

Precision maps reveal significant health and education disparities within African nations

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Satellite imagery of Africa. Credit: Public Domain

A new scientific study finds that while nearly all nations in Africa have

at least one region where children's health is improving, not a single country is expected to end childhood malnutrition by 2030, an objective of the relevant United Nations Sustainable Development Goal (SDG).

The study, covering 2000 to 2015, and another on years of [education](#), map the entire African continent in 5x5 square kilometers and were published today in the journal *Nature*. National and provincial maps of education and nutrition in Africa often hide inequalities at the community level, according to researchers at the Institute for Health Metrics and Evaluation (IHME) at the University of Washington.

Mapping children's growth and basic schooling at precise local levels gives stakeholders - from clinicians and teachers to donors and policy-makers - insights into where to direct resources to improve lives in Africa.

Former United Nations Secretary General Kofi Annan, in a commentary accompanying the two studies, stated it is "crucial it is to invest in data.

"Data gaps undermine our ability to target resources, develop policies and track accountability," he wrote. "Without good data, we're flying blind. If you can't see it, you can't solve it."

The Bill & Melinda Gates Foundation funded the study, part of a five-year grant that will enable IHME researchers eventually to map a range of health metrics globally in 5x5 kilometers units.

Education and nutrition are critical factors to one's health and future opportunities, the studies note. Increases in basic schooling, particularly in young women, are linked to improved health for mothers and children. However, inadequate or improper nutrition, especially before age five, is closely associated with poor health and brain development, as well as increased risks for disease and early death.

"Education, like other social investments, is closely related to people's health and well-being, whether in Nigeria or the Netherlands," said Dr. Simon I. Hay, senior author of both papers and Director of Geospatial Science at IHME. "For investments in global health to make sustainable progress toward health-related SDGs, additional - and intentional - efforts must address social inequalities that drive persistent health disparities."

The studies examines average years of education for both males and females ages 15 to 49, and so-called "child growth failure," defined as insufficient height and weight for a given age and exhibited by stunting, wasting, and underweight among children under 5. Stunting refers to insufficient height for a child's age; underweight means insufficient weight for a child's age; and wasting refers to insufficient weight for a child's height and can result from a combination of stunting and underweight.

Previous estimates of basic schooling at the national and provincial levels show many African countries are expected meet SDG 4, which, by 2030, aims to reduce educational inequalities based on income, gender, and location. However, researchers found national and provincial maps could be misleading, since residents of many other communities have significantly lower levels of schooling and, thus, may be overlooked in education funding decisions.

It is SDG 2, which covers malnutrition, hunger, and food sufficiency, that likely is unattainable for all African nations by 2030. The studies also call attention to the need for greater progress to achieve the UN goals, according to Dr. Hay.

"The maps not only help to reveal local 'hot spots' of low education levels and children's poor nutrition, but also shine a spotlight on communities implementing successful educational and nutritional

programs over the past 15 years, from which we can learn" said Dr. Hay. "Precision public health is a new field of study which will be invaluable over the next 12 years to help effectively and equitably target resources as counties strive to meet their Sustainable Development Goals."

Additional findings include:

- There was notable improvement in the prevalence of stunting in Algeria, Mozambique, Burkina Faso, Ghana, Gabon, Equatorial Guinea, and southern Nigeria;
- The prevalence of underweight dropped significantly in Rwanda, and, to a lesser extent, in select areas of Democratic Republic of the Congo (DRC) and Angola by 2015;
- The prevalence of wasting decreased considerably in DRC, both at the national and provincial or community levels, over the past 15 years.
- However, researchers found persistently high prevalence of stunting, wasting, and underweight in 14 countries stretching the length of the African Sahel from Senegal in the west to Eritrea in the east.
- For example, in 2015, South Sudan, Chad, Ethiopia, Somalia, and northern Nigeria all continued to have large regions with high levels of stunting, wasting, and underweight. Years of education completed
- Researchers found wide gaps in years of basic schooling between people in rural and urban areas as well as between males and females in many areas across Africa.
- For example, in Nigeria, the national average for basic schooling in 2015 was seven years; yet there were wide gaps between northern and southern communities, ranging from two to 10 years, respectively.
- Researchers found persistently low levels of completed education in 14 countries stretching the width of the African Sahel, from

Senegal in the west to Eritrea in the east.

- For example, some areas in South Sudan, northern Nigeria, and northern Kenya averaged less than two years of schooling among women of reproductive age (15-49 years) in 2015.
- However, students in several African nations are staying in school longer. Between 2000 and 2015, there was a significant increase in years of basic schooling, especially among the 20-24 year age group (those aged 5-9 years at the start of the study period), in urban areas of Nigeria, Kenya, Ghana, Sudan, and South Africa.
- Males routinely averaged more years of basic schooling than females. The often-substantial gap between male and female education in these countries changed little between 2000 and 2015.
- Particularly vulnerable areas in 2015 with very low levels of basic schooling include rural areas of Nigeria, Ethiopia, Niger, and Uganda.

More information: More detailed study findings on educational attainment and child growth failure are available in the online visualization tools at <https://vizhub.healthdata.org/lbd/education> and <https://vizhub.healthdata.org/lbd/cgf>.

Aaron Osgood-Zimmerman et al. Mapping child growth failure in Africa between 2000 and 2015, *Nature* (2018). [DOI: 10.1038/nature25760](https://doi.org/10.1038/nature25760)

Nicholas Graetz et al. Mapping local variation in educational attainment across Africa, *Nature* (2018). [DOI: 10.1038/nature25761](https://doi.org/10.1038/nature25761)

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