



Speaker Summary Note

Session: Science and Technology Levers

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Title: Priorities from a Nutrition Perspective

Lack of systematic planning to optimize the nutrient intakes of populations

The following science and technology levers have been selected from the perspective of a nutrition scientist, with training in agriculture, who has planned, implemented and evaluated many types of nutrition interventions over several decades; single and multiple micronutrient supplements in tablet, liquid and lipid-based forms; food fortification; animal source foods including meat and milk; nutrient-rich plants; and home garden development in the context of a large agricultural development program. These types of nutrition activities are usually not well-coordinated with other nutrition or health interventions, let alone with agricultural programs which typically pay insufficient attention to meeting the true nutritional needs of their target populations. Addressing food security is not the same as addressing *nutrition security*.

The nutrition community has attempted to fill gaps in known or perceived nutrient needs with a patchwork of micronutrient interventions mostly focused on women, infants and children, but in reality failing to address the needs of the whole population for the considerable number of important micronutrients required. The agricultural community attempts to fill nutrient gaps through biofortification and crop breeding, and home gardening programs, but these too struggle to fill all of the nutrient gaps. *Arguably, defining the nutrition gaps in a population should be a major priority and focal point for both nutritionists and agricultural planners.* Identifying these gaps, then joint planning based on how they can best be met, could provide an effective approach to linking agriculture with nutrition and health. In fact, without this joint goal it is hard to see how agriculture and nutrition can be linked effectively or efficiently.

Key developments that can coordinate linkage between the nutrition and agricultural communities to meet nutrient needs.

1. *Facilitating collection and analysis of information on usual food consumption patterns and nutrient intakes*

Too often, nutrition and agriculture program developers are extremely reluctant to collect any food intake data. Such data is perceived as overly-difficult and time-consuming to collect, unreliable and difficult to interpret. However we should start insisting on the importance of knowing what populations eat now, where they obtain that food, and the “gaps” in terms of their ability to meet nutrient requirements. In fact we can now appropriately interpret intake data collected on 1 day from only about 100 people in each

population subgroup of interest, with 2 days on a subsample. Progress in analyzing these data should be accelerated by the following.

- The imminent release of the IMAPP (International Micronutrient Assessment and Planning Program) software by WHO. This user-friendly software takes nutrient intake data and estimates the prevalence of inadequate (and excessive) intakes of specific nutrients in population groups, adjusting for day-to-day variability in intakes. It then allows simulation of the effect of increasing intake of specific foods, and of fortification at specified levels etc In other words, this is a tool that can be used for joint planning of agriculture and nutrition programs to meet nutrient gaps.
- IMAPP has developed generic estimates of nutrient requirements for all age groups including Estimated Average Requirements (EARs, missing from the nutrient requirement recommendations of WHO and many countries) which are needed to calculate adequacy of intakes. These are used in the IMAPP software.
- We need to link IMAPP to international food composition data bases such as INFOODS (FAO), or others such as EUROFIR and USDA. These tables should be adequate for most purposes with some rare exceptions.
- IMAPP is being linked to software that calculates the cost and limits of micronutrient additions to foods in fortification.

2. *Improved efficiency of analyzing nutritional status biomarkers*

Biomarkers of nutritional status are critical for enabling nutritional status evaluation, and planning and assessment both agriculture and nutrition programs. Common practice is to analyze none or few biomarkers due to cost and feasibility constraints. Hemoglobin (using a finger stick sample and field-friendly instruments) and perhaps an indicator of iron or vitamin A status. Even relatively sophisticated labs still analyze one biomarker at a time, using relatively expensive equipment and skilled technicians who can only 20 to 80 samples for a single nutrient in a day. PATH has supported development of a field-friendly RBP assay that has been used in the Ugandan national survey. Progress in developing multiplex assays in which multiple nutrients can be analyzed simultaneously, rapidly and cheaply, has been far too slow but assays available or under development include ferritin, transferrin receptors, RBP and CRP (iron and vitamin A status) by Erhardt et al.; PATH is working to develop a multiplex ELISA for simultaneous assessment of ferritin and transferrin receptors (iron status), retinol binding protein (vitamin A status) and CRP and AGP (inflammation) using a single dilution, which should be ready for testing mid-2011. A simple, rapid, anemia screening tool that measures presence of malaria-infected red blood cells, Hb, Hct, and red blood cell size, hemoglobin and number is well on its way to being available. A 5-nutrient assay is also under development but the results and feasibility for field application are not yet known.

At the same time there has been renewed attention to defining the types and cut-offs for biomarkers that should be used for specific purposes. WHO is revising recommendations for vitamin A and iron status biomarkers based on their evidence-based process. NIH is in its second year of its Biomarkers for Nutrition and Development (BOND) initiative in which cut-offs are being defined for a range of micronutrient status indicators based on their application to research, clinics, programs or policy.

Overall, these developments have the potential to enable agriculture and nutrition to become much more strongly linked. Agricultural planning should aim, as an early and extremely important priority, to fill the nutrient gaps that exist in the target population, and coordinate with nutrition programs.