

An Empirical Investigation of Resource Extraction and Sustainable Development

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What is Sustainable Development?

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

p. 43, *Our Common Future* (1987), World Commission on Environment and Development (Brundtland Report).



What is Sustainable Development?

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of ‘needs,’ in particular the essential needs of the world’s poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.”



What is Sustainable Development?

“Sustainable development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for better living.”

p. 44, *Our Common Future*, (1987) World Commission on Environment and Development (Brundtland Report).



Does Energy Extraction Contribute to or
Detract From This Aspect of Sustainable
Development?



“Oil and mineral dependence produce a type of economic growth that offers few direct benefits to the poor... We believe the best course of action for poor states would be to avoid export-oriented extractive industries altogether, and instead work to sustainably develop their agricultural and manufacturing sectors.”

Michael Ross,
Oxfam America 2001



“Oil has not only failed to bring benefits to the world’s poor communities – it has been decisive in making them poorer.”

Christian Aid 2003



“Worrying about poverty, of course, means worrying about the causes of poverty, and in the past two months we've heard myriad explanations for Middle Eastern deprivation: Western exploitation, Arab corruption, Islamic hostility to modernization, globalization, the failure of globalization, and a dearth of Western aid. What hasn't been mentioned is **oil.**”

J. Surowiecki,

The New Yorker, Dec. 2001



Does Energy Extraction Create Poverty?

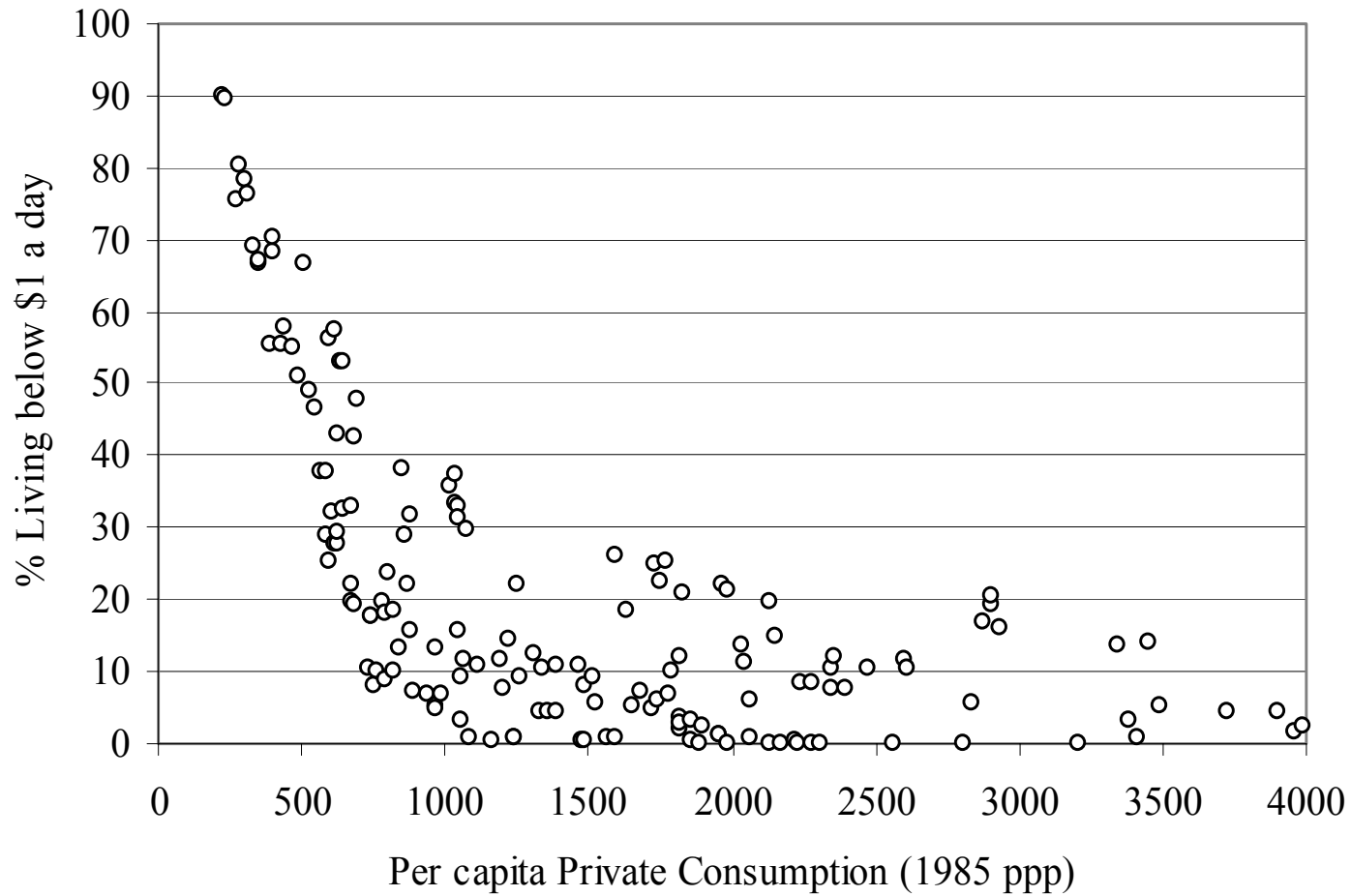
Definition: A person is living in poverty if their daily consumption could have been bought in the US for less than \$1.00 (\$2.00) in 1985.

Poverty Rate: The percentage of a nation's population living below the \$1/day (\$2/day) poverty rate.

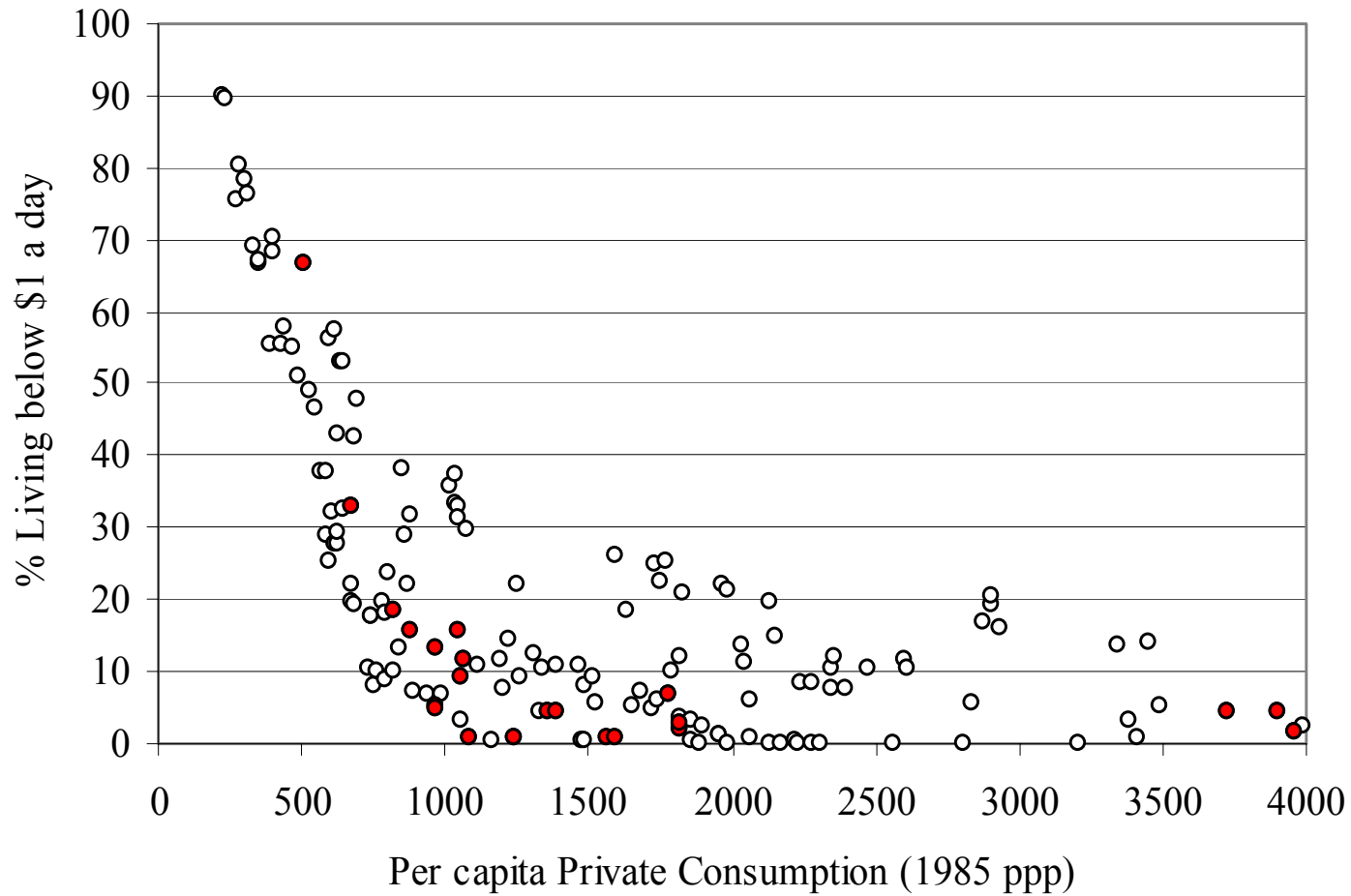
Data: World Bank poverty rate surveys, 1981 through 1998, 54 poorest countries, 153 data points.



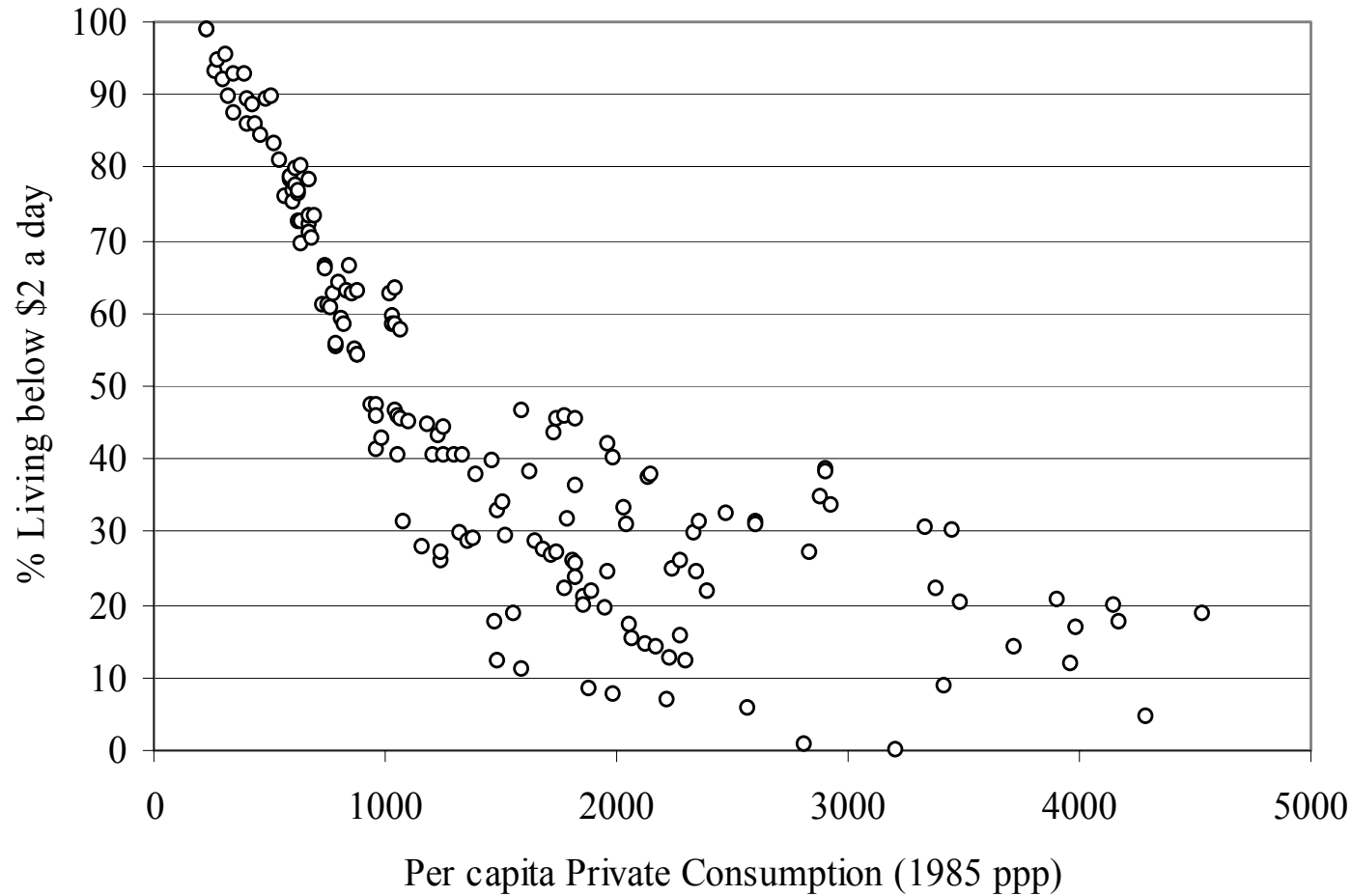
\$1/day Poverty Rates



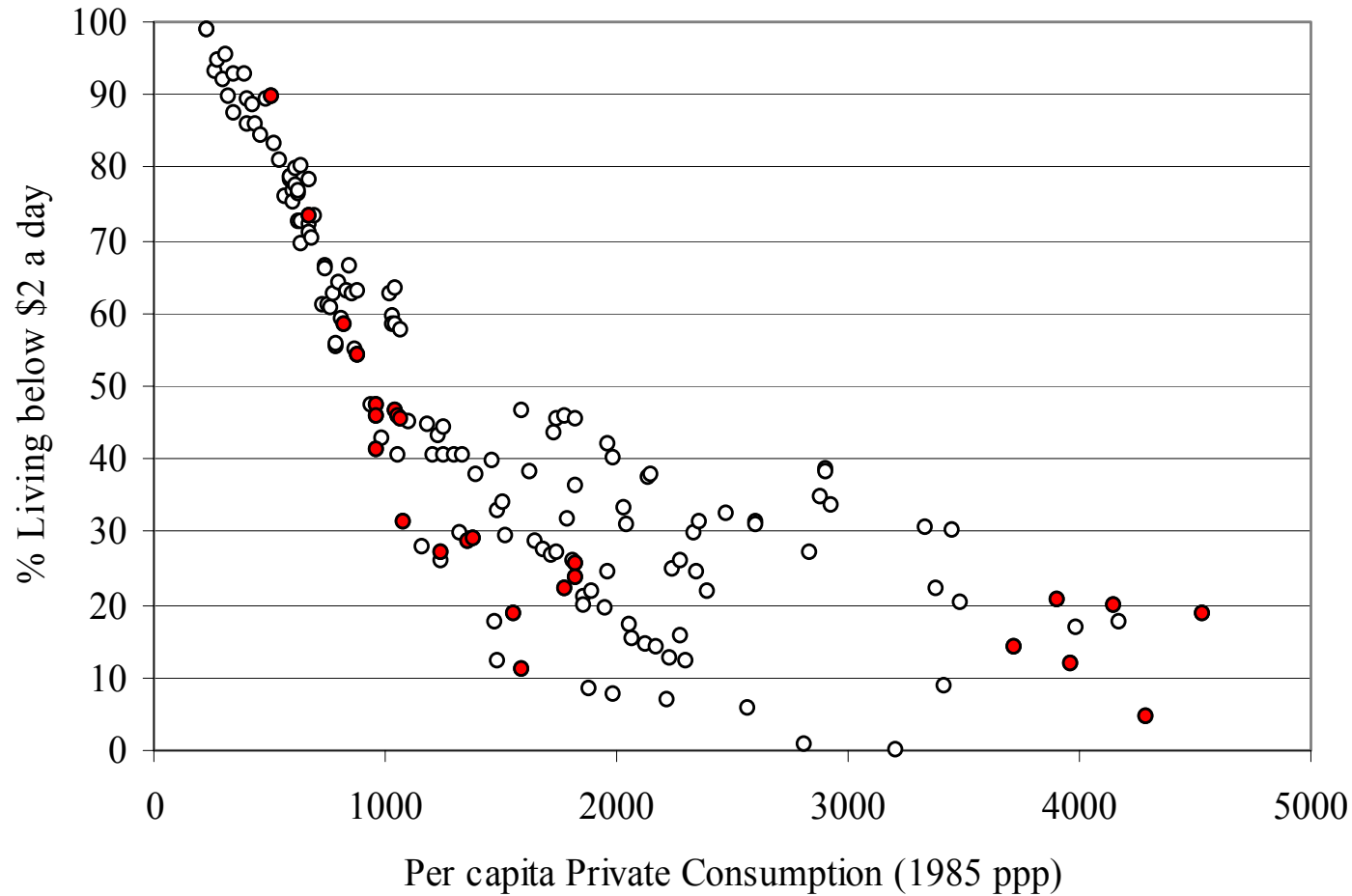
\$1/day Poverty Rates



\$2/day Poverty Rates



\$2/day Poverty Rates



Energy Countries in Sample (Coal, Gas, and Oil)

Nigeria

Côte D'Ivoire

Indonesia

Algeria

Ecuador

Venezuela



Dependent variable: \$1/day poverty rate

	1	2	3	4
Constant	55.57 (15.72)**	89.75 (20.58)**	90.69 (23.41)**	91.05 (23.41)**
Cons	-0.12 (-21.90)**	-0.11 (-10.76)**	-0.12 (-13.46)**	-0.12 (-13.53)**
Cons ²	5.13E-05 (14.63)**	4.58E-05 (7.68)**	5.14E-05 (9.64)**	5.15E-05 (9.64)**
Cons ³	-6.81E-09 (-10.35)**	-6.30E-09 (-6.15)**	-7.14E-09 (-7.64)**	-7.11E-09 (-7.60)**
Gini	1.040 (13.87)**			
Gini*Cons	-1.11E-04 (-2.34)*			
Mining Dummy		1.87 (1.01)	-1.06 (-0.62)	-1.42 (-0.79)
Oil, Gas and Coal Dummy		-6.55 (-4.33)**	-6.48 (-5.30)**	-6.51 (-5.48)**
LatAm/C Dummy			11.98 (5.47)**	13.07 (7.74)**
Africa Dummy			9.35 (9.15)**	9.88 (5.50)**
MENA Dummy				3.11 (1.12)
n	153	153	153	153
R ²	0.961	0.806	0.872	0.873
Adjusted R ²	0.960	0.800	0.865	0.866



Dependent variable: \$2.00/day poverty rate

	5	6	7	8
Constant	143.58 (56.23)**	135.62 (43.24)**	137.51 (40.13)**	136.13 (42.41)**
Cons	-0.14 ((-33.36)**	-0.12 (-15.36)**	-0.13 (-15.53)**	-0.12 (-15.84)**
Cons ²	3.13E-05 (10.26)**	4.41E-05 (9.17)**	4.74E-05 (9.64)**	4.69E-05 (10.13)**
Cons ³	-3.50E-09 (-7.48)**	-5.54E-09 (-6.83)**	-6.01E-09 (-7.34)**	-6.09E-09 (-7.82)**
Gini	-0.33 (-3.94)**			
Gini*Cons	7.35E-04 (10.68)**			
Mining Dummy		-4.13 (-2.40)*	-5.00 (-3.02)**	-3.63 (-2.50)*
Oil, Gas and Coal Dummy		-4.09 (-2.96)**	-3.77 (-3.01)**	-3.66 (-3.23)**
LatAm/C Dummy			7.46 (5.15)**	3.30 (1.99)*
Africa Dummy			3.25 (2.54)*	1.26 (1.11)
MENA Dummy				-11.79 (-6.27)**
n	153	153	153	153
R ²	0.985	0.936	0.947	0.955
Adjusted R ²	0.985	0.934	0.944	0.952



Does Energy Extraction Create Poverty?

- When measuring poverty at the \$1/day rate, energy economies have ~ 6 percentage points *less* poverty than non-extractive economies.
- When measuring poverty at the \$2/day rate, energy economies have ~ 4 percentage points *less* poverty than non-extractive economies.
- This impact is LARGE – roughly equivalent to the ‘Latin America’ effect.
- The high level of poverty in certain poor, energy-intensive economies is completely explained by income and regional location.



Conclusions

- Based on this data set, method of analysis and definition of sustainable development, energy production is completely consistent with sustainable development.
- Energy production does not worsen the lot of the poor.
- The only concern is impoverishment of future generations (the second key concept of sustainability).



Why Does Energy Extraction Reduce Poverty?

- Creates rural infrastructure (paved roads, power, water)
- Creates public markets
- Tax revenues
- Household income diversification

