Impact Pathways from Agricultural Research to Improved Nutrition and Health: Literature Analysis and Research Priorities

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Investment in agriculture is widely seen as a critically important opportunity for reducing malnutrition. There have been repeated calls for the international community to place a higher priority on "unleashing", "leveraging", "reshaping" or "realizing" the opportunities offered by agriculture to enhance nutrition and health. The donor community has responded, bringing a larger budget share to bear on the agriculture sector since the mid-2000s, reversing the steep decline of the previous decade. One of the stated aims of the renewed focus on agriculture is to encourage agricultural policies and programs to become "nutrition-sensitive" or "nutrition-enhancing", or more specifically, to make "agriculture work for nutrition".

The question is, how? Against a backdrop of demands for greater accountability, many donors and national governments are calling for evidence-based programming. This has fueled a search for rigorous empirical information that can inform policymakers on what kinds of agriculture to invest in (through research or programming) that will have positive benefits for nutrition and health, particularly among mothers and children. So far, that search has come up short. There is still "insufficient understanding of the evidence base on how best to achieve this potential." Indeed, an assessment of 23 studies of agriculture interventions, commissioned by DFID found "no evidence of impact on prevalence rates of stunting, wasting and underweight among children under five." Thus, knowledge about agriculture's impact on nutrition as summarized by Hawkes "Despite the clear potential for agricultural change to improve nutrition in low and middle income countries, the evidence base for this relationship is poor. Recent systematic reviews of studies which have evaluated agricultural interventions for improving nutrition reveal little strong evidence of impact, and a need for more and better designed research."

This paper contributes to ongoing work at many institutions aimed at identifying priority knowledge gaps, determining the best research approaches needed to fill those gaps, and exploring how to better support policy and programme implementation with sound empirical evidence of 'what works'. The paper has four parts. First, a discussion of approaches used in conceptualizing causal pathways from agriculture to nutrition and health. Second, an overview of research-based evidence on agriculture impacts on nutrition and health. Third, a discussion of knowledge gaps and associated priority research questions. Finally, conclusions on proposed priority research questions.

This review of the literature on impact pathways from agriculture to improved nutrition and health confirms the existence of important evidential lacunae that will continue to hamper activities in agriculture aimed at supporting nutrition until they are appropriately addressed. FAO recognizes that actions aimed at "increasing production of staple crops, are by themselves often not enough to accelerate reductions in hunger and malnutrition". The problem is that even a narrower focus on subsectors of agriculture producing outputs of higher nutrient density than others (such as horticulture and livestock, or more recently biofortification), suffers the same reality. The provision of higher levels of one or other nutrient, or one or other commodity, had not yet been shown to translate into enhanced physiological outcomes.

Once again, it is important to emphasize that the current lack of evidence does not mean that agriculture *does not* support gains in nutrition and health, rather that the evidence of positive impacts is still weak. Even that conclusion would be confounded by the host of methodological weaknesses that have been identified in the existing studies in this area. Thus, the lack of rigorous evidence suggests three important conclusions:

First, the quality as well as the volume of research on this topic *has* to be improved.

Second, research has to be improved in new ways that allow for elaboration of, a) specific mechanisms not just broad pathways, b) contextual counterfactuals (that may have more to do with the result than a narrow focus on single interventions might suggest), and c) appropriate metrics to allow for measurement of net, often non-linear, effects. There is an urgent need to advance innovative strategies to better understand, measure and promote nutrition and undertake research that allows a tracking of impact on multiple outcomes at once (such as diet, nutritional status, productivity, and income), designing studies that can attribute impact to specific approaches and collecting information on costs and cost-effectiveness.

Third, demand is high for empirical evidence of how to leverage agriculture's potential to promote enhanced nutrition and health. Funding streams have shifted recently towards the agriculture sector, and multisectoral actions with nutrition intent are high on many donor agendas.

That means ensuring, a) designing evidence-capture in ways that will pass the bar of methodologically rigor when included in future systematic reviews, b) ensuring that appropriate nutrition outcomes are selected in relation to the kinds of research and intervention pathways concerned, c) focusing on understanding mechanisms (multiple intermediate links in the chain) and not just theoretical pathways leading to poorly defined outcomes, d) linking agriculture research much more closely with public health systems research that can help fill in knowledge gaps about dose-response and confounding mediating factors in the food system environment, and e) spreading research to regions and countries not well-represented in the existing portfolio of studies (namely, semi-arid and hill/mountain areas, West Africa, Latin America and Oceania, regions of low population density, and peri-urban settings).

For the coming decade, *pathways research* will arguably be relatively less important than *mechanisms research* since so much remains to be understood about the reasons why, and contexts in which, nutrients available in foods do (or do not) become the building blocks for defined and measurable nutrition outcomes. Similarly, while it remains important, continuing research on products (enhancing nutritional value of individual crops) has to be placed more appropriately in the wider context of human impacts that derive from choices relating to both farm and non-farm investments, activities and consumption.