Cameroon uses MINIMOD to reveal significant cost savings in vitamin A programming

The Context

The 2009 national micronutrient (MN) survey in Cameroon (conducted by Helen Keller International (HKI) and the Ministry of Health (MoH)) revealed that 35% of children 12–59 months of age nationally had vitamin A (VA) deficiency1, with a maximum prevalence of 43% in the North macro-region2.

This high prevalence of deficiency is cause for serious concern due to the associated health effects, which include depressed immune function and increased risk and severity of infections, which together result in elevated mortality3.

A variety of interventions is available to increase VA intake, though each faces its respective challenges. For example, VA-fortified oil programs are underperforming, and some children consume no fortifiable oil. The distribution of VA supplements (VAS) during Child Health Days (CHDs), while effective, is very expensive and unsustainable in the declining funding environment.

As in many countries, policymakers in Cameroon lacked a clear framework and tools for prioritizing VA (and other MN) interventions on the basis of program effectiveness and costs, particularly in light of the variance in VA deficiency in different regions of the country (see map above), and the fact that dietary patterns vary such that traditionally fortifiable foods are not consumed in all parts of the country. Further complicating this situation, VA interventions are implemented by different public and private sector entities, and with insufficient coordination or supervision.

MINIMOD

MINIMOD is a set of mathematical tools that provide input into the planning and more efficient management of MN intervention programs in low- and middle-income countries. It can also help identify practical policy pathways moving from current sets of intervention programs to programs that are more efficient.

MINIMOD is supported by the Bill & Melinda Gates Foundation to the University of California, Davis.

More information can be found on the UC Davis MINIMOD website (https://minimod.ucdavis.edu/), or by contacting Stephen Vosti (vosti@primal.ucdavis.edu) or Reina Engle-Stone (renglestone@ucdavis.edu).

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1 Prevalence of vitamin A deficiency is defined as inflammation-adjusted plasma retinol binding protein <0.83 µmol/L.
2 Due to data limitations, the MINIMOD tool in Cameroon works at the macro-regional level: North, South, and Cities (Yaoundé and Douala), instead of the regional level.
In response to these challenges, a team from UC-Davis’s Micronutrient Intervention Modeling Project (MINIMOD) developed an economic optimization model that can provide estimates of both the nutritional benefits and costs related to alternative MN interventions, and identify the combination of national and subnational interventions that achieve maximum ‘effective coverage,’ (see box below) for a specified budgetary limitation. Conversely, the model is also capable of identifying the lowest-cost combination of MN interventions needed to achieve a specified rate of effective coverage.

The Policy Questions

The MINIMOD tool addressed the following policy questions related to addressing VA deficiency among young children:

- Given the spatial/regional disparities in VA deficiency and the costs of VA intervention programs throughout the country, what combination of VA interventions will achieve the same level of effective coverage as current intervention programs, but at the least possible cost?
- Which VA interventions should be implemented, and where (nationally and sub-nationally: North, South and Cities)?
- When should selected interventions begin, be reinforced, and end over a designated (e.g. ten-year) planning time horizon?

While this case study focuses on the policy questions listed above, the MINIMOD tool is also capable of addressing questions related to other MN, and of taking the opposite approach and addressing the question: What is the maximum effective coverage that can be achieved given an established budget?

Scaling Up Nutrition (SUN)

The SUN movement emphasizes ‘knowing your problem’ and basing the programmatic response on an in-depth understanding of a country’s context.

That is exactly what MINIMOD is designed to do. Instead of arbitrarily choosing a VA intervention (based on donor preferences, ease of implementation, or short term budget constraints), MINIMOD provides national and subnational framework for selecting the most cost effective interventions across a geographically-varied, VA-deficiency landscape.
The Process

The process began with a significant investment in helping stakeholders to understand the MINIMOD approach, and clarifying exactly what the tool could and could not do. It was a new concept to many, so this was a lengthy but necessary series of conversations.

A nutrition working group consisting of stakeholders such as HKI, UC-Davis, the MoH, and UNICEF, was formed to guide the project and to promote use of the tool’s results. Discussions revolved around: types of VA interventions currently in use; alternative interventions with demonstrated potential; definitions of ‘success’ (including specific definitions of reach, coverage and effective coverage); and, finally, MINIMOD's ability to model a framework that would maximize the impacts of an increasingly-limited budget for VA and other types of MN programming.

Once a common understanding was achieved, a series of large workshops were organized and a mapping of all of the nutrition-oriented programming (throughout the country) was conducted, including both nutrition-specific and nutrition-sensitive programming. At first, gathering vital inputs from the group was very challenging; so, a small task force comprised of MoH, HKI and UC-Davis team members was assembled to lead this process more proactively, and to liaise with stakeholder groups individually, outside of the plenary context.

Inputs to the analysis included:

1. Data on the distribution of MN deficiency or risk of deficiency within the broader population, which drew heavily from the national survey of MN status and dietary intake conducted in 2009. The nutrition benefits model within the MINIMOD tool was then used to estimate the reach, coverage, and effective coverage of alternative interventions and combinations of them.

2. The costs of planning and managing alternative interventions to the targeted population groups. If candidate interventions had not yet been implemented at scale (e.g., VA-fortified bouillon cubes and VA bio-fortified maize), cost estimates were based on pilot studies, or on similar programs in other countries.

MINIMOD then analyzed these data sets and compared a ‘business as usual’ scenario (i.e., continuing with the VA programming that currently exists), to scenarios that included all possible alternative combinations of VA intervention programs, including hypothetical programs such as fortified bouillon cubes and bio-fortified maize, as well as investments to improve the performance of the VA fortified edible oils program. Finally, the MINIMOD tool identified the most cost-effective combination of interventions that could be delivered to specific target groups, in specific locations, and over selected periods of time.

Effective Coverage as an Indicator of Programmatic Impact

Effective coverage is defined as the proportion of individuals in a population who have inadequate dietary VA intake, and subsequently achieve adequate intake as a result of one or more MN intervention.

It can also be understood as the proportion that “converts” from inadequate to adequate VA intake following interventions. Effective coverage takes into account MN intake without any interventions in place as well as the amount of MN delivered through an intervention and is thus more likely to predict public health impacts in comparison to ‘reach’ and ‘coverage’.
Results

Over a 10-year period, continuing with ‘business as usual’ effectively covers approximately 12.9 million children at a national average cost of $2.34 per child-year (see table to the right). By comparison, the MINIMOD tool found that by introducing the fortified bouillon cubes, and increasing investment in fortified cooking oil, and reallocating resources between macro-regions and over time, the same level of effective coverage could be achieved at a cost of $0.71 per child-year. Notably, the investment in fortified oil would eventually allow replacements of the (expensive) high-dose VAS programs in certain (though not all) regions of the country.

This dramatic potential savings in total cost is made possible because MINIMOD’s economic optimization model takes advantage of spatial disparities in cost-effectiveness between the North, South and Cities (see map at right for costs), and achieves gains in efficiency by shifting resources among alternative intervention programs, across regions and over time. Interestingly, MINIMOD demonstrated that for all regions, the most expensive scenario would be to continue with business as usual.

Use of the Results

- The results of the MINIMOD analysis contributed to a review of the national Vitamin A supplementation program in Cameroon and the efficient reallocation of resources based on geographic regions as opposed to blanket supplementation.
- Additionally, the MINIMOD process led to the reactivation of a national food fortification committee, to the drafting of standards for monitoring food fortification programs, and to the collection/analyses of food industry and food market data to assess adherence to national fortification standards.

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4 Nutrition-‘sensitive’ interventions are interventions of other sectors (e.g., agriculture, social protection, etc.) that incorporate nutrition objectives (e.g., biofortification of staple crops).

Challenges to using MINIMOD in Cameroon

- The analysis was used to propose strategies that were different in each region. Maintaining cost effectiveness of these strategies would require good monitoring during implementation. This would have implications not only for cost but for capacity. Capacity can be built but requires political will to do so, an issue that is not unique to MINIMOD. The team learnt that ongoing presence in the country, persistence and patience were required to build understanding and political will, however for this ongoing commitment of funds and human resources were required.

- The MINIMOD tool showed that vitamin A supplementation continues to be necessary in the North macro-region, and that other interventions are likely to be more effective and more cost-effective in the South and Cities. Some policymakers thought that this would be politically unacceptable in the regions where VAS was to be curtailed. Political sensitivity was reduced during discussions of how best to use the ‘cost savings’ that would be generated.

- At first, some stakeholders perceived the project as aiming to completely eliminate VAS and was thus reluctant to support or be perceived as supporting the project. Members of the UC-Davis and HKI teams met with stakeholders, and over time gained their trust and helped them understand that the intention was to continue with VA supplementation in the short-term while looking for longer-term solutions that were equally effective, but more affordable and sustainable.

- All transitions to alternative programming require coordination and start-up investments, and the introduction of (say) VA-fortified bouillon cubes is no exception. Benefits would be generated starting in year four and continue to the end of the planning time horizon (e.g. 10 years). Convincing policymakers to make the needed investments during transition periods (of four years in this case), and shift to a longer-term approach, however, can be challenging. That said, policymakers often build roads, bridges, and port facilities, all of which require equal or greater patience. The great challenge, of course, is that port facilities can be seen, while reductions in VAD are invisible.

- There are challenges associated with collecting the timely, high-quality, sufficiently-disaggregated, dietary intake and micronutrient status data that allows MINIMOD tool to estimate national and subnational MN needs and the effects of alternative intervention programs in meeting those needs. In Cameroon, the 2009 MN survey provided an excellent source of data for this exercise, but in many countries, this type of information is yet to be available. A simplified version of the MINIMOD tool that makes use of generally available secondary data is being developed.

Opportunities and Unexpected Benefits

- Engaging local stakeholders around the MINIMOD process not only changed the language that was used in stakeholder meetings (e.g., to a focus on cost-effectiveness and effective coverage); but as importantly, it has helped participants understand the need for a national decision-making frameworks that identify subnational MN needs, and cost-effective national and subnational programs to meet them. This was very new to many stakeholders, who had previously relied on individual donors or implementers to dictate which MN programs are put in place based on their own biases and preferences.

- The MINIMOD team has collaborated with the Lives Saved Tool (LiST) team to link estimates of effective coverage to functional outcomes, such as child deaths averted by a given intervention (or combination of them). This allows the MINIMOD team to ‘translate’ nutrition-based indicators of programmatic impact into measures that resonate better with policymakers and that are easier to link to the Sustainable Development Goals (SDGs).6

- Finally, when considering various mixes of interventions to test, in-country actors tended to limit their thinking to interventions that are already being implemented in Cameroon, or that have been in the past. When well-facilitated, the MINIMOD process helps participants to generate hypothetical interventions into the mix, including many which have been tried in other countries with good results. In Cameroon, this led to the group considering both bouillon cubes and biofortified maize, and eventually concluding that bouillon cubes may be an option worthy of investment.

6 Nutrition Modeling Consortium Meeting Report – November 18, 2018

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