Income from work:
The food-population-resource crisis in 'the short Africa'

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'*Africa*' here means '*the short Africa*': excluding North Africa, islands and South Africa. All these are sharply distinct from the rest of Africa environmentally, agriculturally and economically. Mostly, they are also well ahead in mean income, poverty reduction, growth, farming (irrigation, fertiliser, seeds), and demographic transition. The short Africa is highly diverse, but no more so than India or China.

Much talk of Africa moans of stagnation or trumpets economic renaissance. Africa does not face stagnation or renaissance, but a crisis in people's ability to get income from work.

Workforce

Between 1950 and 2012, population in the short Africa rose five-fold. It will more than double again[1] in 2012-50, to 11.3 times its 1950 level. Workforces – people aged 15-65 – are rising faster still, thanks to better child survival and some fall in fertility. In 1985 sub-Saharan Africa had 106 people of prime working age for every 100 dependants; by 2012 there were 120; in 2050 there will be 196.[2] That is a 63 per cent rise in workers-per-dependant from now to 2050 – and a 3.5 per cent rise *each year* in the number of people aged 15-64. In South and East Asia, a similar rise provided a demographic window of opportunity, contributing about a third of the 'miracle' of growth and poverty reduction.[3] That happened because the extra workers found productive employment. At first, this was mainly in smallholdings. They used more labour, because it paid to apply more fertilisers, control water, and harvest green-revolution crops. Often, land redistribution also raised employment and output. Later, farm transformation both increased demand for industry and services, and released farmworkers to them as farms mechanised.

In the short Africa, will the swelling ranks of young workers produce Asian miracles – or worsening poverty, unemployment and violent unrest? Farming will decide in Africa, as it did in Asia. Farms remain the main income and work source for 70 per cent of the short Africa's economically active people – more among the young and the poor.[4]

This will change, but not fast. Official rural-to-urban migration data and projections in Africa are huge overestimates.[5] Neither mines nor manufactures have so far offered many affordable workplaces, especially to the unskilled poor.

Smallholdings

Within farming, smallholdings (below 1-5 hectares, dependent on land quality) are central. They support most farm people, and will long do so. Small farmers are efficient resource users and keen (if risk-averse) innovators. In developing countries, where farming relies more on supervised family labour than on capital, small farms usually produce more output per hectare than large farms – and provide far more employment and labour income per hectare. ('Per hectare' is crucial, because most of Africa is running out of spare land.) However, offsetting smallholders' lower unit cost to farm, they often face higher

[1] Asian populations grew less, and slowed more and faster: South Asia 489.6m (1950), 1752m (2012) and 2394m (2050, medium projection); East Asia 672m, 1586m, 1512m; South-East Asia 173m, 696m, 759m; short Africa 168m, 835m and 1902m: UN (ECOSOC), *World Population Prospects: The 2010 Revision*.

[2] UN 2010.

[3] R. Eastwood and M. Lipton, 'Demographic transition in sub-Saharan Africa: How big will the economic dividend be?', *Population Studies*, 65 (2011), 9-35.

[4] M. Lipton, 'Learning from others: increasing agricultural productivity for African human development': Background Paper, UN Africa Human Development Report, 2012, Table 2; FAO, *Statistical Yearbook 2009*; World Bank, *African Development Indicators 2008-9*, p. 8. Many farmworkers do significant non-farm work, and vice versa.

[5] D. Potts, 'Whatever happened to Africa's rapid urbanization?' (London, Africa Research Institute, 2012); M. Lipton, *Why Poor People Stay Poor: urban bias and world development* (Temple Smith, 1977), pp. 224-6.

costs to process their crops, and sometimes to reach supermarkets. However, once small farmers have enough surplus to sell, it usually pays intermediaries to provide such services.[6]

In 1977-84, when China reformed land into equal family smallholdings and relaxed price restrictions, these farms – most below 0.7 hectares – used water-control, fertilisers and improved seeds to raise rice and wheat output by over 6 per cent per year for six years. Much of India, Bangladesh, Indonesia and other parts of Asia also did extremely well. Some areas and smallholders did not benefit, but radical improvements spread far beyond the innovators and the best lands. Asia's demographics also improved sooner and faster than Africa's: child mortality

A farmer harvests part of his cassava crop, in Osun State, Nigeria. Partners such as the Alliance for a Green Revolution in Africa (AGRA) are working to strengthen the agricultural value chain – from the seeds planted, to improved farm management, to bringing crops to market. Their focus is on helping small-scale farm households, by bringing about sustainable, equitable development across the African continent. Photo: © Bill & Melinda Gates Foundation.

fell much faster, and this is the prime mover lowering fertility.[7] In 1950, most agreed that South and East Asia, near the land frontier, had been dealt a worse demographic and resource 'hand' than Africa. Yet large swathes of Asia in 1965-2000 showed that smallholders can lead transformation *within* agriculture – and hence, afterwards, transition *out of* agriculture. The conditions are public infrastructure and commitment, new science, and firms (sometimes, large farms) – and social capital – helping smallholders to co-operate, process, and liaise with expanding or globalising markets.[8]

Most of African agriculture has suffered decades of policy neglect, and extraction – from both farmers and natural resources. It faces harsher problems in resolving the demography/smallholder/resource crisis than Asia did. To produce more, sustainably, farms need enough land, water and soil nutrients. In the short Africa, below 1 per cent of cropland is irrigated (compared with 20-25 per cent in South/East/South-East Asia in 1965, and 35-40 per cent now). Below 2 kg/hectare of main plant nutrients – nitrogen, phosphorus, potash – are applied, compared with over 150 kg/hectare in South/East/South-East Asia.[9] Lack of water control makes farmers reluctant to apply fertiliser even if available. There are successes: some agronomic advances; better seeds, such as hybrid maize in Zimbabwe and elsewhere, and perhaps new varieties of cassava and rice in West Africa; 'smart' subsidies, such as Malawi's for fertiliser; the Alliance for a Green Revolution in Africa's pilots of improved local input development and delivery; ambitious, pre-financed land-water development in the Comprehensive Africa Agriculture Development Programme. However, solving Africa's workforce crisis requires a much wider spread of fast growth of farm output. This normally starts with main food crops, and requires more fertilisers and water-control. Advocating 'low-input' farm growth is seeking bricks without straw.

Land and water

Since 1950, most Africans have not enjoyed sustained, rapid growth of food staples yield. Yet there are five times more Africans now than in 1950, and most are farmers. How did they get food, income and work? Mainly by expansion into new farmland. However, this produced barely survival rations. Africa's data for output of food staples are largely worthless.[10] However, decent data for nutrition, food trade, and dollar-a-day poverty (affecting a stagnant 50 per cent of Africans in 1981-2005) imply that calorie output and intake per person in most of Africa are no higher than in the early 1960s.

Thus farmers' strategy of feeding themselves by land expansion – forced on them by insufficient public attention to irrigation, fertiliser access and seed improvement – failed to advance living standards. Moreover, the strategy is fast becoming unsustainable. In most of Africa, farmland *expansion* is inducing, or soon will induce, soil depletion that means net farmland *loss*. (That, alongside the water squeeze, burgeoning population and workforce, and scant non-farm employment prospects, is why there is a crisis.) Forced farm expansion has spread land-exhaustive, largely unfertilised crops, especially

[6] M. Lipton, *Land Reform in Developing Countries* (London, Routledge, 2009), ch. 2; R. Eastwood, A. Newell and M. Lipton, 'Farm size', in P. Pingali & R. Evenson (eds.), *Handbook of Agricultural Economics vol. 4* (Rotterdam, Elsevier, 2010); T. Reardon and J. Berdegue, 'Retail-led transformation of agri-food systems' (Washington DC, World Bank, 2007); T.W. Schultz, *Transforming Traditional Agriculture* (Yale, 1964); A. Berry and W. Cline, *Agrarian Structure & Productivity in Developing Countries* (Baltimore, Johns Hopkins, 1979).

[7] D. Conley, G. McCord and J. Sachs, 'Africa's lagging demographic transition', WP#12892 (National Bureau of Economic Research, 2007); Lipton and Eastwood (2011).

[8] M. Lipton, 'The family farm in a globalizing world' (International Food Policy Research Institute, Washington DC, 2005).

[9] Lipton 2005: *sub-Saharan* Africa has 3.7% and 7 kg/ha, almost all outside the short Africa.

[10] M. Jerven, *Poor Numbers* (Ithaca, Cornell, 2013), pp. 14, 79, 103.

maize, into areas that – without fertilisers or irrigation – can sustain only extensive grazing. In 2002-3 in sub-Saharan Africa, 40 per cent of farmland was losing over 60 kg/hectare of main plant nutrients each year; 95 million hectares had been severely depleted of soil nutrients.[11]

Is the short Africa's farm water position also critical? Few countries outside the Sudano-Sahel face *physical* water stress (defined as over 75 per cent of river flows withdrawn annually, net of recycling), and agriculture gets over 80 per cent of fresh water. Yet such aggregates conceal local reality. Probably, the proportion of food staple crops dying for lack of water is higher in the short Africa than in any other region. All but a few countries face *economic* water stress.[12] Without irrigation, this means that many farmers cannot get water at some crucial crop time. Further, much African land expansion has been into marginally rainfed land. Global warming boosts evaporation and transpiration in the hot peak seasons, and makes rainfall less reliable. Unlike Asia and Northern (and South) Africa, where substantial irrigation spread before (and enabled) the green revolution, in the short Africa the farmer must fight vociferous expanding cities, mines and industries for irrigation water that she does not yet have.

Supply and entitlements

But need one worry about the determinants of food *supply*? Hasn't Amartya Sen[13] shown that most famines, and most hunger, happen when there is ample food to go round – because many people lack *entitlements* to that food? The answer is that in Africa most food entitlements, especially for vulnerable people, come from farmwork, largely on family land but sometimes for other farmers. Rural non-farm work (and urban work) matter too, but their growth usually depends on earlier growth of farmers' demand. So big rises in non-farm employment usually require prior growth of farm income, output and employment. This priority is local, not just national, in much of Africa: expensive and bad transport means that local food adequacy often depends on local food supply. Further, if we look beyond hunger to national development and transformation, these have almost always followed expansion, initially in smallholder agriculture, of both work and productivity.[14]

The short Africa's swelling young workforce, its food farming that stubbornly lags far behind achievable levels, its threatened soil-water base – all these faced Asia in 1965 too. Like all crises, they offer not only risks of disaster, but

Farmers like Linet Wanzunzi help grow and sell improved bean seeds to other farmers. Linet's initial investment in seeds turned into a five-fold profit. Photo: © Bill & Melinda Gates Foundation

[11] J. Henao and C. Baanante, *Agricultural Depletion and Soil Mining in Africa* (Muscle Shoals AL, International Fertilizer Development Corp., 2006); see A. Haileselassie, J. Priess, E. Veldtkamp, D. Teketay and J-P. Lesschen, 'Assessment of soil nutrient depletion and its spatial variability in Ethiopia', *Agriculture, Ecosystems and Environment*, 108 (2005), 1–16.

[12] International Water Management Institute, 'Trends in water and agricultural development' (2007).

[13] A. Sen, *Poverty and Famines* (Oxford, 1981).

[14] Once a region cannot much expand sustainable farmland affordably – increasingly true of the short Africa – if all main groups are to reduce their poverty (a) agricultural labour productivity must grow, but (b) productivity of land (and in many cases water) must grow *faster*, so farm employment rises.

(as Asia's green revolution and demographic transition showed) great opportunities too. Being behind offers a chance for quick catch-up:[15] *not* to large capital-intensive farms, ideal in America and Australia but costly and often disastrous in Africa, but to skilled smallholder intensification, with controlled, carefully managed water and fertiliser. Such farms prevail in most of Asia, and parts of Africa too, but past failures show that smallholder-led development in Africa is by no means a soft option. How might Africa have a good crisis?

Stop kidding ourselves that economic renaissance has already arrived

Faster GDP growth in Africa since 2000 is mostly a statistical illusion.[16] Local evidence, and trade and nutrition data, reveal what the 'poor numbers' for aggregate GDP and food output cannot. Staples yields (and labour productivity) have not reversed the dismal trends that Timmer diagnosed two decades ago. Big, *credible* rises are seen in only a few African countries (e.g. Rwanda, Ghana). Most of the populous ones (Ethiopia, Nigeria, the Democratic Republic of Congo) tell a sad tale.

A few African countries have enjoyed a mining boom. Unfortunately, mining expansion alone seldom eases the employment-land-food-income crunch, and often makes it worse. 'Big mining' normally employs few, pumps up corruption,[17] and draws incentives and resources away from employment-intensive activities, especially farming. Instead, manufacturing-first strategies might create a good deal of employment (though in Africa this has seldom happened), but raises serious questions of competition with, say, Vietnam on skills and labour cost.

Unusually, analysis supports common sense: with agriculture sluggish and supporting over two-thirds of Africa's fast-growing workforces, rapid growth in agricultural output and productivity is normally a precondition for tackling the employment-land-food-income crunch. But how? Shifts of land to capital-intensive big farms (e.g. land grab) 'raise labour productivity' of those who stay employed, but slash it – and income – for many, pushed off the land before the non-farm sector is ready to absorb them. With some exceptions, big African farms are socially inefficient. Land grab will not conduce to more per-hectare employment, work income, or even output. Most of Africa has almost no empty, good, cheaply available cropland, and soil-water resources are depleting: if anything, sustainability requires *reducing* cropland. As was true in Asia, smallholder-based yield growth is a necessary preliminary to development.

Stop denigrating smallholders

The language of many economists and politicians bombards smallholders with undeserved disrespect. Family farmers and smallholders are routinely called subsistence, sub-subsistence, part-time, even 'scratch-a-patch', and contrasted unfavourably to 'commercial' farms. Yet family smallholders are highly commercial. Most buy some input; many sell some output. To survive, they make at least as good use of resources as big farmers – in the case of land, better. (That's why land in Asia and Africa has been shifting towards smaller farms.)[18] Smallholders are glibly dismissed as elderly failures, who need replacement by big farmers with machinery – and whose kids don't want to farm.

Sometimes that caricature has a grain of truth. Not so, however, with policies that respect small-farm incentives, rural infrastructure, and agricultural research. In India's Punjab in 1967 semi-dwarf wheat and rice, with fertiliser and reliable irrigation, meant that young officials and factory workers scrambled home from Delhi to double-crop family land: now, they could make good profit out of even half a hectare. In most of the short Africa, if young people flee farming – often into city underemployment or even crime – that is because the powers-that-be disrespect and under-resource smallholdings, so they can't become scientific, properly serviced or reasonably reliable. Asia in the 1960s typically allocated 20 per cent of public spending to agriculture; the short Africa today allocates 5-10 per cent.

Respect and resources are preconditions, but all economic means – composting where humus is deficient, water management, much more irrigation major and minor, better seeds (often using biotechnology), sometimes land reform – will be needed to catch up. Most of Asia and some of Africa shows this can be done – and that *afterwards* industrialisation, even so-called miracles of poverty-reducing growth, can happen.

States and 'experts', unwilling to create the preconditions for smallholder-led transformation, used to scapegoat smallholders for inefficiency. Some still do, but the great weight of evidence has made it somewhat passé. Instead, smallholders are berated for inability to co-operate, form social capital, exploit scale economies in processing and distribution, and do without the State. Smallholders need policies, not homilies: respect, land, infrastructure, semi-public goods, facilitation.

Have a coherent policy for a multifaceted crisis

We have reviewed African and Asian progress in *food farming*. However, Asia's rapid growth with poverty reduction in 1960-2010 also required transformations in *population* and *nutrition*. A fourth target area, *environment*, is crucial for sustainability, but was weakly integrated into most Asian development policy: Africa can learn from Asian errors as well as Asian successes. One should consider *together* the effect of policy options – via incentives, institutions and infrastructure – on all four target areas. This applies however little, or much, the state intervenes.

As for *population*, Malthus was right that, for sustained growth with poverty reduction, fertility must fall. Malthus also learned that this happens voluntarily in the right

[15] A. Gershenkron, *Economic Backwardness in Historical Perspective* (Cambridge MA, Harvard, 1962).
[16] Jerven, *Poor Numbers*, pp. 28, 86.
[17] P. Collier, *The Bottom Billion* (Oxford, 2007).
[18] Lipton, *Land Reform in Developing Countries*, pp. 94-102.

conditions.[19] But voluntary fertility reduction, rapid in most of Asia, has been slow, late and intermittent in Africa, especially in rural areas. That is mainly because child mortality has improved more slowly[20] – and because earnings prospects for African women remain low, so they lose little income by having many children. As in much of Asia after 1965, so in Africa now: for a 'good crisis', i.e. a *resource-sustainable* transition to fast and employment-generating growth, green revolutions need complementary policies for slower population growth. Paradoxically, these demand first slashing child mortality, then maximising fertility response by enhanced female education, and spreading access to contraception.

Policy for better child *nutrition* is the linchpin. It holds together population policy (lower child mortality as the key to lower fertility) and farm policy (technical and institutional change to transform smallholder production of staple foods). Better child nutrition is advanced by malaria and dysentery control, breeding higher levels of micronutrients into main food staples, and more income (principally via more food output) for poor smallholders.

Environmental sustainability – especially, soil-water impacts – should be pre-screened for *all* policies. The imperatives, to irrigate and to fertilise, can support sustainable soil-nutrient and water use by adding resources that cultivation removes – but also can create new sustainability issues (salinity, nitrates in drinking water), and can interact well or badly with global warming. Rising energy prices, pollution problems, and faster evaporation mean that just *more* use of farm water and inorganic fertiliser – while essential in Africa – must go alongside much higher use-efficiency, and more care with water and nutrient disposal and recharge. In these matters as elsewhere, smallholders are well placed to respond to appropriate incentives.

Top-level political responsibility is needed to integrate *one* sustainable policy for all aspects of the crisis in *productive labour income*: agriculture, food; child nutrition, mortality, reduced fertility; land, soils, water. This is not a mad planner's dream: in agriculture as elsewhere, most policies will involve correcting incentives (e.g. so people bear the external costs of their water use), providing infrastructural and semi-public goods (irrigation, rural roads, much more agricultural research and the much-maligned extension), and in some cases in Eastern and Southern Africa reforming away gross inequalities of, and barriers to, secure private land access. Perhaps the main lesson of Asia is the need for a social or state-led base to support private, farm-based transformation.

What can donors do? Aid helped Asia's fast, science-based, employment-intensive small-farm growth, inducing economic transformation. Western goods face new rivals; Western power is challenged. I hope the still-low levels of aid to African farming do not indicate that, in John Mellor's bitter jest, donors won't make *that* mistake again.

[19] M. Lipton, 'Responses to rural population growth'. *Population and Development Review*, 15 (1989), 215-42.
[20] Conley *et al.*, 'Africa's lagging demographic transition'.