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The future of agriculture through a hunger eradication lens



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Andrew is now retired in Tuscany, growing much of what he eats. He spends quite a lot of time trying to convince people that the time has now come to put an end to hunger and encouraging them to invest in secondary education in rural Kenya.

I last came to Reading in 1968, invited by Hugh Bunting to present a paper at his International Seminar on Change in Agriculture. I talked about the factors driving the very high rate of innovation amongst the small-scale vegetable farmers of Aranjuez in Trinidad, the subject of my PhD research. Hugh visited farmers with me and was fascinated to see how up-to-date they were with modern technology. I was never taught by him, but regarded him as one my mentors.

And so I feel very honoured to have been invited to deliver this Hugh Bunting Memorial Lecture. I would like to think of him sitting in the front row, judging whether I have learnt anything useful over these past 44 years. If anything, I have learnt to try to simplify matters (because most people seem to like complicating them), to be suspicious of “fashionable” ideas in development, and not to believe all I read, even when it comes from illustrious sources. I have also learnt to be optimistic.

So, let me start by quoting from a complicated report that I have just read with rising impatience. It is called *Sustainable Agricultural Productivity Growth and Bridging the Gap for Small Family Farms*. It is presumably authoritative as it was written for the upcoming G-20 meeting by Bioversity, CGIAR, FAO, IFAD, IFPRI, IICA, OECD, UNCTAD, UN-HLTF, WFP, WB and WTO! In one place it says “According to FAO, closing the gender productivity gaps associated with unequal access to resources could raise the total agricultural output in developing countries by 2.5-4%, leading to a reduction of 12-17% in the number of people undernourished globally”. I have few problems with the first part of the statement, but the second repeats the unfounded but very widely held assumption that increases in farm productivity – whether by women or men – automatically reduce the number of hungry people. The constant propagation of this idea is, I believe, a main reason for persistence

of the hunger problem, because it has tended to close the door to serious consideration of other approaches and to lead to Ministries of Agriculture being usually responsible for hunger reduction. The authors have also sinned by misquoting the original source, which correctly said *could* lead to this fall in hunger. Hugh Bunting would not have liked such sloppiness.

The world's food system is in a mess. Since 1945, we have raised food output much faster than the record rates of population growth. Population has almost tripled, from 2.5 billion to 7 billion, and food availability per person is 40% higher. But the nutritional outcome is dire – 1 billion hungry and famines still occurring; over 2 billion suffering from vitamin and micronutrient deficiencies, and about 1.5 billion overweight or obese. In spite of ample food supplies, the health and life expectancy of about two thirds of the world's population is being damaged – and their productivity (and hence the prosperity of their communities and countries) compromised – by eating badly. Equally seriously, food production and waste is putting unsustainable pressure on the natural resources (including climate systems) needed by future generations to meet their food requirements.

This evening, I want to make six main points:

- 1/ We must de-couple thinking about eradicating hunger and malnutrition from thinking about assuring long-term global food security.
- 2/ Ending hunger and malnutrition through direct measures is quite simple, costs remarkably little and puts minimal extra pressure on global food supplies – and it can stimulate local agricultural development.
- 3/ The biggest strain on the global food system comes from our waste and over-consumption in the industrialised countries, not from the hungry. Our eating habits cause huge health and environmental damage, and it would be disastrous if



they were to be emulated by the billions of people whose rising incomes will allow them greater food choices.

- 4/ It is possible and necessary to make rapid shifts to truly sustainable food production and consumption systems, but these will be driven more by changes in consumer behaviour and by measures to conserve natural resources and to slow climate change processes, than by the agro-industrial complexes that have set the main directions of post-war farm development.
- 5/ Small and medium-scale producers in developing countries will have comparative advantages, but their capacity to respond to the new opportunities can be greatly helped by more publicly funded agricultural research, greater sharing of knowledge, and food pricing that rewards their hard work, risk taking and environmental stewardship.
- 6/ For the good of humanity, we must now seize these great opportunities to end hunger and to engage in sustainable food production and consumption behaviour. For this, the global institutions responsible for food system management must be given more teeth so that they can take deliberate actions to steer the system in the right direction.

Expanding food production alone will never end hunger

"It will help to end hunger" is used to justify almost anything that promises increased farm output, in spite of the evidence that links between rises in food availability and the incidence of hunger are weak. Most governments believe that, to end hunger, they must expand food output, in the false expectation that the extra output will end up on the plates of those who need it rather than of those who can afford to buy it (and who may already be eating more than is good for their health).

Thirty years ago Amartya Sen showed that famines occur even when food supplies are adequate. At the global level, the long period of rising food production and falling prices that started in the 1980s failed to lead to the big fall in the number of hungry that might have been expected; it remained at around 800 million people. We have been silent witnesses to a diffuse famine throughout this period of plenty – a famine that has not caught media attention but which has caused millions of people, including lots of young children, to die prematurely each year. What is worrying is that few people seem to care. Yet, if you think about it, through our inaction, when the means have existed to address the problem, we have become accomplices to probably the biggest crime against humanity perpetrated by our generation, with chronic hunger needlessly causing many more deaths than the two world wars or any recent famine.

For almost 40 years I helped countries prepare and implement projects for improving agriculture – and I like to think that they raised food availability, generated good economic returns and improved the livelihoods of rural people. Looking back, however, I realise that their impact on chronic hunger was probably marginal. They simply passed over the heads of the hungry. They may have benefited lots of small-scale farmers and their workers, but mostly those who had access to services, including markets, or had jobs, and not the people caught in the hunger trap.

The failure to reach the hungry is because, whether they live

in the country or the cities, chronically hungry people, have, by definition, a dietary energy intake of below 120% of their basic metabolic requirements (BMR). They, therefore, don't have the energy or strength for a day's hard work (which would require more than 170% of BMR), so cannot get a job to earn enough money to buy more food. Nor can they grow it. The chronically hungry lie outside the mainstream of society and cannot enter it through their own efforts alone, and they have no resilience to shocks. They are disproportionately susceptible to disease, and face lower life expectancy. Children who are born hungry will, if they survive their stunted childhood, be at a life-long disadvantage vis-à-vis their well-nourished contemporaries.

And so, I would argue that:

- Expanding food production to keep pace with growing demand is necessary for ensuring long-term global food security and preventing food price spikes that can drive more people into hunger;
- Agricultural and rural development amongst small-scale farmers in developing countries can play a vital role in improving rural livelihoods;
- Helping subsistence farmers to diversify and raise food output can have a direct impact on their nutrition, but requires different instruments than those for market-linked farmers (e.g. sweat equity investment, low external inputs).
- BUT expanding food production, alone, will never put an end to hunger and malnutrition.

By barking up the wrong tree for so many years, we have perpetuated needless human suffering and death on a huge scale.

Ending hunger and malnutrition is not as difficult as you think

Many economists say that we need to get rid of poverty to be able to end hunger, and that poverty will fall as a result of economic growth. My view is that hunger is both a cause and an effect of poverty. And so direct action to enable hungry people to eat adequately is a very tangible first step towards freeing people from deep poverty and opening the way to faster growth, as better nutrition enables poor people to work, acquire skills and become bigger consumers.

The marginal amount of food required to enable hungry people to step above the hunger threshold and so stand on their own feet is quite small. FAO says the average depth of hunger amongst chronically under-nourished people is about 250-300 Kcals per day – or the equivalent of roughly 70 grams of rice or wheat, which translates into about 25 to 30 kg of cereals per year. Having shared the popular perception that ending hunger would cause the world food system to collapse, I was surprised to find that enabling 1 billion people to escape hunger would require less than 2% of the 2.3 billion tons of grains produced each year (or 15% of the food wasted in industrialised countries). And, even assuming a rather high cost of \$1,000 per ton (enough probably also to pay for other desirable nutrients, some nutrition education and programme management), the total cost would be \$30 billion per year (or just \$2.50 per hungry person per month).

So, when we go for hunger eradication, the issue is not one of



food availability – nor, probably, of fiscal affordability – but one of how to give undernourished families the means to buy the food that they need. In the long term, it means adopting more equitable economic growth policies – but before these are in place, many more hungry people will be dead.

There is now lots of evidence that the simplest, fastest and cheapest way to end hunger is through cash transfers of a value equivalent to at least the average food deficit, targeted as accurately as possible on the undernourished. The experience of such social protection programmes, initially in Latin America and now also in Africa, is that recipients use the grants mainly for food, putting anything over into productive investments. The key needs are for accurate targeting, honest management (greatly facilitated by electronic transfers to adult women in the participating families), predictability and adjustment of values to local food price inflation. Proposals are often made for attaching conditions to participation (e.g. keeping children in school) or for linking grants to building public works, but I believe that these merely complicate management and add costs without bringing extra benefits for the hungry. Nor do I see food aid as a viable option for reducing hunger except in emergencies. It is difficult and costly to handle, upsets local markets and restricts individual nutritional choices.

Ten years ago, I led a joint World Bank, IDB and FAO team to review Brazil's Zero Hunger programme between Lula's election and the start of his Presidency. Much the largest component is *Bolsa Familia*, a cash transfer programme for over 12 million households (50 million people), costing about \$30 per person per year. Together with an expanded school meals programme, it has already led to big falls in the number of poor, spectacular drops in child mortality and stunting, higher levels of work force participation amongst beneficiaries, and economic growth where it is most needed – in poor communities. It deliberately enables small-scale farmers to respond to the increased demand, by expanding credit availability, accelerating land reform, requiring 30% of school meals ingredients to be bought from small farms, and buying food for emergency programmes also from them. And so, instead of taking a supply-driven approach to raising food output for the hungry, it converts their unmet food needs into demand.

Strangely, the biggest opponents of such programmes are comfortably off people in developed countries who characterise them as “welfare”, “dependency creating” and “undermining dignity” – but I am sure that you would dismiss such reasoning as soon as you put yourself in the place of a mother whose children have gone to bed hungry and does not know where the next meal will come from – unless she borrows, begs, steals or prostitutes herself. I do not think that any human condition can engender greater dependence than chronic hunger.

Another common objection is that these programmes are fiscally unsustainable. But the evidence from Brazil and elsewhere is that they represent a highly viable investment in human capital, generating their own streams of economic benefits, as more people enter the work-force and are able to fulfil their full physical and intellectual potential.

And so, I conclude that any country that wants to end hunger should put in place a nation-wide social protection programme (with no strings attached), targeted on the chronically hungry, as its main instrument. Once operating, this can be a vehicle

for other targeted assistance on additional aspects of nutrition (such as mother and child supplements), support for subsistence farmers, clean water and sanitation, basic health services (including reproductive health) and practical skills training to enhance employability.

The imperative to cut food waste and overconsumption

Many people have taken FAO's widely quoted forecast of a need for 70% more food production to meet the demand of 9 billion people in 2050 (still leaving 370 million people hungry) as a prediction of the inevitable. This was never the authors' intent. It is simply a warning that, if we allow present trends to continue, we shall end up in a still worse food mess!

Surely we cannot sit back, do nothing and let trends continue unchallenged that have resulted in consumers in industrialised countries wasting more good food each year than the total net food production of Africa; that will perpetuate hunger and malnutrition on a massive scale, and lead to further increases in the number of people who are overweight and obese, creating a massive future burden of non-communicable diseases, as well as a lot of environmental damage. What the FAO forecast tells us is that, if we retain a *laissez-faire* approach to food system management, and leave the market to sort the problems out, the outcome will be bad news for humanity.

Much can be done to assure a better outcome. But I shall limit myself now to discussing food pricing.

The relative cheapness of food and its decreasing share in consumer spending as disposable incomes rise is at the heart of the waste and over-consumption problems. And low farm-gate prices make small-scale farmers amongst the poorest people in the world. Low food prices also mean that consumers fail to foot the bill for the environmental damage being caused by their eating habits. At the very least, food should be differentially subsidised or taxed according to its environmental footprint vis-à-vis its nutritional value and to whether or not it is sourced from socially and environmentally sustainable production systems. Rather than effectively subsidize over-consumption, unhealthy eating and waste, as now, governments should use taxes, amongst other measures, to induce changes in the behaviour of middle and high income consumers. Their immediate behavioural response may be poor, but, in this case, taxes will at least generate revenues to finance social protection, consumer nutrition and life-style education, and promote sustainable food production systems. Such measures are urgently needed in fast-growing developing economies so as to forestall tendencies to emulate “western” diets and replace these with healthier eating habits.

My back-of-the-envelope calculations show that it is feasible to reduce future food demand from an extra 70% to around an extra 50% by 2050 – a figure that also emerges from CIRAD's Agrimonde Study. This requires quite small changes in consumer behaviour: further reductions in birth rates can help, but will be largely offset by greater longevity.

This cut in future food demand would not only generate huge future health care savings and take pressure off scarce natural



resources but also make shifting to sustainable production systems much less daunting.

Accelerating the shift to sustainable food production

I am puzzled as to why the IAASTD - the International Assessment of Agricultural Knowledge, Science and Technology for Development - has been largely set aside by the “powers that be”. Perhaps it is wrong to blame only “corporate interests” for this, because I think that the natural conservatism of many agronomists of my generation who have seen – and contributed to – the extraordinary surge in food production since World War 2 may also be standing in the way of change.

Interestingly, in spite of downright opposition amongst people who claim to have science on their side, farmers are rushing ahead with adopting practices that slash input use and greenhouse gas emissions, reduce soil damage and improve water use efficiency. Francis Shaxson and other TAA members who challenged conventional views, are now seeing Conservation Agriculture spread around the world at an exponential rate as farmers find that it makes them richer. It is also fitting that the TAA is proposing Norman Uphoff as their candidate for the World Food Prize. His foresight, courage and tenacity mean that the System of Rice Intensification is now applied in over 40 countries. I believe that SRI is set to eventually become the norm for rice growing, and its principles are applicable to many other crops. Farmers also like technologies that harness biology to control pests and parasites, and get huge yield gains – like ICIPE’s *Push-Pull* that not only cuts maize stem-borer infestation but also controls *Striga*.

For years, there have been huge opportunities for more efficient use of inputs, including slow-release fertilizers, accurate fertilizer placement, and electrostatic pesticide spraying, but there is no incentive for those who sell inputs and guide farmer choice to promote them.

The more sustainable a production technology is the lower will be its demands on most purchased inputs, particularly fuel, fertilizers and pesticides but also water. Hopefully, just as rising fuel prices have forced car makers to invent fuel-efficient engines, higher oil prices will make input efficiency a concern for farm input and machinery manufacturers. But, in general, there are fewer privately appropriable benefits from innovations that contribute to sustainability, and hence we badly need a surge in publicly funded research, engaging farmers in the process.

The comparative advantages of small-scale farmers

Many people question whether small-scale farmers in developing countries can meet future food demands, portraying them as slow to take up yield increasing technologies. My own research convinced me that this is not the case. The fact that agricultural production in developing countries has risen twice as fast as in developed countries (at almost 4% per year since the 1970s) and most comes from small-scale farmers, is surely ample proof of their response capacity.

Many years ago, I was evaluating a T&V based extension project in Bangladesh. I asked the extensionists what “messages” they were giving to farmers. They said “to plant in rows”. “Why?” I asked them, and there was silence until someone bravely said “To improve photosynthesis”. In the coming days, I visited farmers and found lots were using various forms of weeders, made by local blacksmiths, having recognised the real advantage of row planting, one step ahead of their supposed mentors.

The fact that the farmers’ field school movement has spread so widely, with millions of farmers in all continents participating on an entirely voluntary basis, is evidence that they are hungry for good ideas, if they see that they are to their own advantage. I have no doubt that, if consumers pay a just price for food that is reflected in higher farm-gate prices, and if input prices also rise, small-scale farmers will respond, raising output through the greater use of low input technologies like CA and SRI. And the process can be accelerated if they – and possibly also researchers who come up with new ideas – can be rewarded through carbon credits that pay them for greenhouse gas emission reductions.

To the extent that extra food needs are met by small-scale rather than industrial scale farms, the multiplier effects, especially through the creation of jobs, will be all the greater, and rural communities can be revitalised rather than drained of the best and brightest through the lure of the cities.

Closing thoughts

I want to see four outcomes:

First, that as the Millennium Development Goal phase draws to a close, the world adopts the goal of eradicating hunger by 2025. We have all the means to achieve it, and it can only do good. It will require a big collective effort between nations but it will stand out in history as one of the great achievements of our time. Not to do all we can towards ending hunger rapidly, when it is possible, is to be complicit in perpetuating human suffering and premature death on a vast scale. To make sure that all their people can eat properly should become accepted as a perfectly normal function of any government.

Secondly, I want to see an end to nutritional madness, through policies that curb food consumption excesses and that lead those whose income growth widens their food choices to follow healthy eating patterns.

Thirdly, I want to see an accelerated transition to sustainable food production systems, led by small-scale farmers and underpinned by a surge in publicly funded research and sharing of knowledge and ideas.

Finally, I believe that we need to give greater powers to the international institutions that manage the global food system. They must have the power to:

- Require countries to plan for hunger eradication and help each other to achieve this, holding them accountable for delivery against their commitments.
- Ensure that global food stocks are maintained at safe levels and used to reduce extreme price volatility.
- Require, in the event of global food shortages, that over-consuming countries curb excessive food use and waste (if



necessary by rationing) so as to prevent the burden of shortages falling, as now, on those who are already hungry.

A few years ago, I tried making the case for an International Convention for the Eradication of Hunger and Malnutrition as the legal instrument to provide international institutions with

these powers, but I gave up when faced with little enthusiasm on the part of governments. I am glad that the idea is beginning to surface again now, as it may offer the only way out of the present madness.