

## EDITORIALS

### Agriculture and health

Agricultural research needs to be better integrated with nutrition and health outcomes

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We live in a “triple F” crisis. Global and European financial problems dominate the press and the concerns of privileged people in privileged societies. But for the poor it is fuel and, for most of the poorest, food that present the greatest direct threats to their daily lives. Our ability to sustainably produce and ensure access to a diet of sufficient quantity and quality (in terms of vitamin and mineral content) is central to guaranteeing both food and nutrition security, and it is a major emphasis of current global development policy and planning.<sup>1</sup> In the linked systematic review (doi:10.1136/bmj.d8222), Masset and colleagues assess evidence from low income countries on the effects of interventions that aim to improve children’s nutritional status by enhancing households’ agricultural production and improving diets.<sup>2</sup>

Great strides have been made in ensuring global food security in the past 50 years. Global food production has largely kept pace with population growth, allowing not only more people to be fed but also greater consumption of a wider diversity of vegetable—and particularly animal—source foods, especially by the rich. However, success must be tempered by recognition of serious system failures—recent data suggest that almost 30% of children under 5 years of age are stunted (a marker of chronic undernutrition) and nearly 9% are wasted (a marker of acute undernutrition). Hundreds of millions of people across the globe are deficient in key nutrients that can result in long term poor health and functional losses, such as vitamin A, iron, and iodine.<sup>3</sup> Continuing high and volatile food prices are likely to lead to further deterioration of global nutrition.<sup>4</sup>

The links between agriculture and health are complex and bidirectional: agriculture provides a source of food and income at the household and national level, and healthy populations are more economically productive. Agriculture is important for ensuring food security and thereby reducing undernutrition, but also, by defining the foods available for consumption, agriculture has an increasingly crucial role in the global patterns of non-communicable diseases.<sup>5,6</sup>

Two links between agriculture and health are the “own production” and “market” pathways. The own production pathway (where households eat food they produce themselves)

links households’ food production directly to their access to food and its consumption, and thereby potentially with changes in markers of nutritional status and health. The wider market pathway (where households eat food bought in markets) links food production with greater and cheaper food availability in markets, higher household incomes, and increased purchases of goods and services (such as food, health, and education). This pathway is an important element within agriculture’s powerful role as a driver of wider economic development and increased economic and social prosperity.<sup>7,8</sup>

In this context, critical examination of whether agricultural interventions directly affect nutritional status via the own production pathway is important. Masset and colleagues found no good evidence to show whether or not agricultural interventions that promote improved nutrition in producer households affect the nutritional status of children in these households.<sup>2</sup> The review highlights substantial weaknesses in the evidence base. Of the 23 included reports, 22 were cross sectional or longitudinal comparisons of people or households that were adopting (or had adopted) a range of agricultural interventions, and only some of these studies matched the intervention with control groups. Furthermore, the small size of many of the studies resulted in insufficient statistical power to detect potentially important effects. The review does not investigate the evidence base for the impact of the market pathway on the nutrition and health of children.

There is a pressing need to bridge the research divide between the agriculture and health sectors and to integrate nutrition and health outcomes more fully with agricultural research. Randomised controlled trials that investigate the nutritional and health effects of agricultural interventions via the own production pathway are possible and feasible (effects via the market pathway are more difficult to investigate in this way), and more controlled trials should be conducted in agricultural research. Indeed, Masset and colleagues cite a systematic review that analysed nine trials designed to identify the effect of biofortified maize on child growth in producer households.<sup>9</sup> Innovation is also needed to find ways of measuring outcomes for interventions that cross traditional sectoral thresholds.

The current evidence base that links agricultural interventions directly with child nutrition and health outcomes is limited, and Masset and colleagues show that it is currently not possible to say whether or not agricultural interventions benefit child health via the own production pathway. However the evidence from econometric analyses is that growth in agriculture benefits poor people more than growth in other sectors,<sup>7 8</sup> and that (outside of India) it has a greater impact than non-agricultural growth on child undernutrition and energy supply (although not on dietary diversity).<sup>10</sup> Investment in agriculture for the sustainable production of, and access to, sufficient food of adequate nutritional quality must therefore remain a key development focus. Cross sectoral learning and integration between agriculture and health should also move up the agenda to provide robust evidence for making sound policy in this important area.

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