

Adding milk, meat to diet dramatically improves nutrition for poor in Zambia

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Zambian family. Credit: University of Illinois

Over the past several decades in Zambia, data from the Food and

Agriculture Organization of the United Nations show that there has been a decrease in the per capita consumption of milk, meat, and eggs and an increase in starchy roots, primarily cassava.

The resulting diet is vitamin and mineral deficient. This leads to stunted growth and slowed brain development, shortened life expectancy, increased rates of infant mortality, vulnerability to disease and illness, and inability of mothers to nurse.

Researchers at the University of Illinois compared four diet scenarios to better understand differences among differing dietary approaches to help improve the [nutrition](#) of the poor in developing countries such as Zambia.

"We started by defining a typical diet in Zambia by using data from the World Food Dietary Assessment System," says U of I economist Peter Goldsmith. "It's a program that was developed primarily for dietary research projects in developing countries. A baseline is established based on food availability, not actual consumption."

Because over the past 10 years or so, charitable organizations have gifted poor Zambian households with livestock, the researchers were particularly interested in how well the addition of animal source food would compare with plant-based supplemented diets. Specifically the research team studied what adding various amounts of milk and meat each day would do to the nutrient levels in the typical diet, as compared with plant-based augmentation.

- The first scenario added 18 ounces of whole cow milk each day to the baseline diet.
- The second scenario added meat—60 grams of beef, 30 grams of chicken, and 5 grams of beef liver. Together this equals about one-fifth of a pound of meat.

- The third scenario included both milk and meat.
- And in the fourth scenario, an isocaloric diet mix (comparable in calories to the other three) of locally available plant-based foods was added—cassava, corn flour, wheat, sweet potato, sugar and oils. The analysis focused on changes in the levels of protein, calcium, zinc, iron, vitamin A, B2, B12, and D in the diet.

The dietary allowance was based on conservative estimates of a healthy male between 19 to 50 years old, weighing about 175 pounds. Other groups such as children and teens or nursing mothers generally have much higher daily requirements.

"When comparing all four scenarios, the milk-alone scenario increases the calcium level to a 67 percent probability of being adequate. We find that the plant source food-enhanced diet only eliminates the risk of vitamin A inadequacy," Goldsmith says. "But the milk plus meat scenario raises all essential nutrients to the recommended dietary allowance, with the exception of calcium, which has the probability of being 78 percent adequate, and vitamin D, which has the probability of only being 20 percent adequate."

Goldsmith says that as an economist he wants to identify the most efficient way to improve nutrition. For example, putting iodine in salt is a very efficient way to eliminate iodine deficiencies but there are a lot of other micronutrients to consider.

"We wonder whether there are cost-effective ways to achieve a more nutritionally complete diet," Goldsmith says. "Although animal source foods deliver a dense and broad bundle of nutrients, livestock production can be a difficult system to adopt and manage. A country or a village, for example, may not have a tradition of raising animals. Farmers might not have the labor to pasture, adequate water supplies, funds to build shelters for the animals, or access to animal feed."

"The data from this research are compelling. But there is a reason why the steady state of nutrition is plant based. It's relatively straight forward to implement. That's the dilemma for the development community. Do you stick to what's more culturally normative, such as introducing enriched rice, or do you introduce new models that may in the long run be more efficient and deliver a broad range of nutrients at a lower cost per unit? The addition of some milk and eggs, for example, might be an efficient way to simultaneously improve diets across a number of deficiency areas. Comparing models in terms of environmental sustainability also needs to be factored into the analysis. Clearly more research is needed to model and understand the tradeoffs among the various approaches to improving nutrient adequacy," Goldsmith says.

"The importance of animal source foods for nutrient sufficiency in the developing world: The Zambia scenario" is published in the *Food and Nutrition Bulletin*. It is co-authored by Zhiying Zhang, Peter Goldsmith, and Alex Winter-Nelson.

Provided by University of Illinois at Urbana-Champaign

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