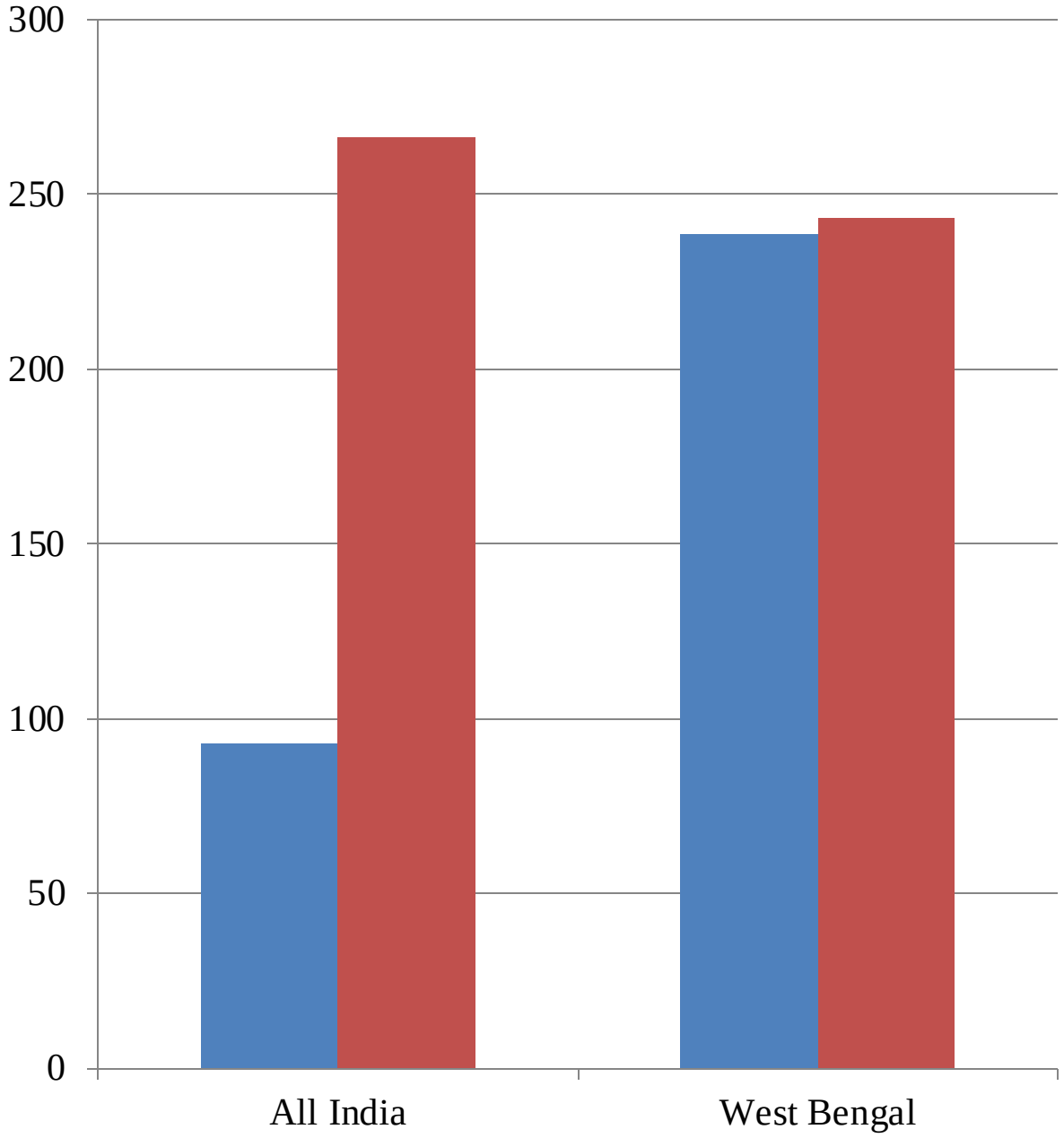
State-wise Status of Rural Accessibility in India



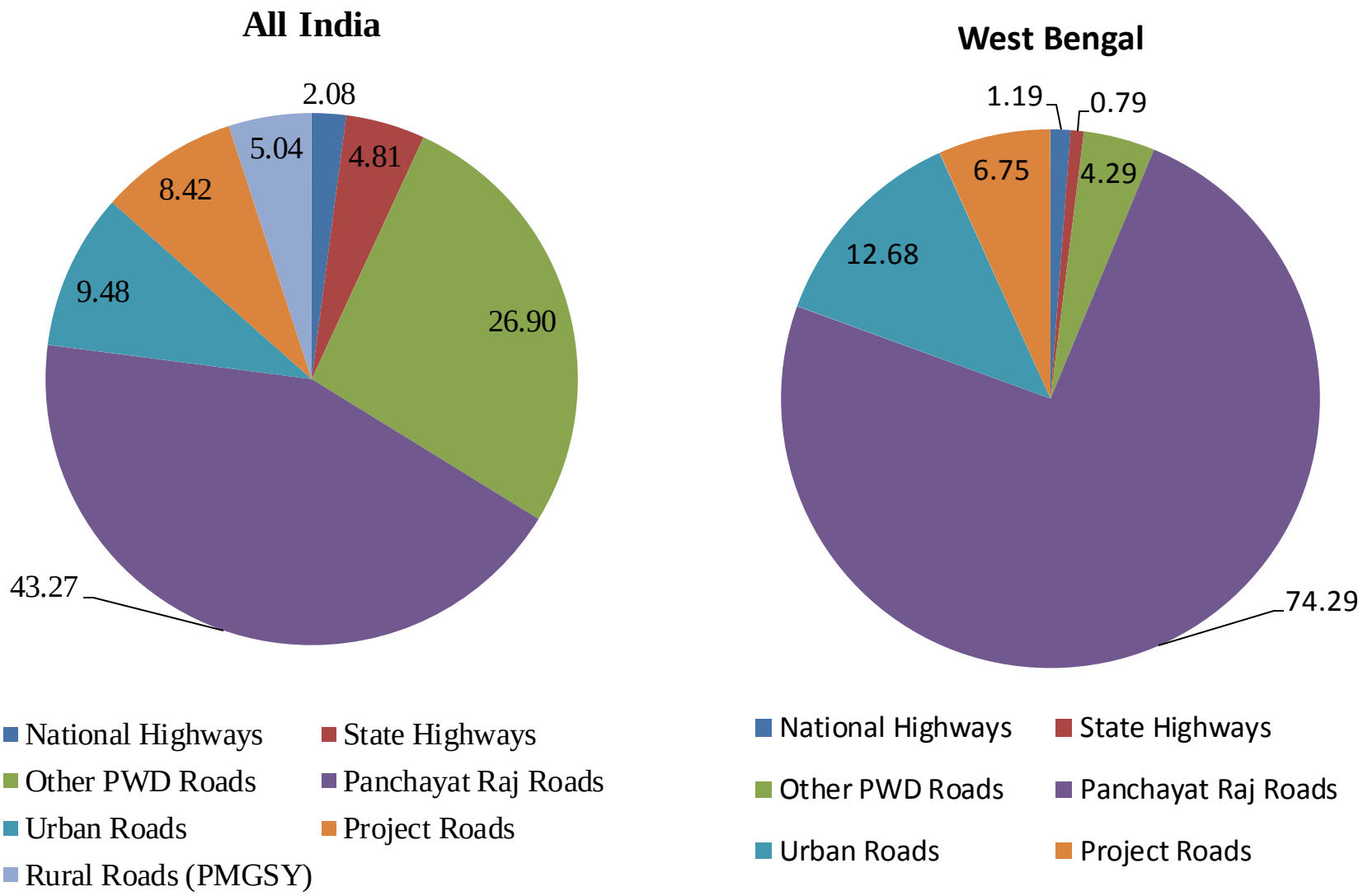
State-wise Incidence of Poverty in India



Some Comparative Road Statistics and Macro Economic data for West Bengal		
	All India	West Bengal
Total Area (thousand sq. km.)	3287.6	88.752
Total Population (in million)	1144.7	86.99
Density of population (number per sq km)	348	980
Road density(in kms) per 100 sq. kms of area)	92.72	238.61
Road length (in kms) per one lakh of population	266.24	243.43
PCNDP at 2004-05 prices for 2008-09 (Rs)	31801	27928



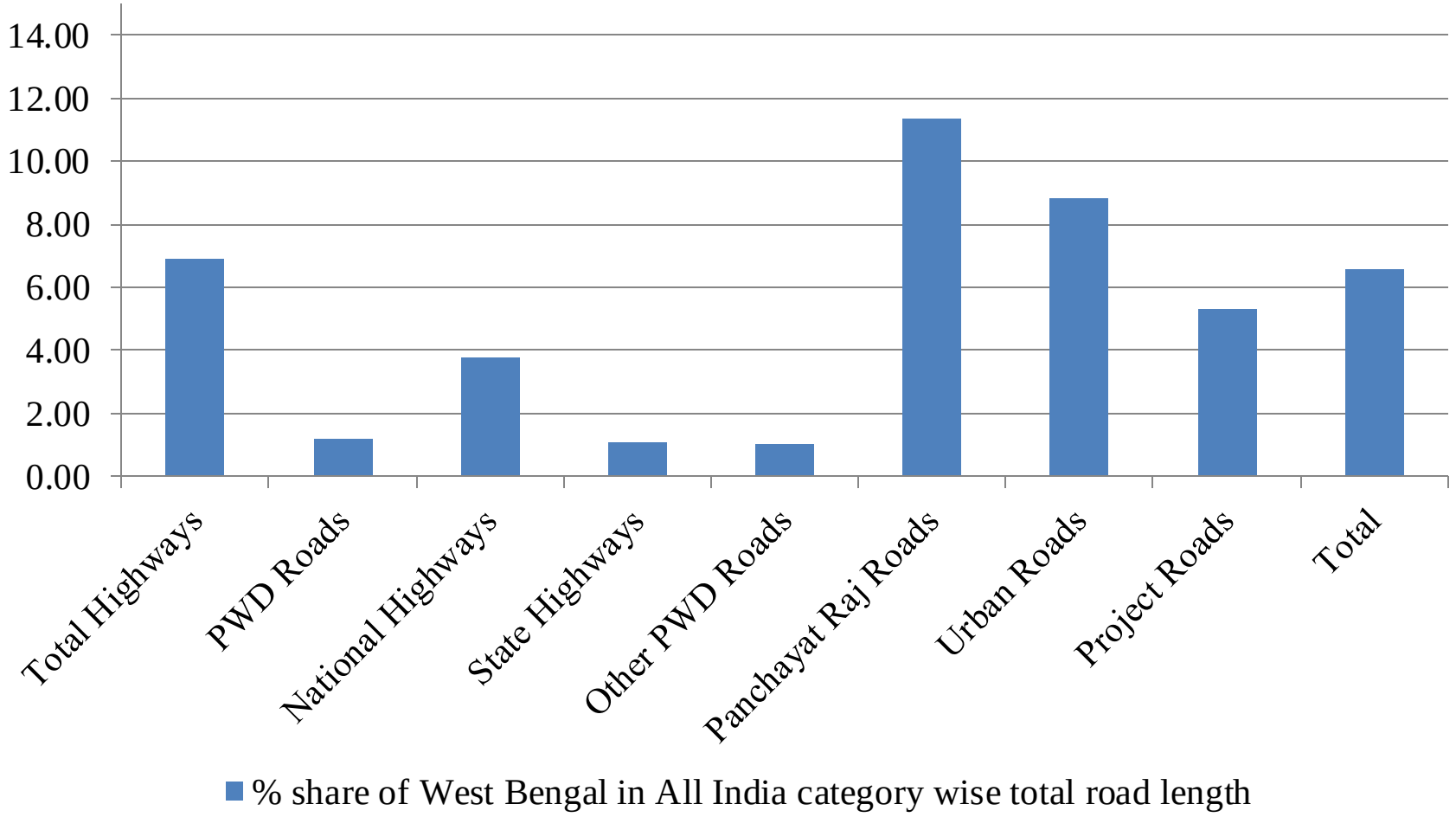
Rank correlation between Per Capita NSDP and Road Density across states: 0.617


All India
2.08
4.81
26.90
43.27
9.48
8.42
5.04
National Highways
State Highways
Other PWD Roads
Panchayat Raj Roads
Urban Roads
Project Roads
Rural Roads (PMGSY)
West Bengal
1.19
0.79
4.29
74.29
12.68
6.75
National Highways
State Highways
Other PWD Roads
Panchayat Raj Roads
Urban Roads
Project Roads

All India and West Bengal Comparison (as on March 31st, 2008) in %

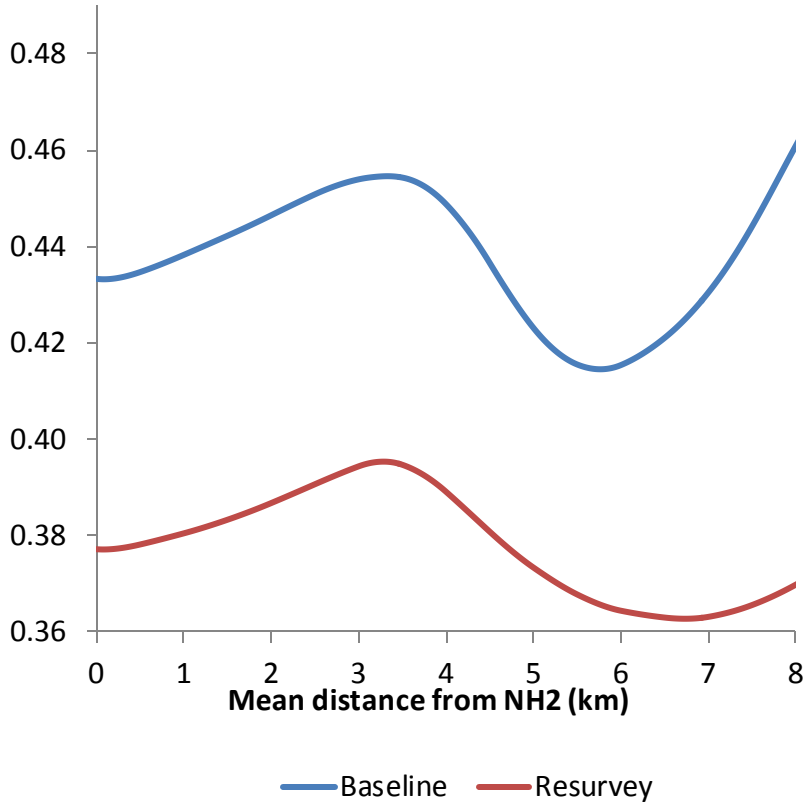
	All India		West Bengal	
India/category	% of surfaced in total	% of motorable in total	% of surfaced in total	% of motorable in total
1. PWD Roads	86.57	94.56	98.83	99.58
1.1 National Highways	100.00	100.00	100.00	100.00
1.2 State Highways	98.85	99.82	100.00	100.00
1.3 Other PWD Roads	83.34	93.20	98.30	99.38
2. Panchayat Raj Roads	33.50	69.19	7.98	29.83
3. Urban Roads	69.91	92.30	66.44	85.04
4. Project Roads	27.45	70.95	39.02	73.07
5. Rural Roads (PMGSY)	100.00	100.00	-	-
Total	57.73	81.66	23.19	44.13

Percentage share of West Bengal in All India category-wise total road length

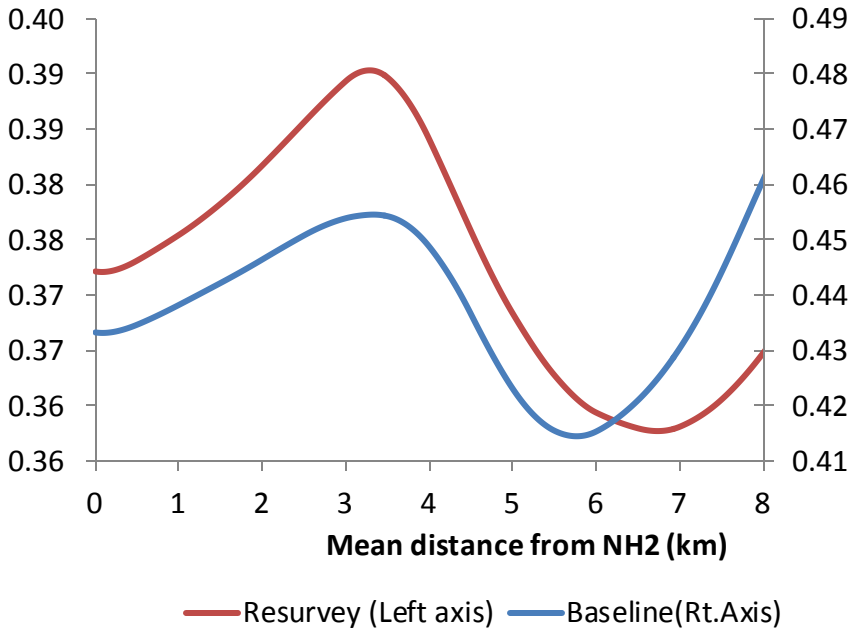


Proportion of Poor Households Based on Poverty Line Measured in Terms of MPCE
(monthly per capita consumption)

Shift of Curve

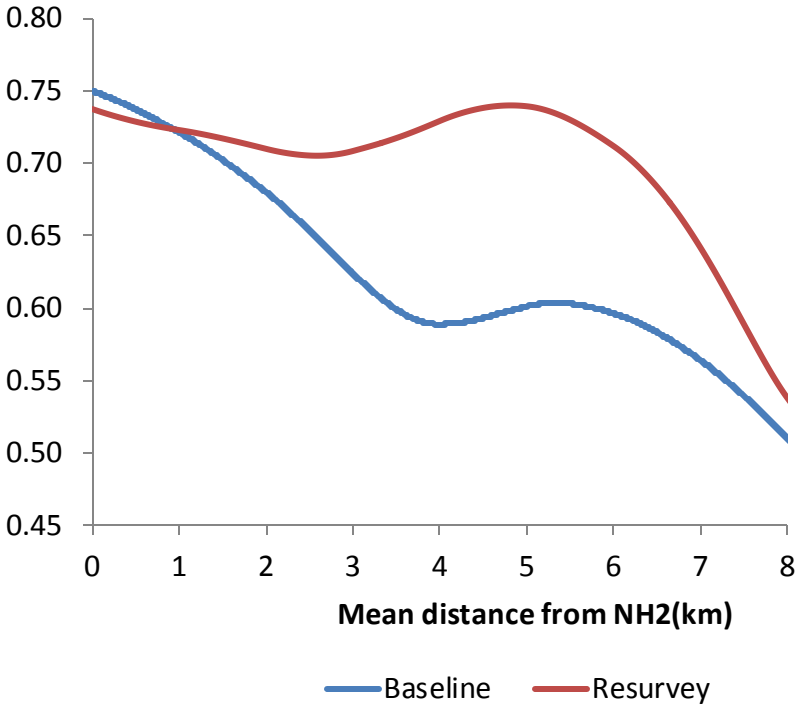


Gradient Change

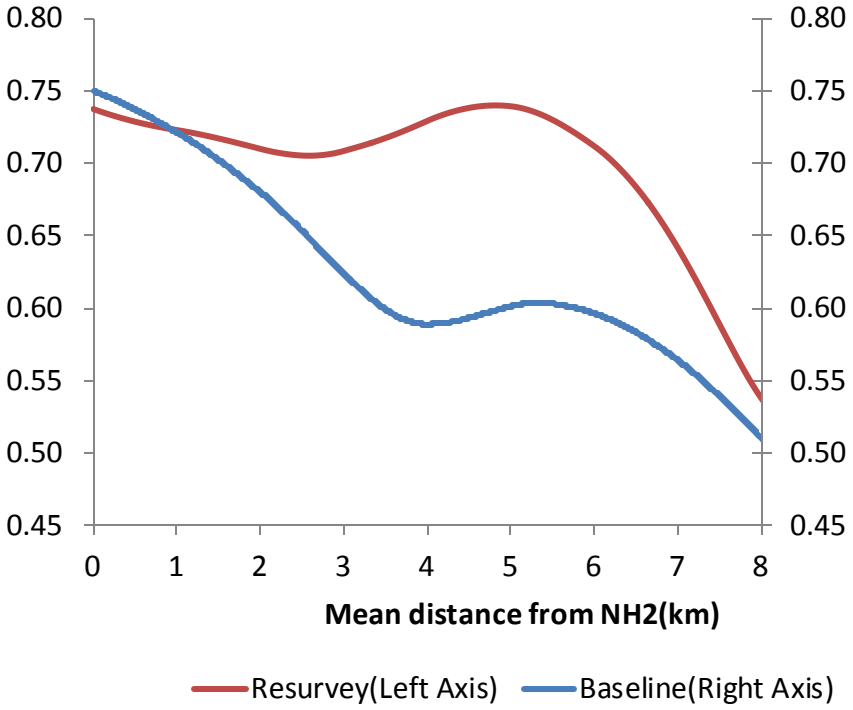


Per Capita Trip Rate for Work

Shift of Curve



Gradient Change



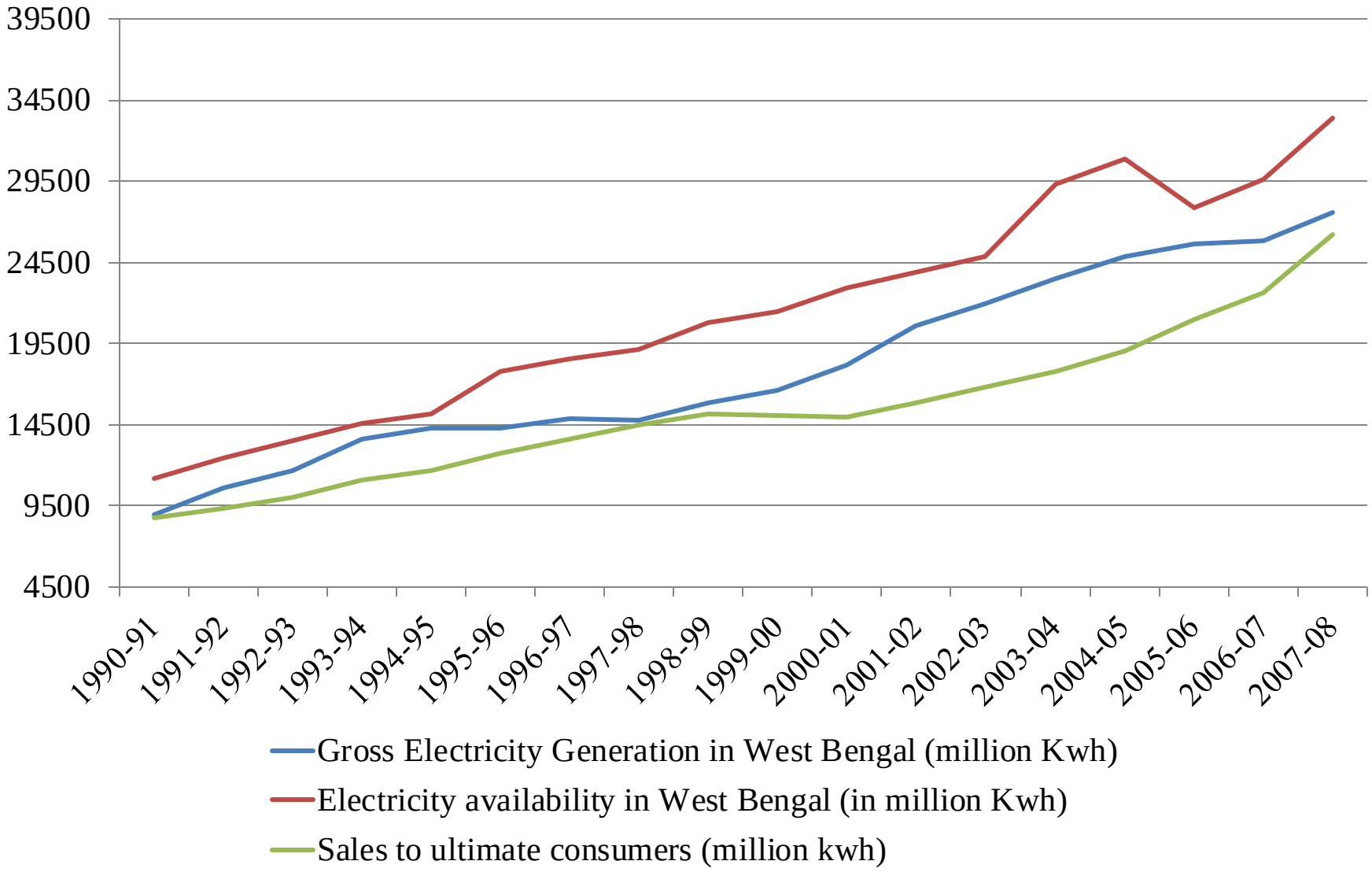
- Access to infrastructure needs to be integrated into poverty alleviation programmes. In fact, there is a strong case for viewing the access to services, knowledge, markets, etc. in a non-technocratic and essentially political manner. It is the obligation of the state to provide access to services whether by locating them close to the people or by bringing people to the services through transport.

- Here, the 'public good' aspect of transport assumes an added and politically significant meaning. Fixed transport infrastructure, such as roads, constitutes such a 'public good' and this at once raises the issue of entitlements. An entitlement is another name for a right. If the MDGs are to be achieved, it is necessary that a new perspective on transport – one deriving from the idea of access as an entitlement – is adopted.

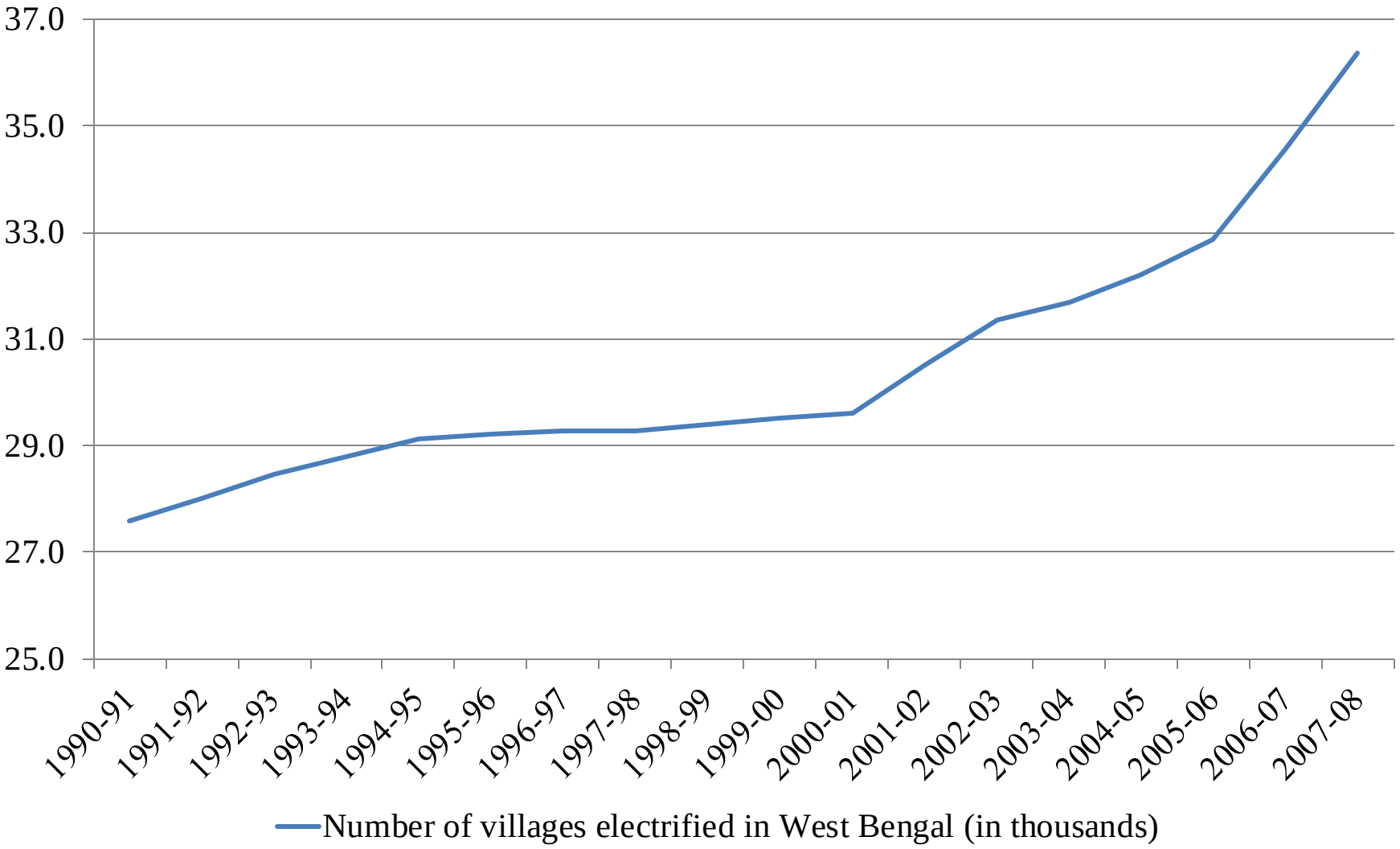
- The traditional cost-benefit analyses of projects have not helped in the provision of rural access infrastructure. They underplay, if not disregard, most of the indirect benefits (dynamic externalities) which are characteristic of a rural infrastructure project. A joint study undertaken by UNESCAP and AITD concludes that most of the benefits that flow from these projects are likely to be indirect and intangible generating significant beneficial externalities. Although these benefits pose measurement problems, it is these very benefits which are likely to be of paramount importance in projects like rural roads, irrigation, education, health and housing.

- To reiterate, given the direct correlation between the provision of transport and access on the one hand and poverty reduction on the other, it is a matter of concern that due and explicit attention has not been focused on this crucial linkage. This calls for remedial action aimed at making access and transport integral parts of national poverty-reduction strategies and programmes. Indeed, the issue needs to be recognised as one of political economy, and not merely of technocratic debate.

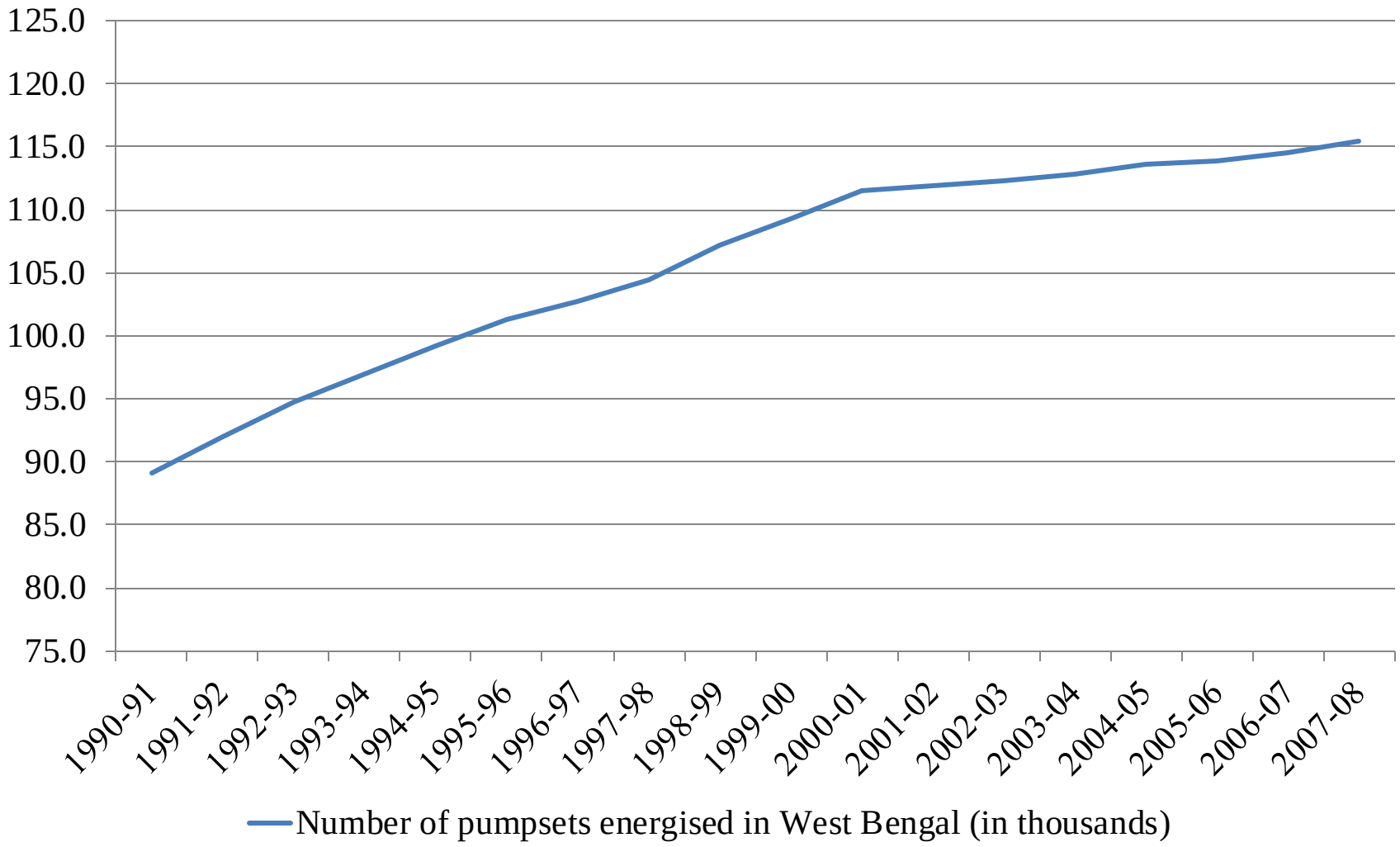
Gross generation, Electricity availability and Sales to Ultimate Consumers in West Bengal, Million Kwh



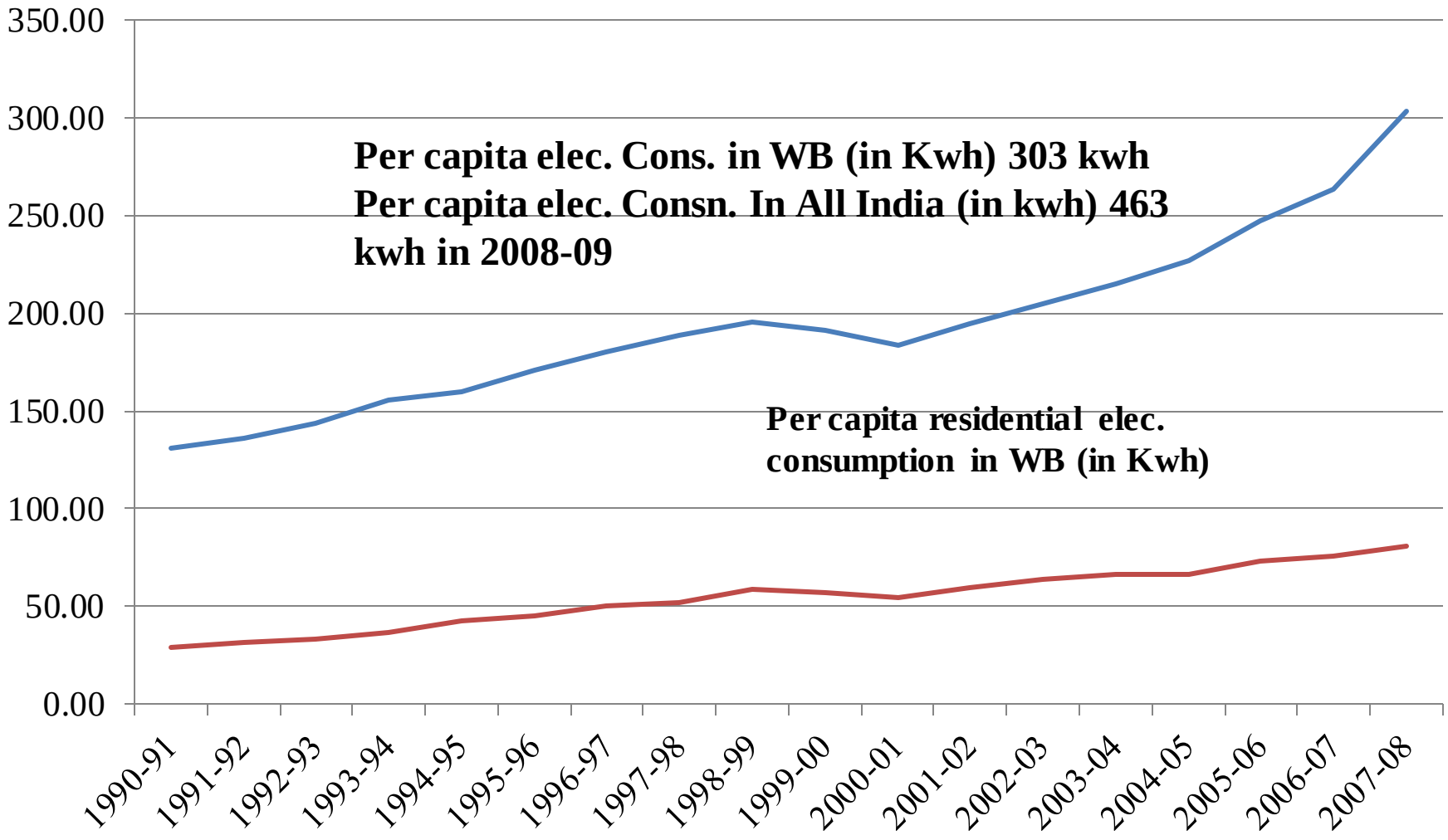
Number of villages electrified in West Bengal (in thousands)

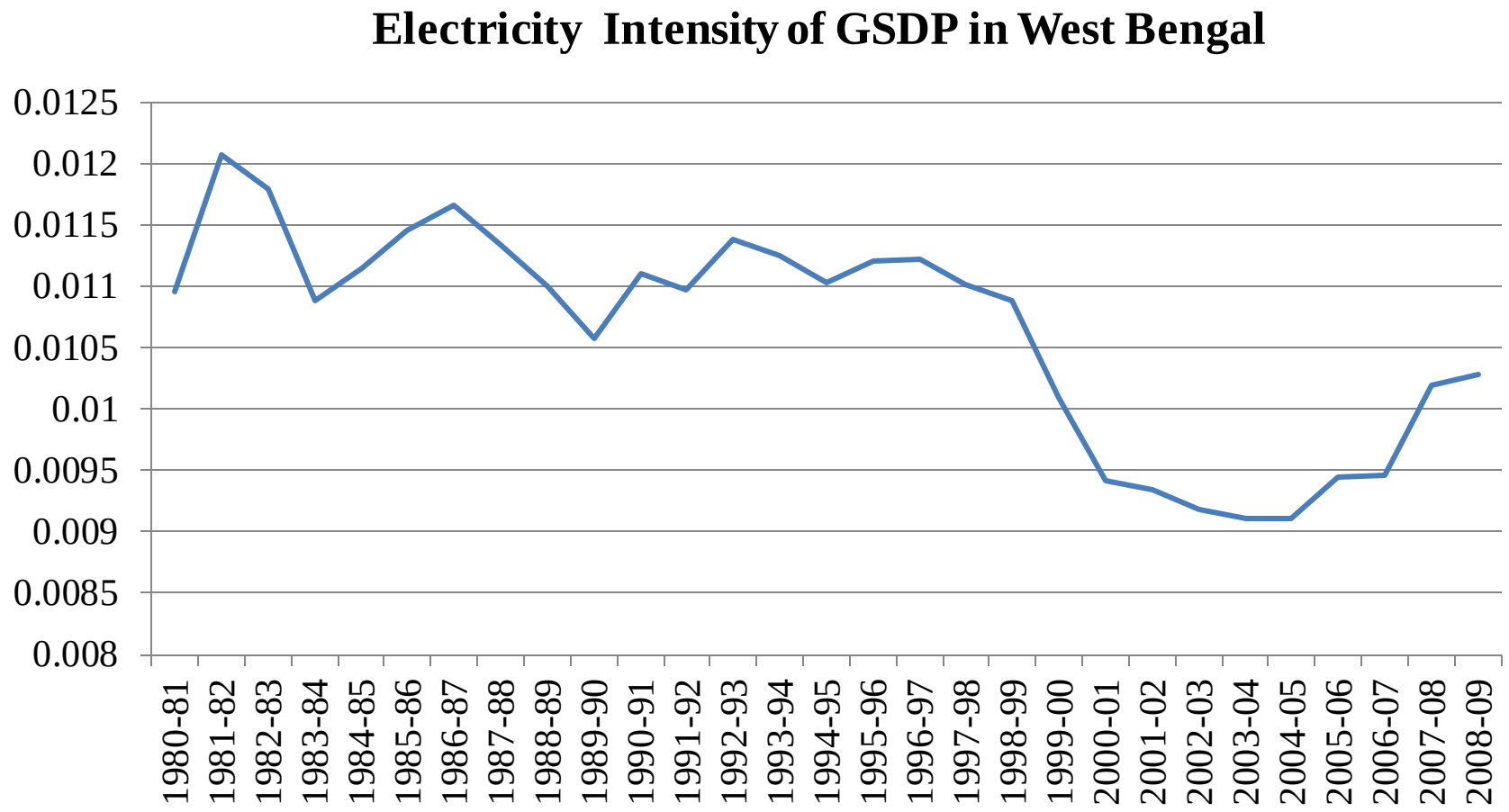


Number of pumpsets energised in West Bengal (in thousands)



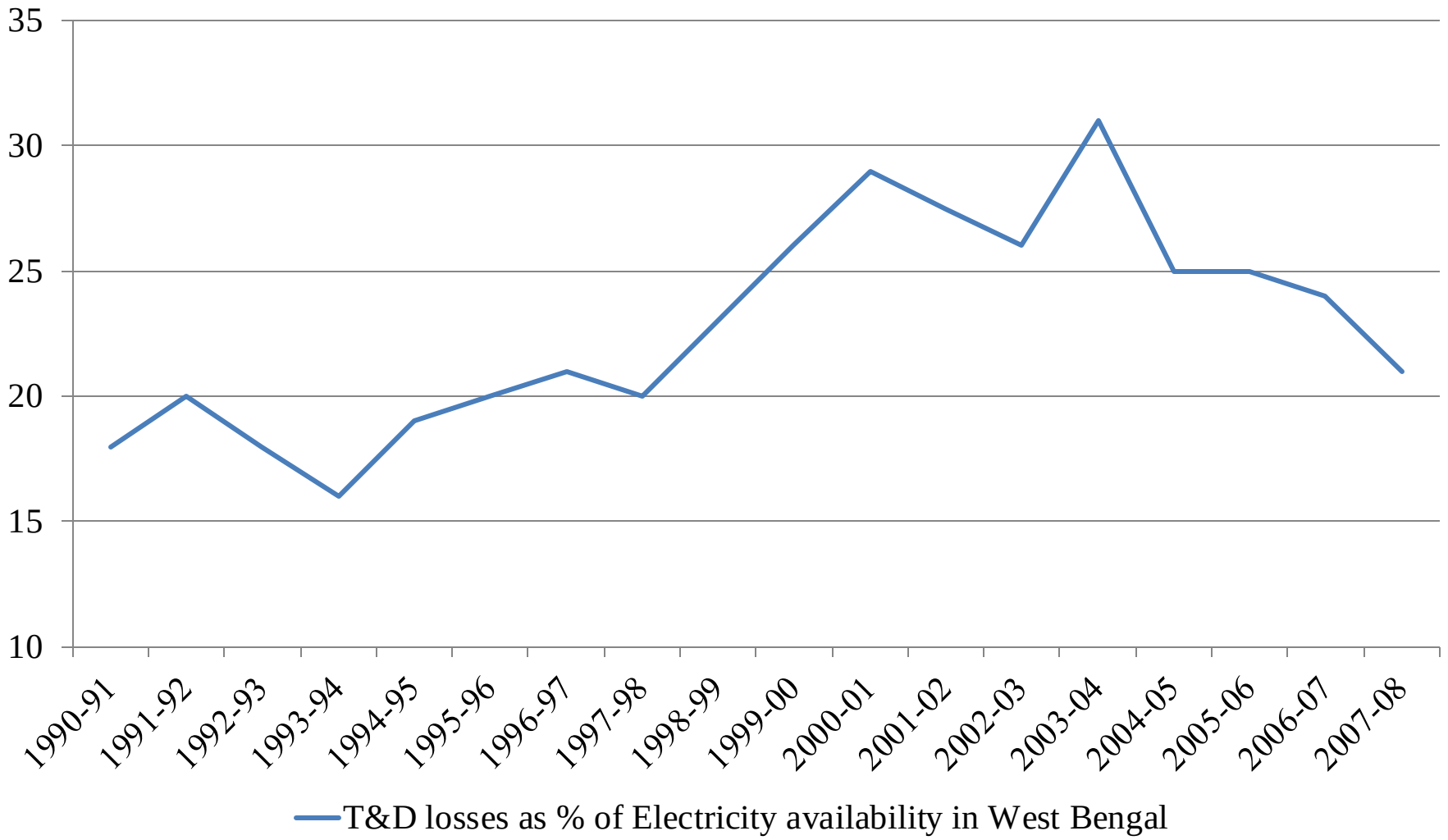
Spearman coefficient of rank correlation	
Per capita NSDP and Per capita consumption of electricity	0.966

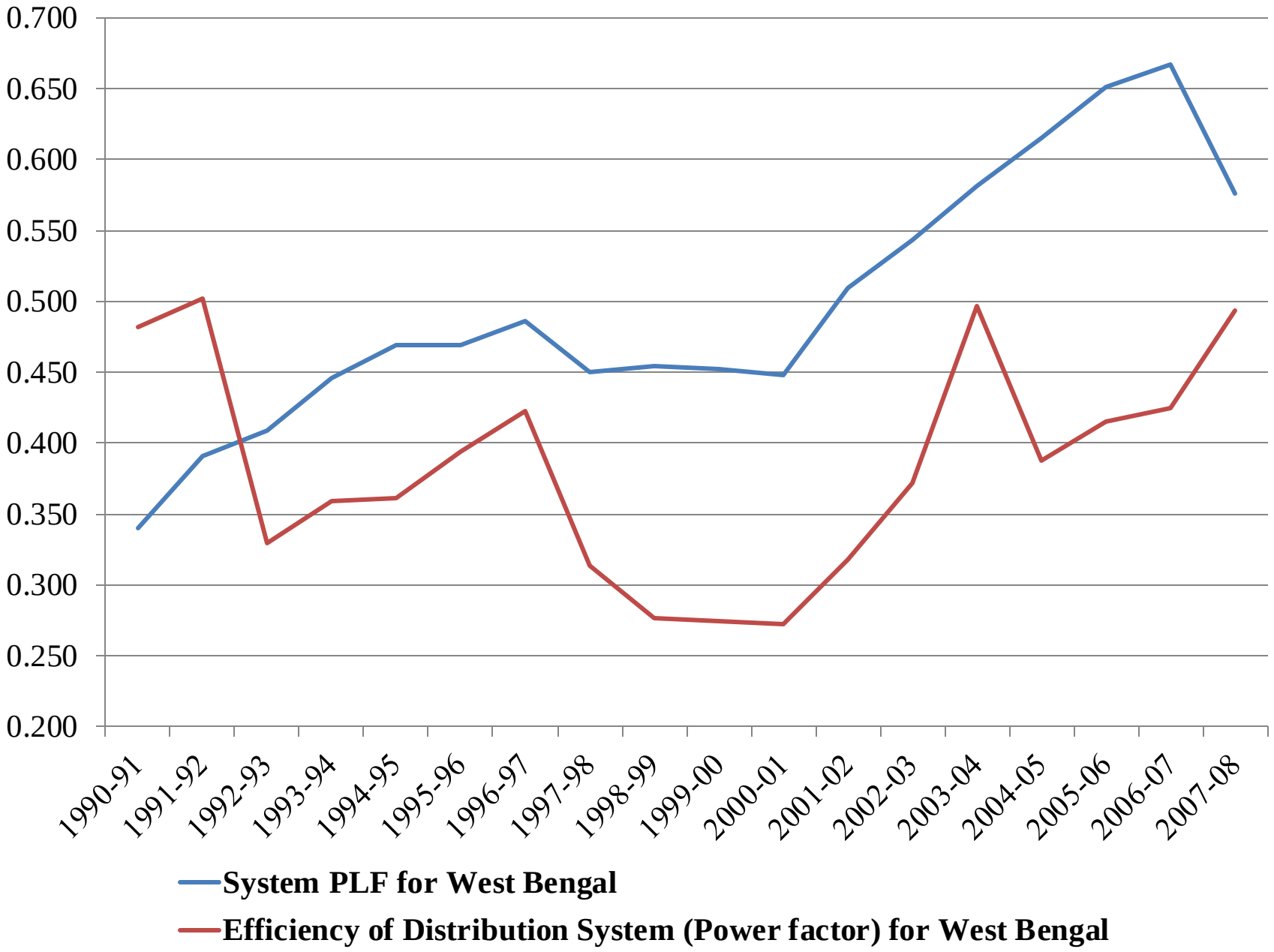




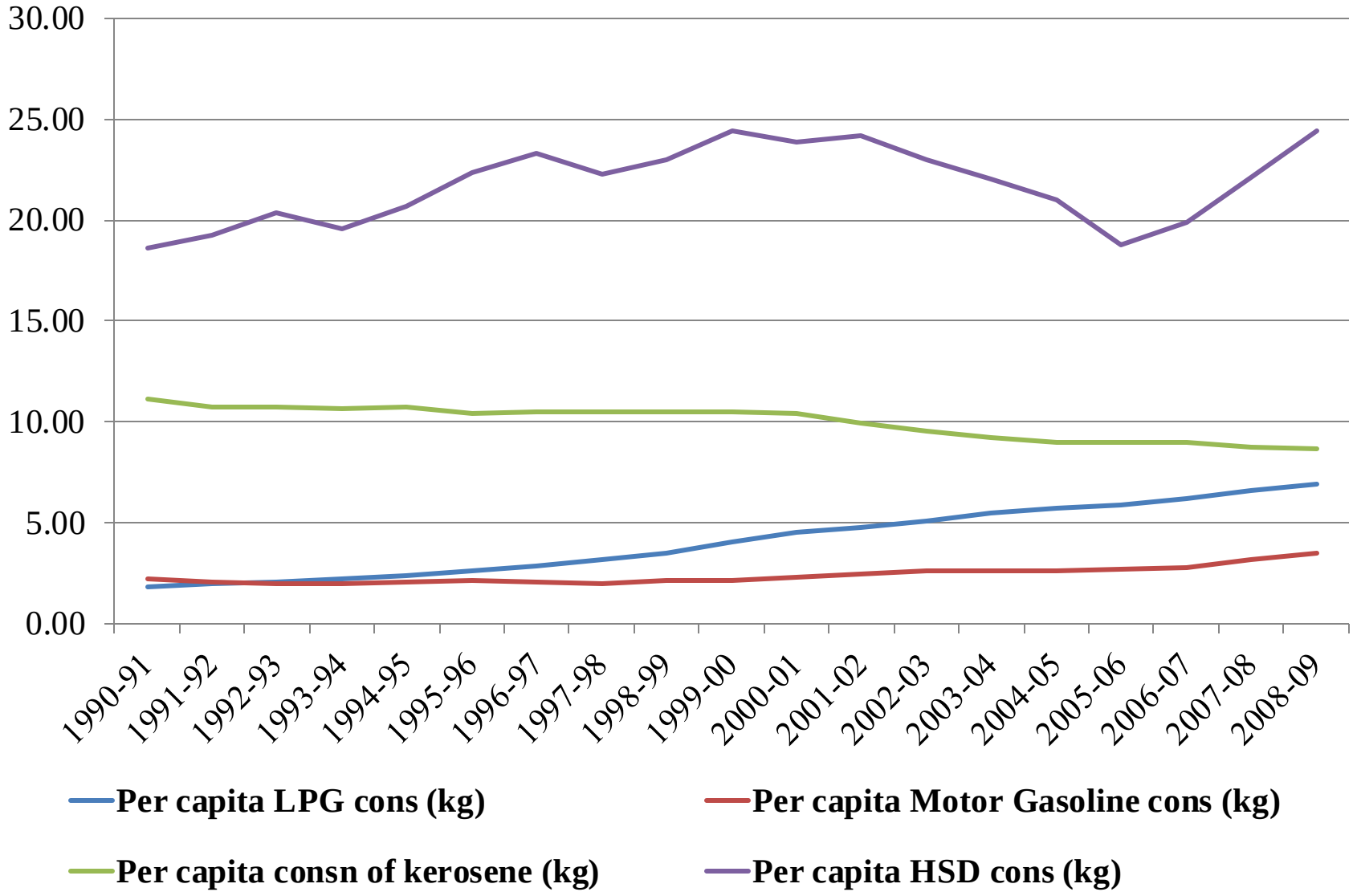
Spearman coefficient of rank correlation	
Per capita NSDP and Electricity Intensity	0.695

T&D losses as percentage of electricity availability in West Bengal




0.700
0.650
0.600
0.550
0.500
0.450
0.400
0.350
0.300
0.250
0.200
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
System PLF for West Bengal
Efficiency of Distribution System (Power factor) for West Bengal

Per capita petroleum products consumption in West Bengal (kg)



Energy poverty:

Concept 1 :

It is the lack of access to clean cooking or lighting fuel which is the basis of concept 1 to define energy poverty. A household is cooking energy poor if it has to depend as principal fuel on biomass. A household will be lighting energy poor if it does not have access to electricity as principal fuel.

	Poverty Ratio (HH) cooking		**Poverty Ratio (HH) lighting**	
	rural sector			
	66th round	61st round	66th round	61st round
INDIA	82.02	84.08	34.41	45.06
WEST BENGAL	77.91	76.88	52.40	65.79

	Poverty Ratio (HH) cooking		**Poverty Ratio (HH) lighting**	
	urban sector			
	66th round	61st round	66th round	61st round
INDIA	18.94	23.42	6.21	7.66
WEST BENGAL	14.18	13.11	7.68	12.73

Energy poverty:

Concept 2 :

The concept is based on subsistence minimum consumption of cooking for cooking energy poverty and lighting for lighting energy poverty. The concept is based on the adequacy or inadequacy of fuels vis-à-vis subsistence requirement in quantitative terms of any fuel composition. With any change in fuel composition, the poverty line in end-use energy terms will change in view of the different lighting and cooking efficiency of the different energy carriers. This concept does not pay attention to cleanliness of the fuel.

Assumptions for Concept2

Minimum useful energy requirement for cooking is 6.1 MJ for a five-member household, for one meal per day.

For lighting, a household will be lighting energy poor which do not have:

- Either a 60 watt bulb when it is using electricity
- Or one hurricane kerosene lamp when it is using kerosene

Energy poverty Ratio
Concept 2 :

	Poverty Ratio (HH) cooking		Poverty Ratio (HH) lighting	
	rural sector			
	66th round	61st round	66th round	61st round
INDIA	22.89	25.35	35.06	46.81
WEST BENGAL	29.15	31.08	52.38	66.59

	Poverty Ratio (HH) cooking		Poverty Ratio (HH) lighting	
	urban sector			
	66th round	61st round	66th round	61st round
INDIA	20.64	25.48	6.89	9.52
WEST BENGAL	24.37	34.62	8.60	15.07

Gini Coefficient of Consumption Expenditure and Concentration Index of Fuel Consumption (real unit) of Rural Sector

	gini coefficient of mpce	CI of total end use energy	CI of LPG	CI of biomass	CI of kerosene	CI of electricity
ALL INDIA	0.28	0.12	0.60	0.00	-0.04	0.29
WEST BENGAL	0.23	0.10	0.75	0.03	-0.02	0.24

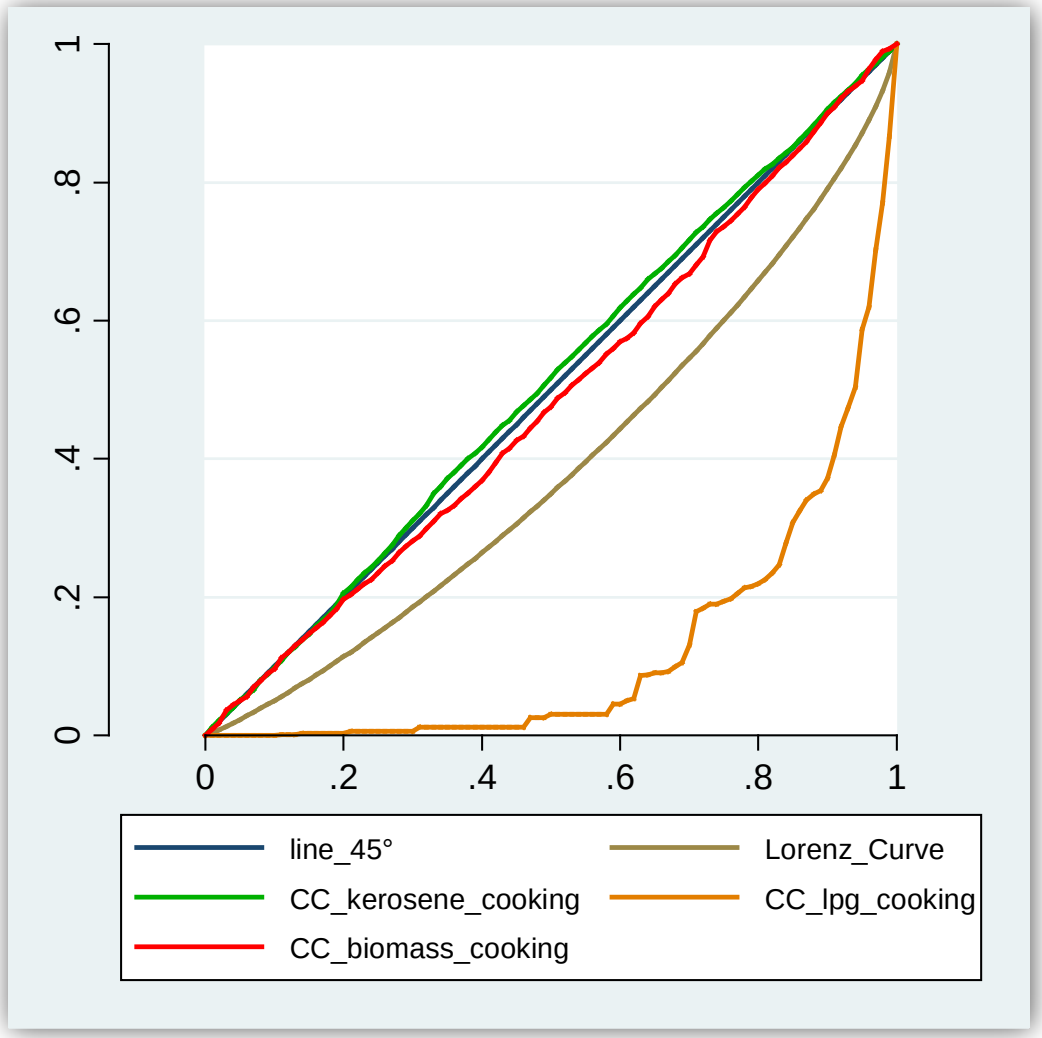
Source: NSSO Consumption Expenditure Survey 66tth Round

Gini Coefficient of Consumption Expenditure and Concentration Index of Fuel Consumption (real unit) of Urban Sector

	gini coefficient of mpce	CI of total end use energy	CI of LPG	CI of biomass	CI of kerosene	CI of electricity
ALL INDIA	0.38	0.19	0.20	-0.47	-0.27	0.29
WEST BENGAL	0.39	0.18	0.34	-0.48	-0.18	0.29

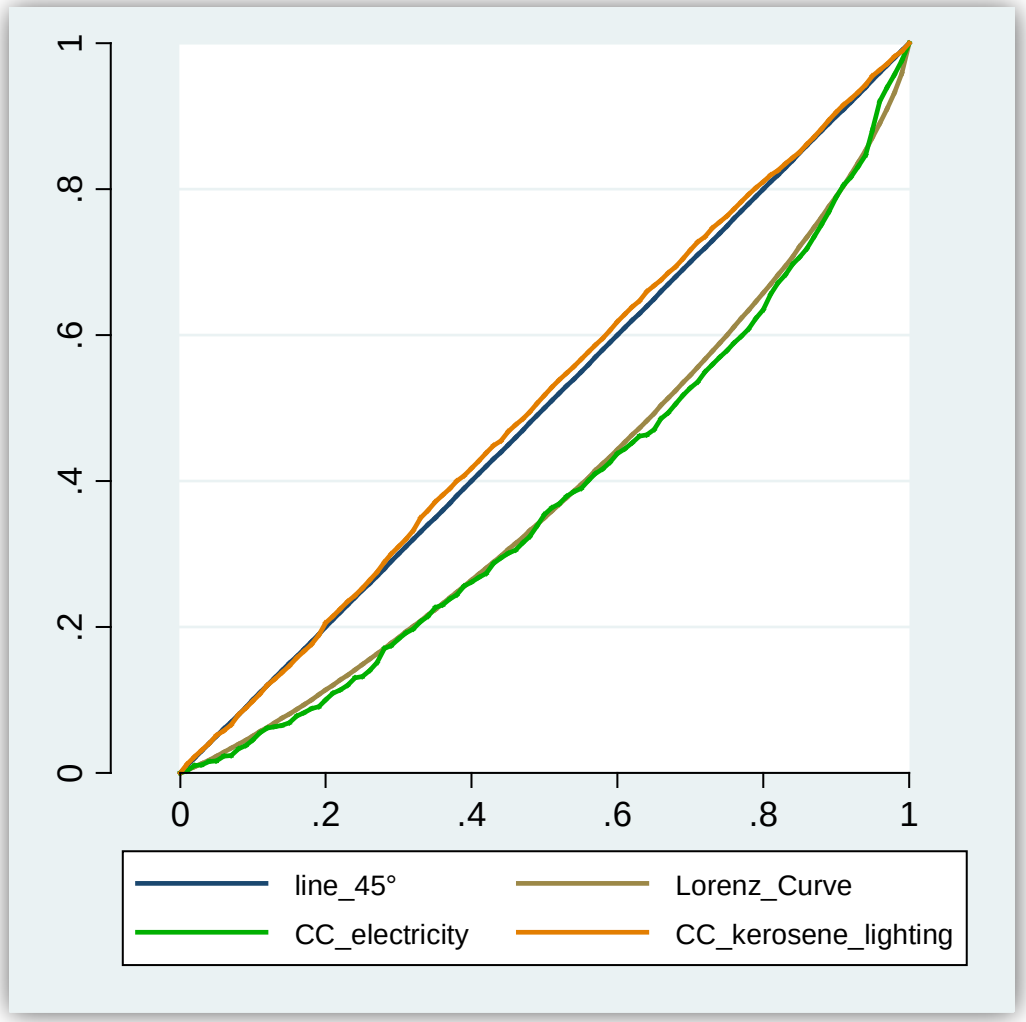
Source: NSSO Consumption Expenditure Survey 66tth Round

Lorenz Curve of Consumption Expenditure and Concentration Curve of Fuel Consumption for cooking (real unit) of Rural Sector of West Bengal



Source: NSSO Consumption Expenditure Survey 66th Round

Lorenz Curve of Consumption Expenditure and Concentration Curve of Fuel Consumption for lighting (real unit) of Rural Sector of West Bengal



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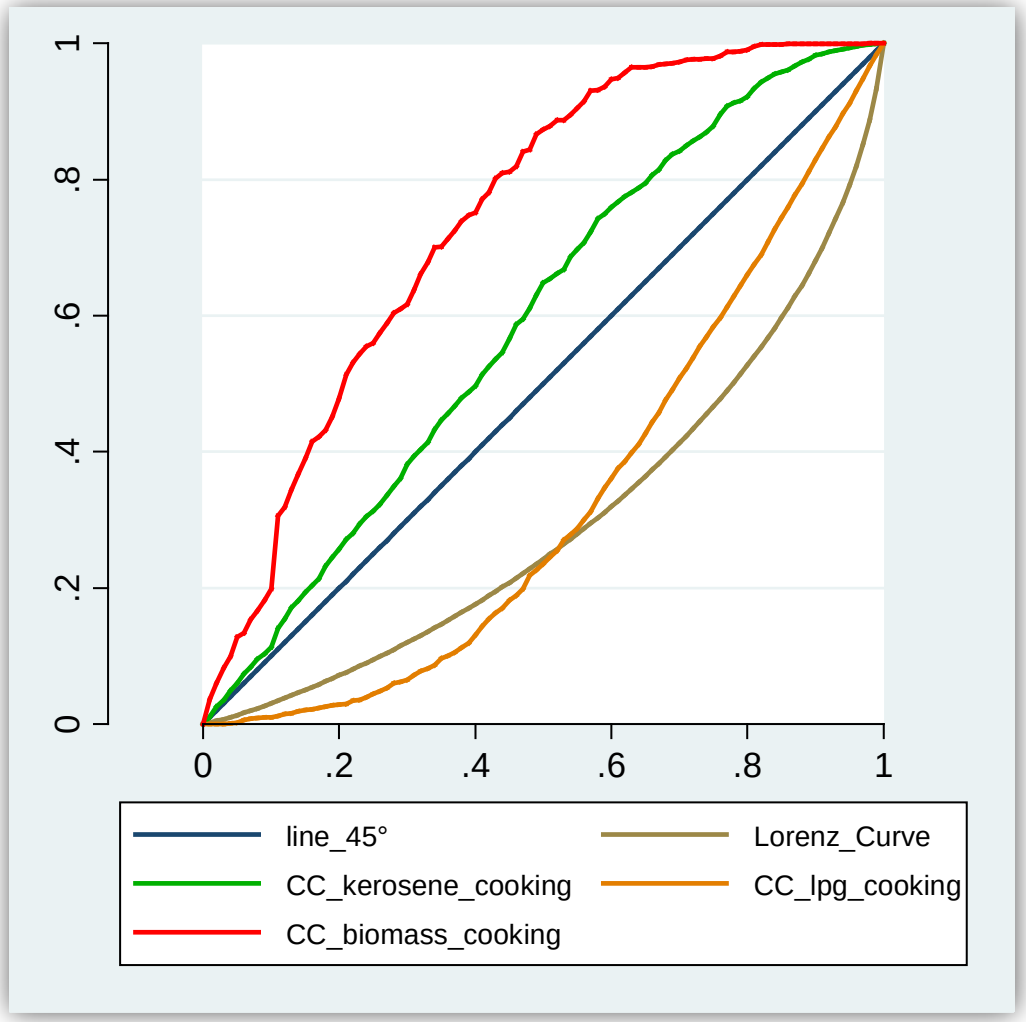
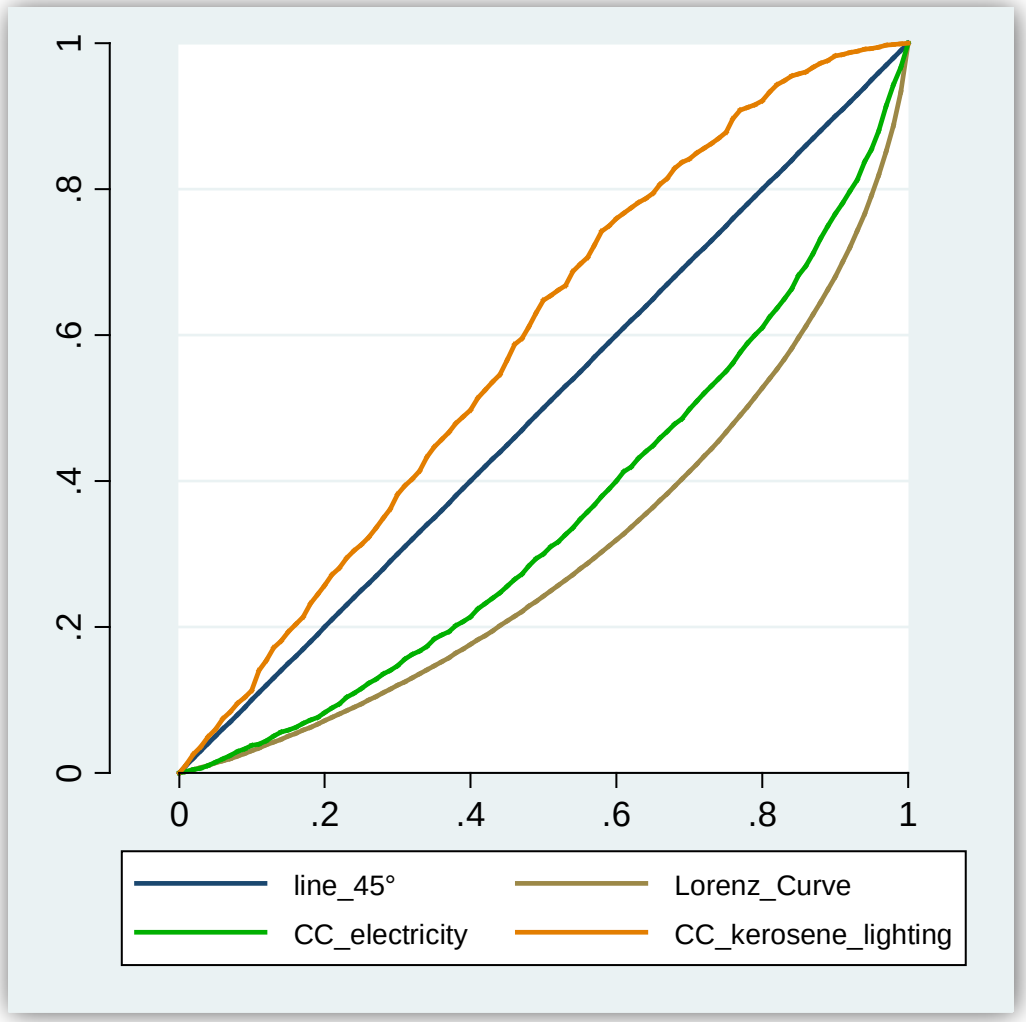


Source: NSSO Consumption Expenditure Survey 66th Round

Lorenz Curve of Consumption Expenditure and Concentration Curve of Fuel Consumption for lighting (real unit) of Urban Sector of West Bengal



Source: NSSO Consumption Expenditure Survey 66th Round

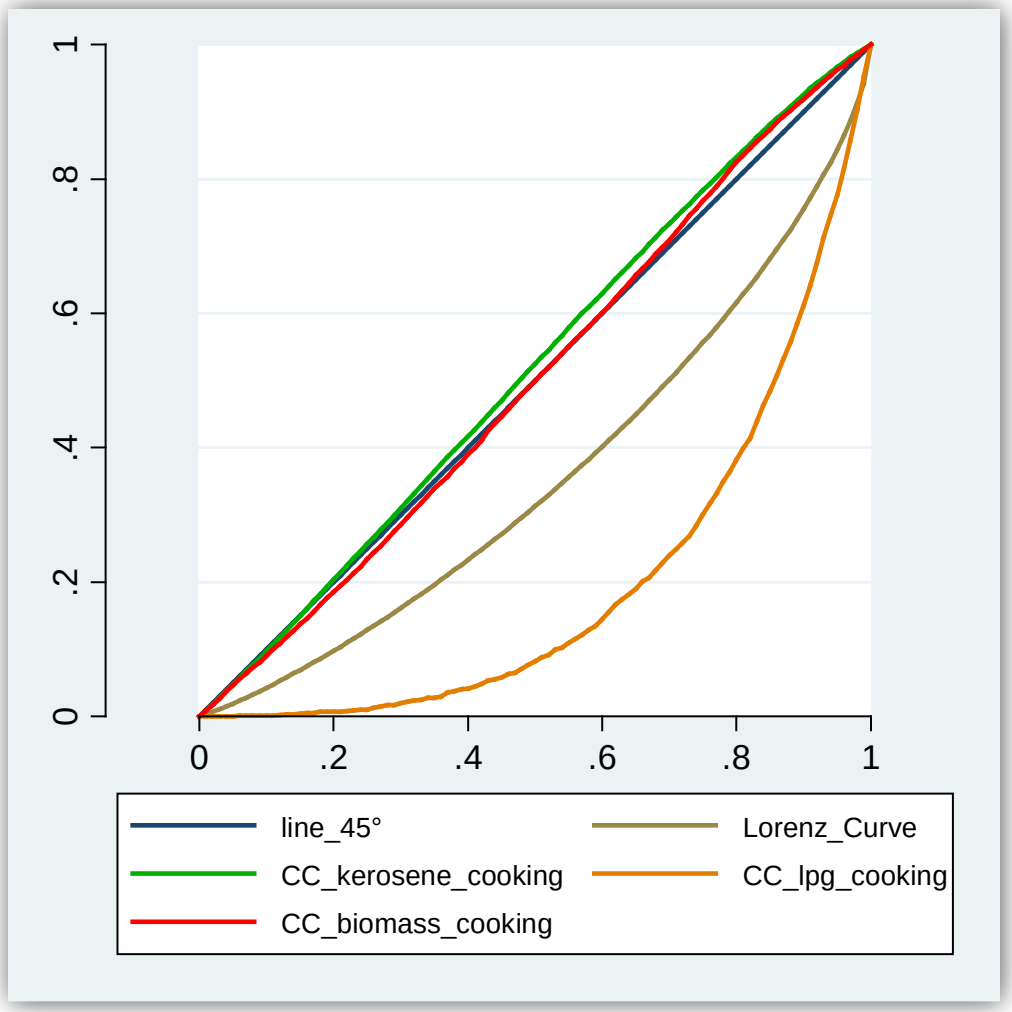
- Access to clean energy and electricity - A rights issue deserving attention for inclusive fast growth and energy security through removal of energy poverty.
- Income poverty can not explain the energy poverty – lighting or cooking. There are serious supply side bottlenecks in both electricity and petroleum cooking fuels like LPG, which would explain energy poverty.
- Important supply side initiatives are required for enhancing availability of electricity and clean cooking fuel by upgrading supply side technical efficiency as well as massive investments in the generation and distribution of electricity and natural gas supply.

- Rationalisation of energy pricing and energy conservation are important issues in the context.
- Household and Agricultural Subsidy need to be better targeted and pricing should be de-politicised
- State Regulatory Commission should be given due autonomy and degree of freedom to act according to principles of efficiency as well as justice.

- Geo-political solutions need to be sought for regional energy cooperation among West Bengal, Bangladesh and North Eastern India and Myanmar where there are natural gas resources.
- In technology choice of energy supply while we should emphasise the enhancing of the share of carbon free or carbon neutral fuel, the fuel policy need not be carbon centric. We should not be apologetic in demanding more ecological space of the planet for carbon absorption in order to accommodate the priority energy needs of all Indians including the citizens of West Bengal.

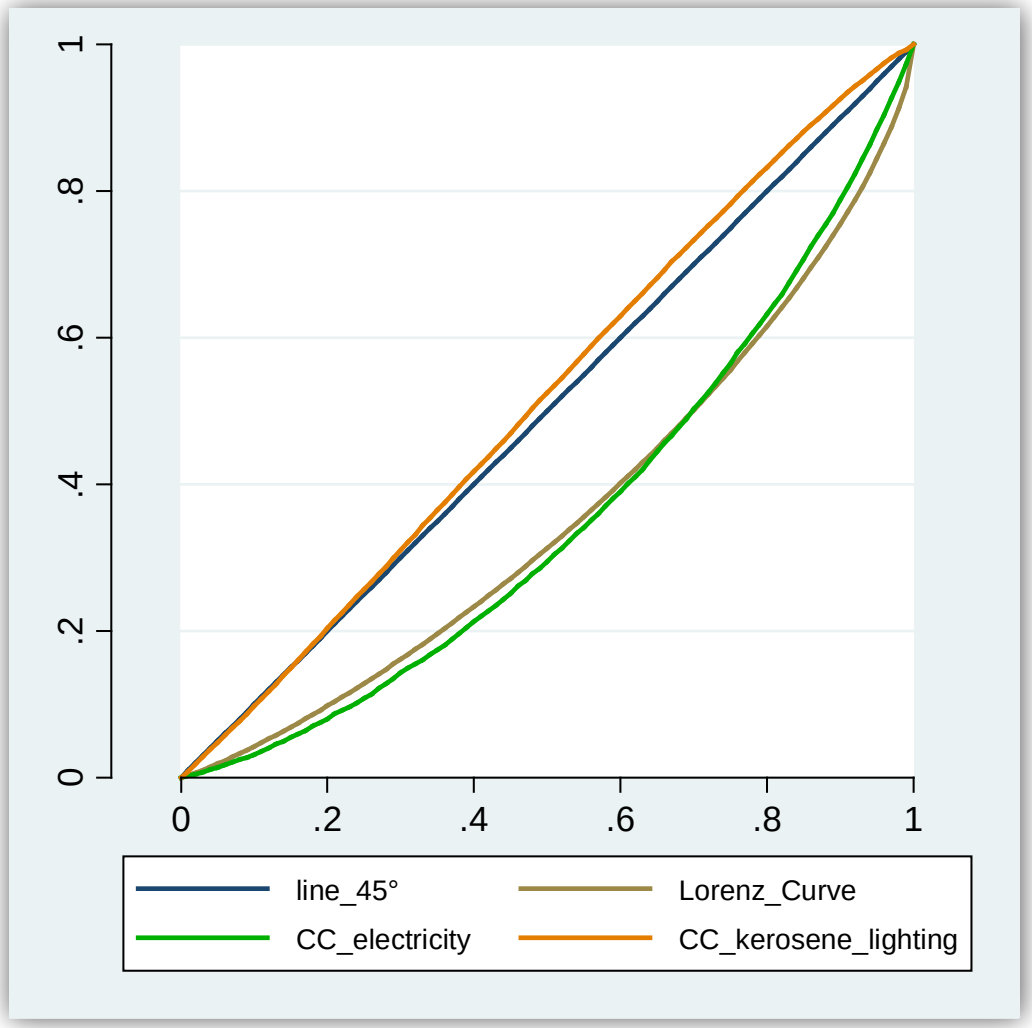
THANK YOU

Lorenz Curve of Consumption Expenditure and Concentration Curve of Fuel Consumption for cooking (real unit) of Rural Sector of India



Source: NSSO Consumption Expenditure Survey 66tth Round

Lorenz Curve of Consumption Expenditure and Concentration Curve of Fuel Consumption for lighting (real unit) of Rural Sector of India



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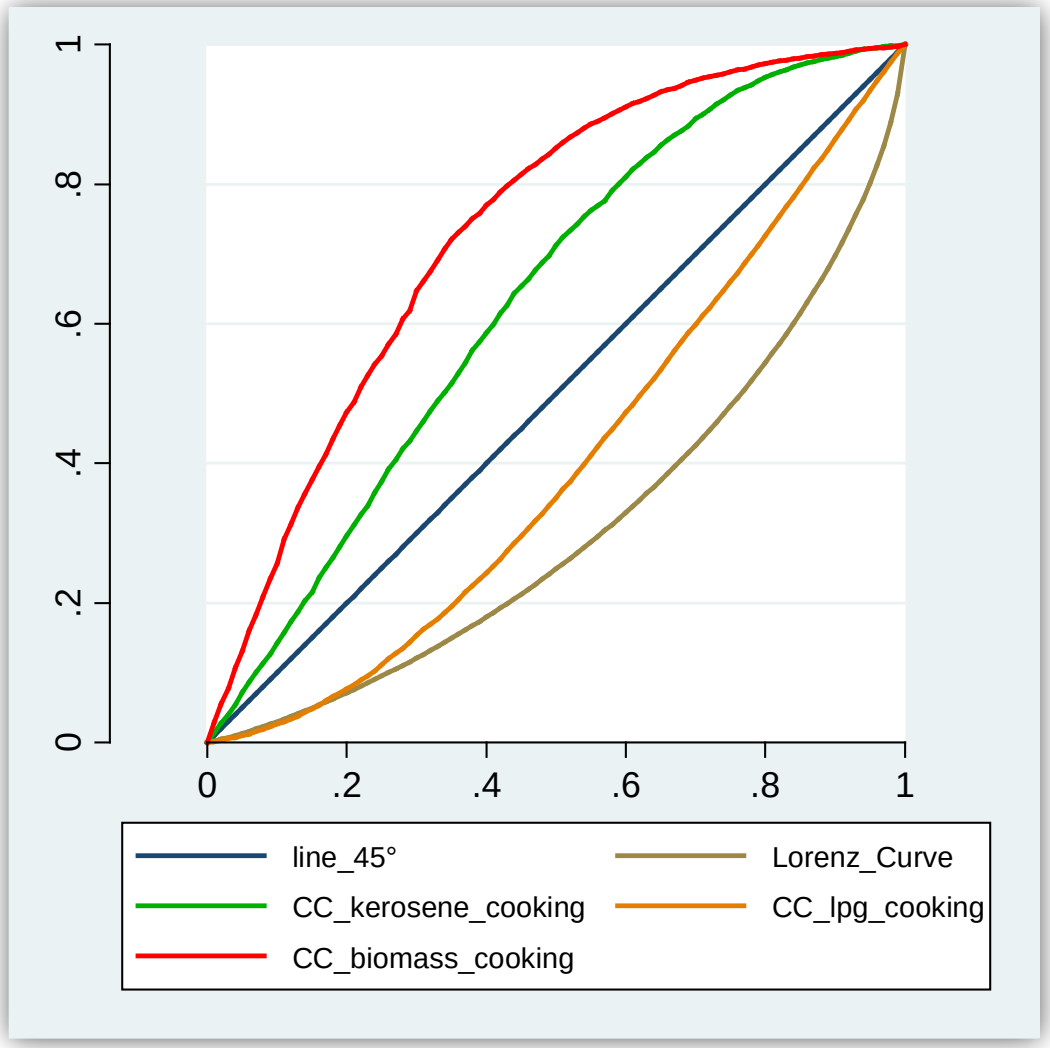

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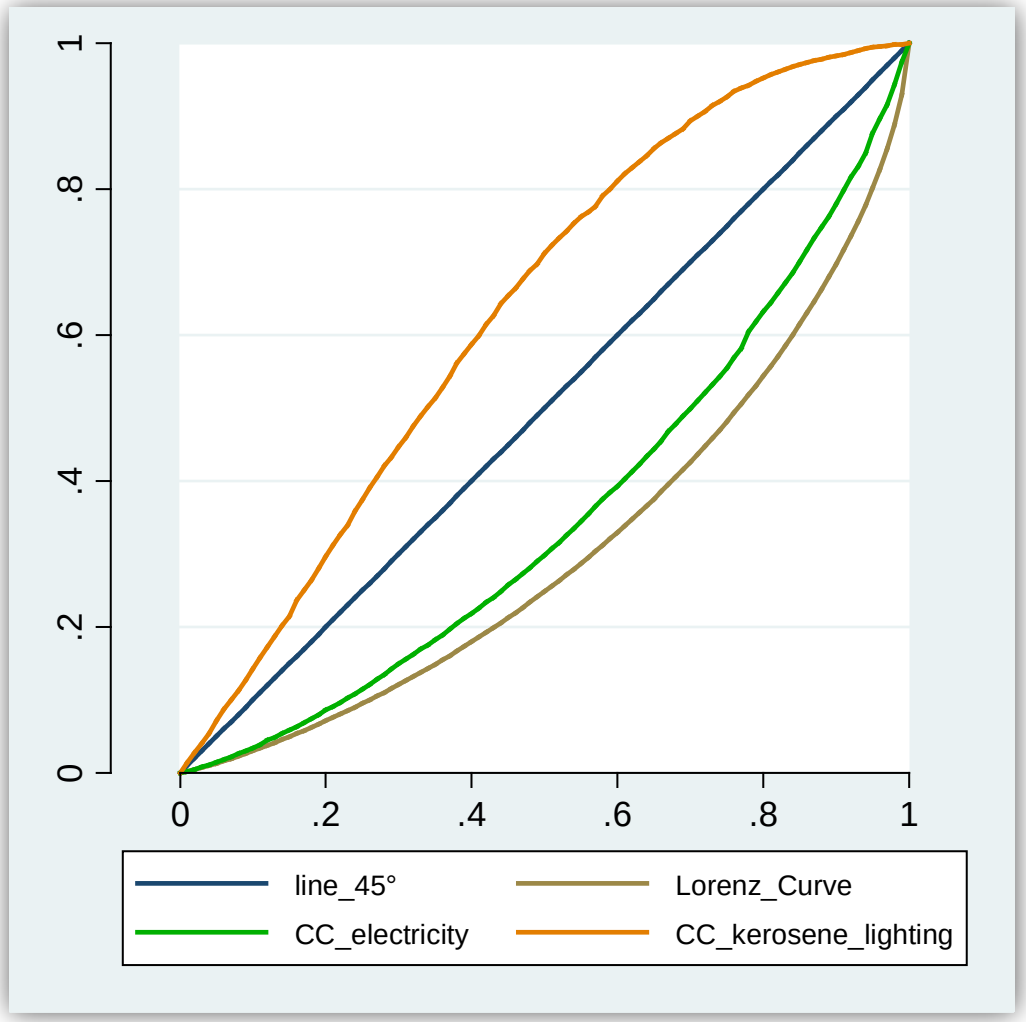
Lorenz Curve of Consumption Expenditure and Concentration Curve of Fuel Consumption for lighting (real unit) of Urban Sector of India



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