Towards Equal Standards of Welfare among Populations of Different Subdivision Areas of a Country: A Case Study of Sudan

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Paper Abstract: The objective of this paper is to study the poverty components, variation and trends through populations of Sudan states; to find/develop simple indicators for measuring the equality of welfare among population of different subdivision areas of a country; and to find/develop simple indicators for measuring the rate of improvement of welfare levels towards a required level of equality.

The first published survey on poverty in Sudan was conducted in 2009; however, the population censuses and surveys conducted in the country included information on different demographic, health and socioeconomic fields which can be used to measure poverty indices from information on Unmet Needs. Some researchers used these information and calculated different poverty indices in their research papers based on longevity, knowledge and economic data. The main sources of data they used are the two 1993 & 2008 population censuses and the two 2006 & 2010 Sudan Household Health Surveys (SHHS). In this paper we are going to use the poverty indices from the 2009 Poverty Survey and indices calculated by different researchers from other sources of data, in addition to indices and indicators we calculate from these sources to fill the gaps in the required information. Two surveys are currently going on in Sudan (The 2014 Poverty Survey and the 2014 MICS Survey) which are, hopefully, to be added to the sources of data we are going to use in this paper.

The paper is going to touch three areas: the variation of poverty indices among states, the pace of change of this variation through time and the relationships between different indices and indicators, specifically, the relationships between poverty indices from the 2009 Poverty Survey and poverty indices and indicators based on UNMET NEEDS data from other surveys. The measurements used in this respect are:

- The Standard Deviation of the percent values of poverty indices for different variables, in order to estimate equality levels.
- The Correlation Coefficient of the relationship between (the values of a variable referred to a base year time) and (the differences between these values and values of the same variable referred to subsequent point of time), in order to estimate the trend of improvement in equality. The value of the Correlation Coefficient of this relationship when we fix the indices at the subsequent point of time on specific required target would be a unity by definition. This is considered to be the ideal trend of improvement.
- The percent decrease of poverty component index per year per state during specific period according to the actual trend.
- The percent decrease of the poverty component index per year per state for specific period according the required ideal trend.

- The difference between percentages from the above two points for each state to estimate the gap in the specific poverty component in order to reach the required ideal level.
- The Regression statistics to find the degree of relationships between different poverty indicators.

Preliminary test results of some variables show that there was considerable variation in poverty indicators between different states for the different poverty components. This variation persisted through time but with decreasing trend with respect to longevity component indicators; equality improvement in Knowledge and economic component of poverty is seemed to be, at most, of very modest pace.

In the preliminary test we fixed the lowest index of longevity indicator in a base year as a target for all states to be reached in five years period, and calculated the percent of decrease of longevity index that should be experienced by different states from this base year to reach the target level. We found that the state with the highest index at the base year reference time should experience a decrease of 12.4 % per year from its longevity index to be equal with all states in five years period. The actual rate of decrease of the index for this state in this regard was 4.4 %; so a gap of 8.1% was estimated for this state to reach the targeted equality status in longevity in five years period.

With respect to relationships between poverty indices and the unmet needs indicators the preliminary test results show that there was significant relationship of 0.54 correlation coefficient value between poverty incident index and Weight/Height (-2) index for children under five years of age; and significant relationship of 0.64 & 0.53 respectively between Severe poverty index and Weight/Height (-2) & Weight/Height (-3) indices. Unsaved water and unimproved sanitation indicators did not show significant relationships with poverty incident indicator. The preliminary results of a linear regression test shows a strong relationship between poverty incident index and longevity (P1) index with R^2 value of 0.53.