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ENERGY BASED POVERTY INDICATORS – A SOUTH AFRICAN PERSPECTIVE

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OVERVIEW

Energy provision and the role it plays in poverty alleviation is well documented ([1], [2]). South Africa has an ambitious poverty alleviation program of halving 2004 poverty levels by 2014 [4], which demand an increase in the provision of energy to both urban and rural impoverished areas. Yet the country has no energy based poverty indicators to guide such policy.

Whilst, low energy consumption is not the cause of poverty it is often perceived as an indicator for many of its elements. These include inadequate education, poor health care and hardships imposed on women and children [5]. Despite the strong link between energy provision and poverty eradication the United Nation's Millennium Declaration (from which the millennium development goals (MDGs) were derived) does not stipulate specific targets for energy services. Yet it is recognised that "modern energy services are an essential element enabling a country to meet these goals, [although] it has been difficult to establish quantitative causal relationships between energy and progress toward the MDGs" [6]. In terms of poverty and energy provision to impoverished areas, South Africa faces similar challenges to many developing countries. Unless the use of natural resources as a method of poverty reduction is explicitly taken into consideration, "there is danger of these resources getting rapidly depleted leading to grave long term consequences" [6]. Given that poverty alleviation is one of the most pressing goals for South Africa, the link between poverty and energy use must be clearly made. Further to this, clear and reliable indicators of energy-poverty are needed, which is where this research paper attempts to fill the gap by developing theoretically rigorous energy based indicators of poverty from extant data gathered by Statistics South Africa in the 2005 South African household survey.

METHODS

Given the objective of the analysis is to compare energy measures with other poverty measures, basic poverty measures available in the Income and Expenditure of Households Survey of South Africa are compared with energy measures of social development. The energy measures that are used for the comparison are primary, useful, and an access-adjusted useful energy (all per capita). The energy expenditures collected in the Income and Expenditure of Households Survey of South Africa refer to the end-use level. By assuming certain efficiencies of the energy supply chain and end-use equipment, primary and useful energy expenditures can be derived respectively. The access-adjusted useful energy measure is constructed as an energy measure that takes the quantity as well as the type of energy used into account. Since a good indicator is characterised by a close relationship between the indicator and the represented development dimension under investigation, the closeness of the relationship between the three energy measures and the basic identified poverty measures is quantified using both correlation and quintile analysis.

RESULTS

Spearman correlation coefficients, which measure the strength of the relationships between ordinal variables, are calculated between the different poverty indicators and energy measures. All correlations are significantly different from 0 at better than a 1% significance level. Total household expenditure correlates fairly strongly with all the conventional poverty indicators except house ownership. The energy indicator that best correlates with all of the poverty measures is access-adjusted useful energy. It correlates most strongly with total household expenditure, house value, material well-being (belongings), sanitation and infrastructure (correlation coefficients above 0.5). It is also very strongly correlated with the other energy indicators (energy expenditure and end-use energy in gigajoules). The energy indicator that has the weakest correlations with all of the poverty measures is end-use energy in gigajoules. As a last exercise we calculated the same correlations for rural and urban areas separately. We find that the correlations between energy indicators and our poverty variables to be stronger for urban than for rural households in almost all cases and identify possible reasons for this finding.

CONCLUSIONS

Many of the claims regarding the importance and legitimacy of explicitly linking poverty to energy use; and in particular, the case for developing a set of energy based poverty indicators; are supported by the strong correlations and quintile analysis undertaken in this research. We argue that the energy dimension of development deserves a stronger profile in policy deliberations in the (sustainable) development field. In developing a set of lead indicators to assess the effectiveness of poverty alleviation policy, the South African government would do well to diversify its economic policy scope by including energy-poverty indicators based both on consumption and accessibility. This has the advantage of providing a relatively easy method of tracking poverty trends and forecasting poverty levels associated with different development paths into the future, all of which can be updated regularly. Although not all the required information is available at this point in the research, the relevant government departments should focus on gathering substantial energy use data in future population data surveys. Ultimately the paper's policy recommendations can be boiled down to the simple and agreed principle of trying to raise people out of poverty. We find that energy can be used to foster this process through recognising that energy provision is a necessary condition for poverty alleviation and that we need to lift people out of the dependency on traditional, polluting, inefficient fuels into the higher, more advanced forms of energy. To do this we need reliable indicators like the ones developed here and track them over time.

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