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Multidimensional Poverty in Ethiopia: Capturing New Health Measures Through Water Quality Measurement

Poverty eradication remains a key and implicit objective of development policy. National poverty assessments have been used regularly to inform policy discussions on poverty alleviation in several developing countries. Income or consumption expenditures are often regarded as proxies of households' economic welfare and for poverty assessment. These two indicators may however fail to capture other crucial dimensions of poverty especially in developing countries. Moreover, monetary poverty indicators often provide insufficient policy guidance regarding deprivations in other dimensions.

The concept and methodology of multidimensional poverty tackles some of the above-mentioned limitations of the Foster et.al. (1984) indices. The Alkire and Foster (2011) multidimensional methodology proposes a dual cut-off at the identification step of poverty measurement. This approach has several desirable properties. Firstly, it can be adopted to different contexts and for different purposes given its different dimensions and indicators. Secondly, the methodology could also be used to examine one particular sector, to represent for example, the quality of education or dimensions of health. Thirdly, ordinal, categorical, and cardinal data can be used. Fourthly, this measure is highly decomposable. The measure can be broken down into its individual dimensions to identify which deprivations are driving multidimensional poverty in different regions or groups. Finally, it is a powerful tool for guiding policies to efficiently address deprivations in different groups. The Sustainable Development Goals (SDGs) thus explicitly include a target on reducing multidimensional poverty. Target 1.2 refers to reducing by half the proportion of women, men and children living in poverty in all its dimensions, according to national definitions, by 2030. The Multidimensional Poverty Index (MPI) is therefore a measure that helps to monitor progress towards the most challenging Goal and the SDGs. The MPI addresses poverty in multiple forms and dimensions and explores how these deprivations are interlinked and overlapping. In addition, the MPI can support the 2030 Agenda by providing a comprehensive and multi-sectoral picture that can guide interventions for leaving no one behind. The multi-dimensional nature of this poverty measure also enables one to capture the single SGD goals such as SDG goal on water and sanitation target, as these are elements used in the calculation of the poverty measure. In particular, the call of the 2030 Agenda for an integrated approach to social, economic, and environmental dimensions is reflected in Goal 6, which sets targets that address all aspects of the water and sanitation cycle. SDG Target 6.1 relates specifically to drinking water: By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Given the above need to align poverty measures with the SDG 2030 Agenda, this paper measures multidimensional poverty incorporating a water quality indicator that is in line with the SDG Target 6.1.

In line with the OPHI methodology, we incorporate three dimensions of wellbeing— education, health, and living standards—with each dimension weighted to represent one-third of the index. Individual indicators are weighted equally within a given dimension and are the following: 1a. At least one child aged 7-15 years in the household is not attending school. 1b. No one in the household has at least six years of education. 2b. At least one 6-59-month-old child in the household is stunted. 2c. Death of child in the household. 3a. Household does not have access to electricity. 3b. Household does not have a finished floor. 3c. Household does not use solid cooking fuel. 3d. Household does not have a radio, television, or phone, or the household lacks a transportation asset as well as land, livestock, or a refrigerator. 3e. Household does not have access to improved sanitation. 3f. Household does not have access to an improved water source.

We generate a baseline MPI measures based on the proposed Alkire and Foster measure as reported in table 1 below. In order to classify a household as poor or non-poor, a minimum number of weighted dimensions are established and only those who are deprived in dimensions exceeding this value are considered poor (Alkire & Foster, 2011). OPHI traditionally uses a cutoff of $k \geq 0.33$ to define the poverty threshold.

We then generate the new MPI by replacing the baseline Water indicator with the Water Quality indicators. We use the Ethiopia Socioeconomic Survey's Water Quality Data (ESS-WQT) which was collected as part of the Ethiopia Rural Socioeconomic Survey (ERSS) aimed to measure the quality, availability, and sufficiency of drinking water in all parts of the country. Drinking water samples were collected from 4,688 households and 4,533 source points all statistically representative at the regional level. The survey, conducted in May-July 2016, included tests of the microbial, chemical, and physical characteristics of drinking water samples. This made it possible to identify both the extent of contamination of water sources and contamination occurring during water collection, transport, and handling. Chemical and physical characteristics analyzed were fluoride, iron, free chlorine residual, electroconductivity, hardness, and turbidity.

We generate two water quality indicators based on the high and very high level of water contamination at the household as well as at the source. With the new Water indicators, we then calculate the MPI and compare these results with the baseline MPI. Poverty rates remain above 50% in all three MPI measures with the two MPI measures exhibiting significantly higher poverty rates compare to the baseline MPI. MPI using contamination at household indicator exhibits highest poverty rates. There is a significant increase of the MPI especially when we consider the MPI with water contamination at the household. These differences are statistically significant. The increase in MPI is driven by deprivations in the new water quality indicators.

This result is consistent in all regions, though we observe regional differences. Small towns and urban households are the key drivers of the increase in MPI. These results emphasize the importance of the water contamination indicator in better capturing households deprived in this indicator as well as defining the poverty index.