

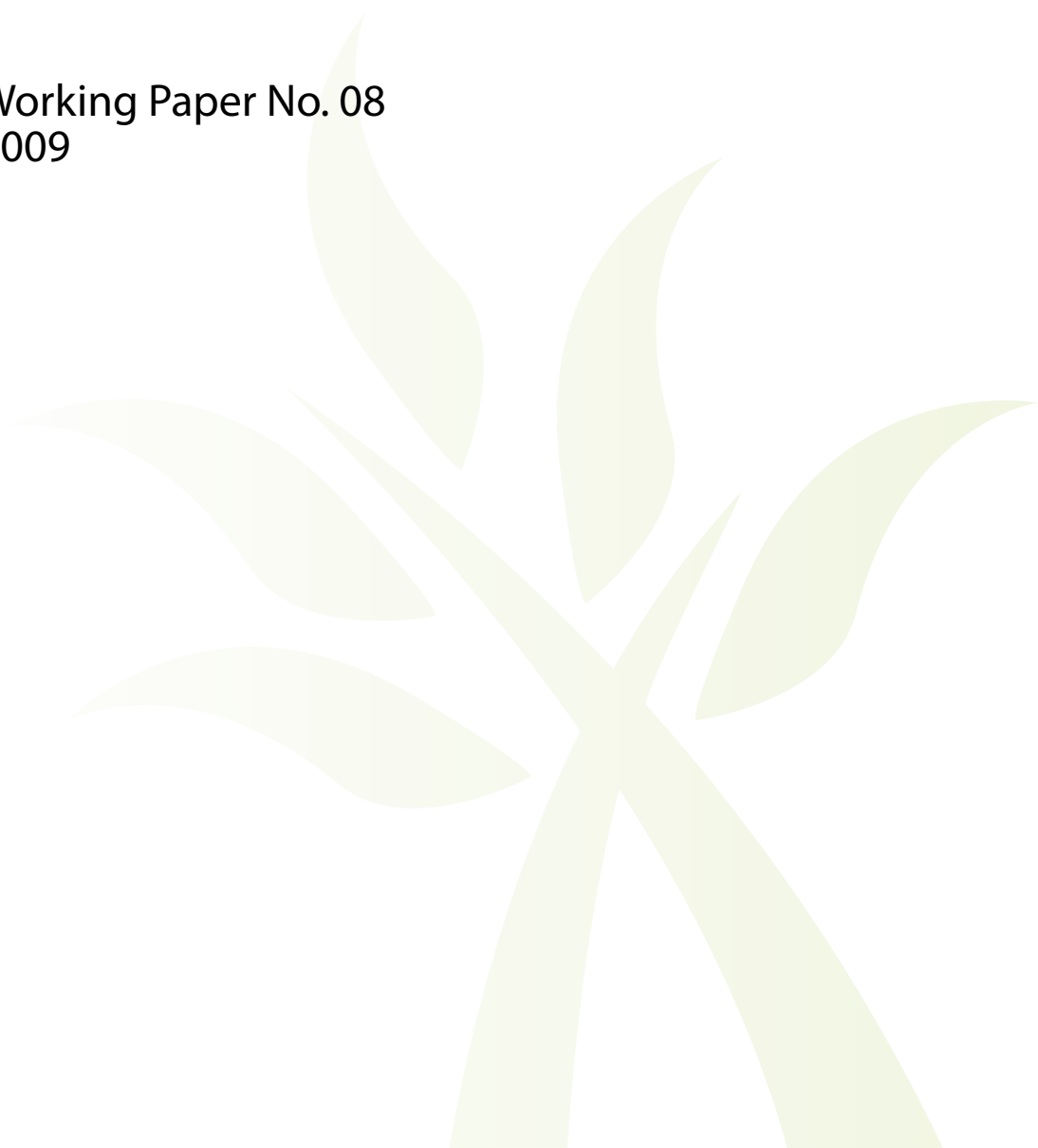
# Can the smallholder model deliver poverty reduction and food security for a rapidly growing population in Africa?

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FAC Working Paper No. 08  
July 2009

Agriculture is a key pathway out of poverty

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This paper was prepared for the The Food and Agriculture Organization of the United Nations (FAO) Expert Meeting entitled:

**“How to Feed the World in 2050”**

FAO Headquarters, Rome  
24-26 June 2009

This meeting was held in preparation for the High-Level Conference (HLC) on the long-term issues and challenges facing the global food system. The HLC is scheduled for 12-14 October 2009.

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# Can the smallholder model deliver poverty reduction and food security for a rapidly growing population in Africa?

## SUMMARY

Despite the achievements of smallholders in Asia during the green revolution, there is scepticism that Africa's smallholders — who dominate the farm area in most countries — can imitate this model and deliver agricultural growth. This paper assesses whether such pessimism is justified.

Given the high transactions costs of hiring labour of farms, diseconomies of scale can be expected when labour is relatively cheap and abundant compared to other factors of production: which may explain the survey evidence that small farms often produce more per hectare than larger farms. In conditions of low development with relatively cheap labour, small units may have advantages over larger ones.

The empirical record of performance of small and large farms in Africa is uneven and incomplete. Given the dominance of small farms in agriculture in many African countries, national data may be indicative of small farm performance. The record since the 1960s shows variable performance in agricultural growth through time and space, with slow growth in the 1970s followed by acceleration from the early 1980s. Even more striking is the difference in the performance of Northern and Western Africa compared to that of other regions of the continent. But the differences are not just regional: there is great variation across countries. While many African countries have a disappointing record of growth, thirteen doubled or more their production in the twenty years from the early 1980s onwards. These include countries where the bulk of output comes from small farms — Burkina Faso, Ghana, Niger, Mali, etc. Countries that have, or had, notable large-farm sectors such as Namibia, South Africa and Zimbabwe are well down the growth ranking. This proves little about scale since other factors are so much more important for agricultural growth, but it does show that to have an agriculture dominated by small farms is no obstacle to growth, and quite rapid growth at that.

On labour productivity, either by level or rate of growth, small farming suffers in comparison to large-scale farming. This is to be expected: small farms tend to apply much more labour per hectare than large units. This creates employment, but the statistics suggest that too often this is poorly rewarded.

Detailed studies and historical reviews show many instances where agricultural booms — periods in which substantial increases in marketed output of both food and cash crops have been seen — have taken place, based on small-scale farming. These can be seen on both export and food crops. An IFPRI survey of technical successes shows that almost all have been applied to good effect by small farmers.

On the other hand, there is no record of generalised success with large farms: on the contrary, there have been some notable failures with large farms — for example, the groundnuts scheme — often associated with reliance on (heavy) machinery unsuited to local soils. There are reasons other than history to explain why, other than for some high value enterprises and for crops that require processing in large-scale plants, large farms are not common in Africa.

For policy these debates are perhaps less important than understanding the conditions under which smallholder development takes place. There is broad understanding that the combination of creating a favourable investment climate, spending on public goods, fostering of economic institutions, the presence of demand at the farm gate, and conservation of natural resources are necessary. The details of this in particular circumstances can, however, be elusive. But for the purposes of this paper, the record shows that they have been achieved at various times and places: the agenda is not impossible.

Some object to the argument so far, pointing out that history is not necessarily a good guide to the present or future since times change. Africa today is not the same as Asia at the start of the green revolution. Agricultural supply chains are changing with ever more demanding conditions being imposed on would-be suppliers that may marginalise small farms; technical innovations for African conditions may be difficult to generate; environmental degradation and climate change undermine development efforts; HIV/AIDS takes a heavy toll in parts of Eastern and Southern Africa; and the kind of support to farming given by Asian governments thirty-odd years is simply unthinkable today. But not all change is negative: agricultural science is better equipped today to produce innovations than before; Asian economic growth, upward pressure on commodity prices present Africa with export opportunities; and biofuels may constitute a major new market for farmers. It is far from clear that African farmers have worse prospects than their Asian counterparts of a generation ago.

An important qualification to the debate is that smallholder development will benefit directly probably no more than the uppermost quartile of small farmers, those with a little more land and resources than their often land-poor neighbours. Surveys show clearly just how unequally land is distributed even within relatively egalitarian villages where there are no landlords, only farming households; and the way in which most of the marketed output comes from a minority of small farms.

Does this mean, then, that even agricultural development based on small farms, however successful in producing more, will not reduce poverty and hunger? No, given complementary actions there is every reason to expect multipliers in the rural economy to translate the uneven pattern of smallholder growth into broad-based gains. Measures to encourage the rural non-farm economy, to build links to cities and to provide social protection are more complementary, overlapping and synergistic, than competing.

## Introduction

Despite urbanisation, Africa is still a predominantly rural continent, with more than 60% of 906M persons living in rural areas in 2005; where most households live in villages and farm, even if they undertake other activities for their livelihoods as well. The bulk of farms are both physically small — of less than two hectares of good arable land, or its equivalent — and operated at the household level using for the most part using family labour.

There are around 33M small farms — roughly, those with less than two hectares — in Africa, representing 80% of all farms, with an average size of 1.6 ha. There are varying reports of the share of production that comes from small farms, some going as high as 90%. Table 1 shows the numbers and shares of farms and area for selected countries. (All data reported in Nagayets 2005)

**Table 1: Africa, selected countries, small farms**

|          | Year    | No small farms | Share of farms, % | Share area tilled, % |
|----------|---------|----------------|-------------------|----------------------|
| Ethiopia | 2001–02 | 9,374,455      | 87                | 60                   |
| Nigeria  | 2000    | 6,252,235      | 74                |                      |
| DR Congo | 1990    | 4,351,000      | 97                | 86                   |
| Tanzania | 1994-95 | 2,904,241      | 75                |                      |
| Egypt    | 1990    | 2,616,991      | 90                | 49                   |
| Uganda   | 1991    |                | 73                | 27                   |

Source: Nagayets 2005

Debates over the relative efficiency of small and large farms are longstanding (see Hazell et al. 2007). Notwithstanding that the successes of the green revolution in Asia, and above all in China, were achieved largely by smallholders, scepticism about the ability of Africa's small farmers to repeat this experience is widespread. A recent example is an essay by Professor Collier (2008) that argues that to get agriculture in Africa moving, large commercial farms may be a better option than smallholder development.

Why the pessimism over the prospects for African smallholder development? Amongst the reasons mentioned are that Africa's physical geography — soils, climate, hydrology — means that the technical challenge of breeding higher-yielding crop varieties is more daunting and that the possibilities for irrigation are less; that lower world food prices — as seen before the 2007/08 price spike — made food crop intensification uneconomic; and that governments were unprepared or unable to contemplate providing the extensive state support to kick-start a green revolution in the way that Asian governments had in the 1960s and 1970s.

Furthermore, the of disappointing record of African agricultural development — in many, but not all, countries — over the last 30 or more years not surprisingly invited doubts about the ability of the predominantly smallholder structure of farming across the continent to deliver agricultural development. This essay will argue that the disappointments, although real, are far from universal and that a more detailed examination of the record of African farming show more success than is commonly portrayed.

The paper is made up by the following sections. First, the general debate over the relative merits of small and large farms is set out, looking particularly at the relative efficiency of small and large farms. Following this the empirical record of small and large farms in Africa, such as it is, is reviewed. Third, the conditions under which smallholder development is possible are considered. Qualifications to the main argument are presented in the fourth section, before concluding.

The title of this paper suggests that it will deal with the relation between agricultural development, poverty and food security. That will be attempted only to a limited extent: the main focus here is on the question of whether smallholder development can deliver agricultural growth. Whether such growth, and its pattern, reduces poverty and improves food security is a much wider question; one that will only be touched upon here. This reticence arises mainly from the need to devote space first and foremost to addressing the debate over the feasibility of smallholder development in Africa since this is the main point in contention. Relatively few observers doubt that agricultural develop-

ment is a necessary, if not sufficient, condition for poverty reduction and food security in Africa: and certainly not after the shock of the 2007/08 price spike that undermined the argument that food security could readily be achieved through food imports. (Indeed, if anything, mainstream thinking about Africa agriculture — as represented by the African Union's Comprehensive Africa Agriculture Development Programme [CAADP] and the donors and private foundations that support this initiative — is only too convinced that this is the case.) Moreover, the case for agricultural development as being an effective way for low income and largely agrarian countries — as applies across most of Africa — to reduce poverty has been made cogently in the 2008 World Development Report (World Bank 2007).

This is to not to argue that the links from agricultural development to poverty reduction and better nutrition are automatic: they are not. But to widen the discussion to consider these fully would make this a far longer paper than is appropriate. This issue will be revisited briefly in the conclusions.

## Small and large farms: relative efficiency

Surveys of farms of different sizes in developing countries frequently show small farms producing more per hectare than large farms, with an inverse relationship between farm size and production per unit of land (Cornia 1985, Eastwood & Lipton 2004) — see Figures in Annex.<sup>1</sup> The explanation usually put forward is that there are few economies of scale in farming, and indeed that there may be diseconomies of scale once the farm grows larger than can be managed and operated by household labour. These diseconomies arise from labour use: household labour can be readily available, flexible in time and effort to suit the demands of the farm that can be difficult to predict exactly — for example, planting times, control of pests and diseases, harvesting. Above all, household labour is usually self-supervising and motivated to carry out operations diligently. In contrast, larger farms depending largely on hired labour incur (transactions) costs in recruiting and supervising labour. Hence small farms usually apply more labour per hectare than larger farms and consequently produce more — albeit with lower marginal returns to labour.<sup>2</sup>

Diseconomies of scale in farm production are therefore likely to be stronger when labour is a major input to production, as applies when labour is relatively cheap and capital relatively costly — the case in much of Africa.<sup>3</sup>

Other advantages of small scale in farming that are mentioned are farmers operating small plots may have considerable detailed knowledge of their soils, topography, drainage, etc. allowing them to work the land appropriately. Small farms may be better able to resist temporary slumps in prices, since household labour may be prepared to accept lower returns to their labour at times when a commercial farmer would simply go bankrupt.

Small farms producing subsistence crops also have advantages in circumstances when obtaining staples from the market may involve significant costs and risks; which is still the case in much of rural Africa.

In transactions off the farm, however, countervailing economies of scale apply in procuring inputs, marketing output, obtaining credit and other financial services, in obtaining information on markets and technical issues, in meeting standards and certifying production, and in transacting with large-scale buyers from processors and supermarket chains with their exacting demands for quality, timeliness and bulk deliveries. Poulton et al. (2005) summarise these as shown in Table 2.

<sup>1</sup> The evidence for the inverse relationship is not undisputed. There are difficulties with definitions of farm size and with measures of productivity. However where studies have tried to refine definitions of size and productivity by, for example, looking at size in terms of land area per worker and adjusting for land quality, the relationship has often been strengthened (Lipton, 1993).

<sup>2</sup> This persists owing to factor market failures, since it would be better if smallholders hired out some of their labour to larger farms, or alternatively if the larger units rented out land to small farmers; either of which would be expected to equalise returns to land and labour.

<sup>3</sup> Indeed, the transaction costs of hired labour seem to be so high that across the world for most lines of agriculture — some poultry, pigs, fruit, vegetables, flowers and fish excluded — farms are typically operated at the household scale, with hired labour used only for peak-season operations.



**Table 2: Transaction Cost Advantages of Small and Large Farms**

|   | Small farms | Large farms |
|---|-------------|-------------|
| Unskilled labour supervision, motivation, etc | √           |             |
| Local knowledge                               | √           |             |
| Food purchases & risk (subsistence)           | √           |             |
| Skilled labour                                |             | √           |
| Market knowledge                              |             | √           |
| Technical knowledge                           |             | √           |
| Inputs purchase                               |             | √           |
| Finance & capital                             |             | √           |
| Land  |             | √           |
| Output markets                                |             | √           |
| Product traceability and quality assurance    |             | √           |
| Risk management                               |             | √           |

Source: Poulton et al. 2005

In some circumstances high transaction costs for credit can stymie production on very small farms, as Dorward (1999) argues when examining farm survey data for Malawi from the 1980s. In this case, production per hectare rose with size up to two hectares; apparently since those with smaller holdings were so starved of cash to buy inputs that they had to work on neighbouring farms in the early part of the crop season to raise funds and so neglected their own holdings.

In sum, when labour costs are important, and when at least part of production is for subsistence, small farms may have significant advantages over larger units. Conversely, once agriculture becomes more intensive in transactions beyond the farm gate, larger farms may have the advantage. It should not be expected that the advantages of scale are immutable: they can be expected to change with development. But for much of rural Africa, with relatively low levels of development, there are thus reasons to expect small farms to be as efficient in land uses, or more so, than larger farms.

## The record of agriculture at small and large scale in Africa

Evidence, albeit incomplete, imperfect and even indirect, to examine the records of small and large farm performance in Africa can be found at both national and district level.

### Insights from national data

Nationally, there are few if any countries in Africa that record estimates of farm output by farm size. That said, there are countries where small family farms dominate agriculture to the point that national statistics are tantamount to a record of small farm performance. Indeed there are few countries in Africa where large commercial farms, estates and plantations occupy more than a small fraction of the land — South Africa and Namibia being prominent exceptions. Thus, with a few countries excepted, examining the record of agricultural growth across Africa would largely reflect the ability of small farmers to increase production; while looking at labour productivity would indicate the ability of the sector to contribute to incomes, poverty reduction and to food security.

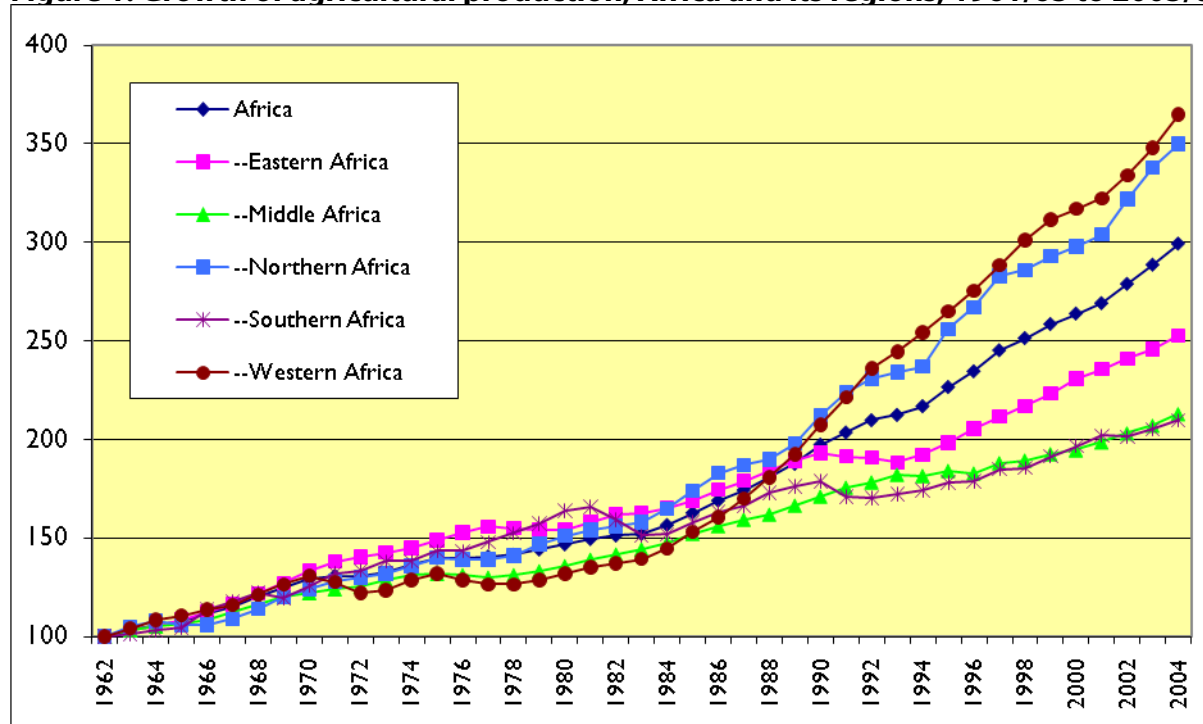
The record of *agricultural growth* since the early 1960s is not good for Africa as a whole. By 2003/05, the continent as whole was producing just under three times more than it did in 1961/63: less than the rate of population growth, so that per capita production had fallen, albeit marginally.<sup>4</sup> But this miserable statistic hides important variations through time and space. Agricultural growth slumped in the 1970s across the continent, but in most regions and countries that was followed by recovery and a marked acceleration of agricultural growth in the early 1980s. Hence the record for 1981/83 to 2003/05 shows a continental increase that almost doubles production, outstripping population growth in that period by 10%.

Spatial variations are even more striking, as Figure 1 shows. The continental average is comprised of highly variable performances across regions, with Northern and Western Africa doing far better than

<sup>4</sup> Computed from FAOSTAT data on Gross PIN for agriculture, taking three year moving averages to reduce the effect of annual fluctuations.

the rest of the continent; and in these two cases, the acceleration since the early 1980s is particularly pronounced.<sup>5</sup> In both of these regions, production per capita has been raised by more than 40% between 1981/83 and 2003/05. The performance of these two regions in raising agricultural output is, surprisingly, the equal of Asia during the green revolution.<sup>6</sup>

**Figure 1: Growth of agricultural production, Africa and its regions, 1961/63 to 2003/05**



Source: FAOSTAT, gross PIN, taking three-year moving averages and basing the index to 1961/63.

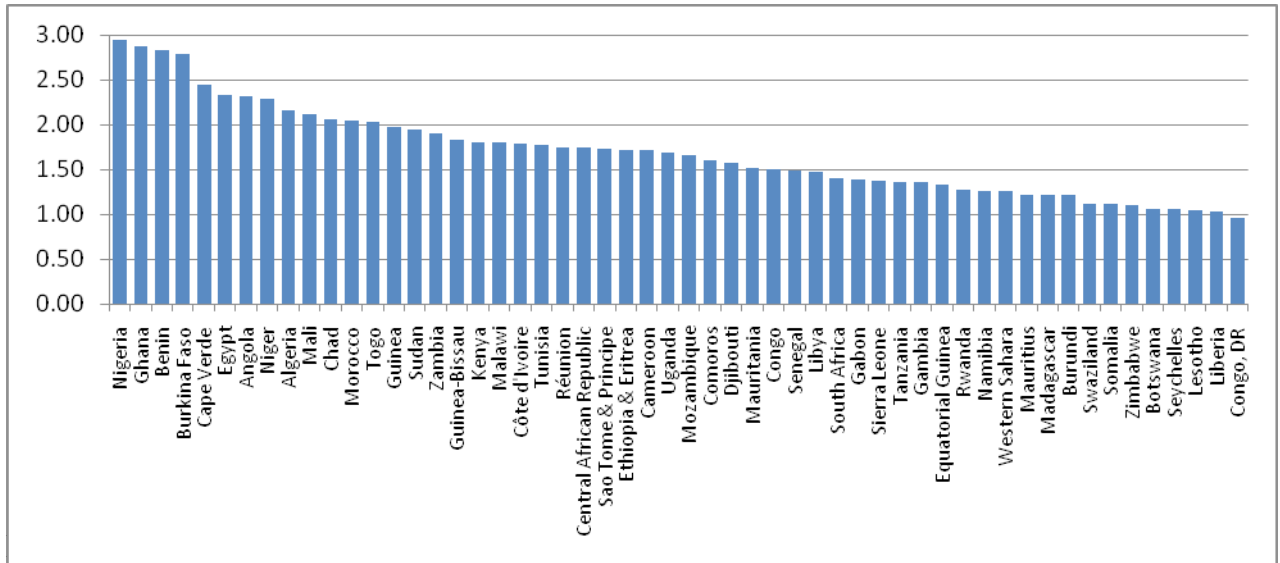
A more detailed examination of the record at country level shows considerable variation between countries, including within the regions. Even in regions that have performed poorly, there are some countries that have done quite well in raising agricultural production. Figure 2 shows the agricultural growth performance over the last twenty years for the individual countries of Africa. The range of performance is wide. Thirteen countries more than doubled production, the equivalent of growth at 3.5% a year — a rate that comfortably outstrips even rapid population growth. On the other hand, there is a long tail of less impressive and frankly disappointing performances.

5 Why did agriculture in these two regions see such a pronounced increase in growth from the early 1980s, and why did this not happen in other parts of Africa? If there is a formal study that addresses this question, I do not know it. Of the factors that change in the early 1980s there is a marked reduction in negative protection and that plausibly may have stimulate farming. Western Africa may differ from Eastern and Southern Africa in that there were fewer parastatals organising agriculture that were wound up, privatised or otherwise cut back in the era of structural adjustment; and some of those that did exist, such as the cotton companies of francophone West Africa were left largely intact.

6 The comparison is this: the increase in value of agricultural output for Northern and Western Africa between 1981/83 and 2001/03; set against that for Eastern, Southern and South-Eastern Asia for 1971/73 to 1991/93, the earlier period reflecting that the green revolution began in Asia in the late 1960s and early 1970s. The multiple in (constant) values of production are as follows:

|                    | 1971/73 to 1991/93 | 1981/83 to 2001/03 |
|--------------------|--------------------|--------------------|
| Northern Africa    |                    | 2.05               |
| Western Africa     |                    | 2.43               |
| Eastern Asia       | 2.12               |                    |
| Southern Asia      | 1.90               |                    |
| South Eastern Asia | 2.09               |                    |

**Figure 2: Growth of agricultural output in Africa, 1983/85 to 2003/05**



Source: FAOSTAT data, Gross agricultural PIN, three-year moving averages. Ethiopia and Eritrea combined to allow record to extend before 1991.

Now, what do these statistics suggest about smallholder performance? Simply this: amongst the higher performing countries are several where the bulk of output comes from small farms — Ghana, Burkina Faso, Niger, Mali, etc. There is another observation: those countries that have, or have had, notable large-farm sectors — Namibia, South Africa, Zimbabwe — are well down the growth ranking; and others with smaller but significant large farm sectors such as Kenya and Zambia are not amongst the fastest growing agricultures.

Of course, scale of farming is far from being the main factor affecting growth; so this is hardly strong proof of the efficacy of small farms in Africa. Turned around, however, the argument is more compelling: those who believe that small farms cannot be the basis for a rapidly growing agriculture have to explain why countries such as Ghana with its many small family farms has seen growth over the last twenty or so years that is the equal of that seen under the much-vaunted Asian green revolutions. Perhaps Ghana's agriculture would have grown even more quickly had the units been larger, but in the absence of evidence from a country where farming is largely carried out on large scale doing better than Ghana, that would be hard to argue.<sup>7</sup>

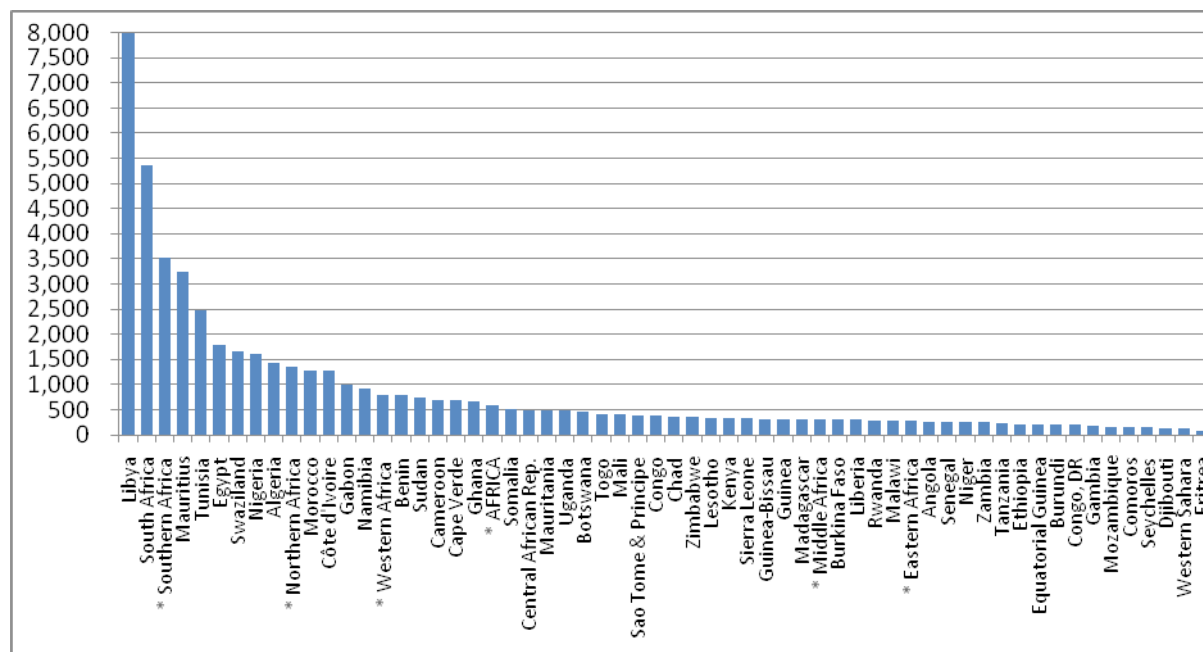
What do the national statistics suggest about *labour productivity*? Figure 3 shows statistics for the level of labour productivity in Africa. Labour productivity is low, at US\$580 per person employed overall, but with marked differences across countries. Only seven countries achieve an average higher than US\$1,000 per worker. Countries with significant large farm sectors are prominent: South Africa, Mauritius and Swaziland. The distribution of productivity has a long tail of very low indicators: almost half the countries have estimated average productivity of under US\$350.<sup>8</sup>

Growth of labour productivity since the early 1960s is equally variable. Five countries have more than tripled labour productivity in the intervening four decades, and another seven have at least doubled it. At the other end of the distribution, eighteen countries have actually seen labour productivity fall.

<sup>7</sup> Africa does not have many countries where large farms are prominent so perhaps this comparison is unfair. So how does Ghana compare to a country outside of Africa where large farms are important, such as Brazil? Value of production in Brazil rose by 2.15 times between 1983/85 and 2003/05, whereas it rose by 2.87 times for Ghana. All told, nine African countries achieved more growth of production than Brazil in this period.

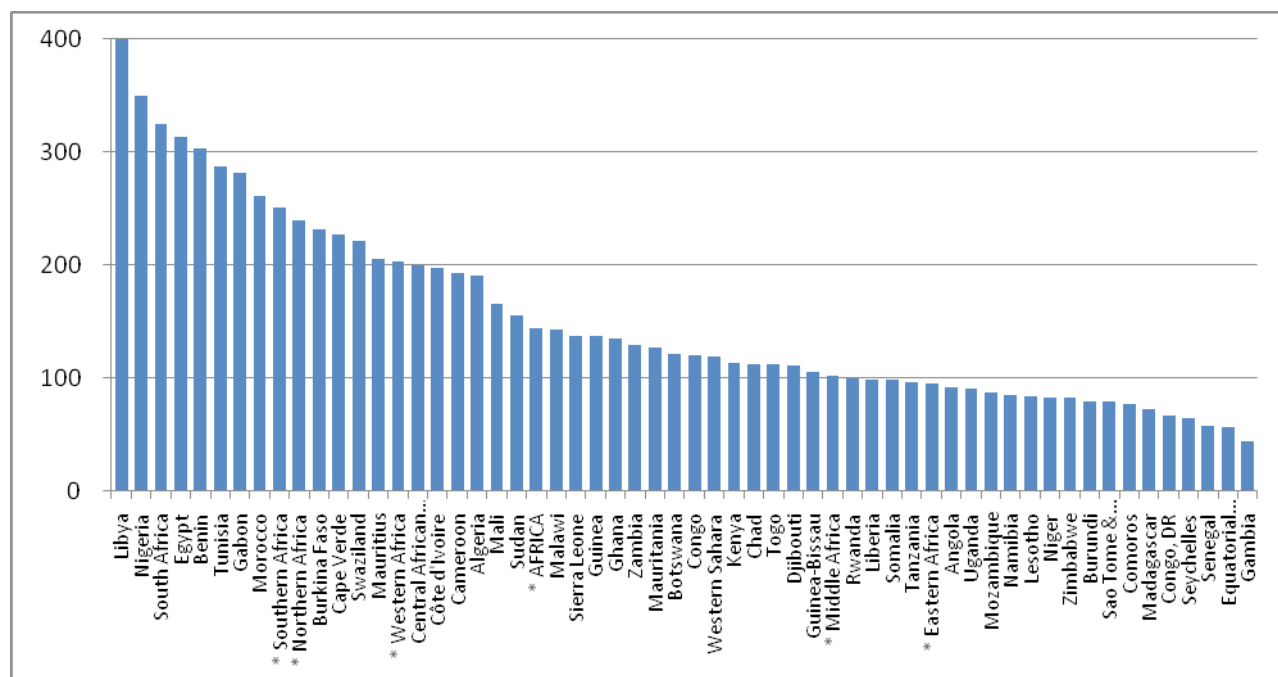
<sup>8</sup> Levels may be low, but the comparison with some Asian countries is instructive. The equivalent figures for China, India and Indonesia are US\$725, US\$560, and US\$670. India's level is thus below the Africa average, and the levels seen for Northern and Western Africa.

**Figure 3: Labour productivity in agriculture, Africa, 2003/05, US\$ per worker**



Source: FAOSTAT data for gross agricultural production value divided by the estimated economically active population in agriculture, using three-year moving averages

**Figure 4: Growth of labour productivity in agriculture, Africa, 1961/63 to 2003/05**



Source: as for Figure 3

What may be inferred by small farm labour productivity from this? In many African countries where small farms dominate labour productivity in agriculture is painfully low: insufficient to allow people to escape poverty.<sup>9</sup> Yet there are great variations. Although most of the higher performers are

<sup>9</sup> Assuming that each worker in farming has to support one dependant child or old person, then to escape dollar-a-day poverty average production per worker would need to reach US\$730 at very least, given that these are gross estimates with no allowance for any cash costs of farming. The unknown here is what proportion of those counted in the agricultural labour force

countries with substantial large farm sectors, not all are. Whilst those countries showing the greatest improvements in labour returns include many of the countries with substantial large farm sectors, there are also some where small farms dominate, such as Burkina Faso.

On labour productivity, either by level or rate of growth, small farming suffers in comparison to large-scale farming. This is to be expected: small farms tend to apply much more labour per hectare than large units. This creates employment, but the statistics suggest that too often this is poorly rewarded.

### Smaller-scale studies and other reports

Detailed studies and historical reviews show many instances where agricultural booms — periods in which substantial increases in marketed output of both food and cash crops have been seen — have taken place, based on small-scale farming. During the colonial era, export crop production in West Africa came almost entirely from small farms — groundnuts in Senegal and the Gambia, cocoa in Côte d'Ivoire and Ghana, oil palm in southern Nigeria. In the second half of the twentieth century booms were seen with the small-scale production of export crops such as tea and coffee in Kenya, and in cotton in the francophone countries of the West African guinea savannah and in Zimbabwe (Poulton et al. 2004).

There have also been growth spurts based on producing food for domestic markets: hybrid maize in Zimbabwe in the first half of the 1980s (Eicher 1995), in Tanzania and Zambia in the 1980s are examples where small farm production has been organised by state agencies. Smaller-scale booms in marketed food crops include rice in the inland delta of the Niger (Diarra et al. 1999), open-pollinated varieties of maize in the middle belt of Nigeria (Smith et al. 1993), horticultural exports from Kenya (Minot & Ngigi 2003), and peri-urban production of dairy, fruit and vegetables for the city of Kano (Mortimore 1993).

Not all of these booms have been sustained. On the contrary, they have often been sensitive to prevailing prices, often linked to world market prices, as well as to state support and organisation.

IFPRI has documented successes in African agriculture, using a survey of specialists, to identify cases where there had been a 'significant, durable change in agriculture resulting in an increase in agriculturally derived aggregate income, together with reduced poverty and/or improved environmental quality.' (Haggblade et al. 2003, 10; see also Gabre-Madhin & Haggblade 2001) Most of the experiences captured concern small farmers and herders benefitting from technical advances. These include hybrid maize varieties in Zimbabwe, Kenya and open-pollinated maize in West Africa; use of improved bananas in East Africa; horticulture and fruit produced by smallholders on contract in Kenya; cassava resistant to pests and diseases associated with large increases in cassava production in West Africa, and in parts of south-eastern Africa; cotton in West Africa; and smallholder dairying in Kenya.

These accounts of success contain two strong messages for this paper. One is that almost all the technical advances described have been applied by small farmers to good effect: in no case have the innovations been adopted by larger-scale farms solely or disproportionately<sup>10</sup>, nor is there any suggestion in these accounts that measures to consolidate holdings might be critical to success.

The other is that some of the successes were not sustained, the clearest case being that of hybrid maize in Southern and Eastern Africa where use has stagnated and declined as support in the form of subsidies to inputs, transport and credit have been reduced or withdrawn.

The case made is that small farms, under certain conditions, can increase their production significantly. But that does not mean that larger-scale farms might not be even more effective in increasing output, improving efficiency and generally contributing to development. So what of experiences with large farms in Africa? Analysis of *large farm experiences* is, however, relatively scant.

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work full time, and how many have other activities that generate income.

<sup>10</sup> The exception may be the case of hybrid maize in Zimbabwe that initially was used mainly by the large-scale commercial farms. But this imbalance was redressed in large degree in the 1980s when the government through the GMB made it possible for smallholders in the communal areas to use the seeds.

Historically there have been several instances when great faith has been placed in the potential of large farms, using the latest technology, to stimulate agriculture. One of the best known, and oldest, of these was the Groundnuts Scheme. Planned in 1947, it was to operate in Tanganyika, Kenya, Northern Rhodesia on 1.3M hectares to produce vegetable oil for export back to the UK. By 1949 costs had risen from £26M to £36M, less than 100,000 hectares were cleared, fewer nuts had been harvested than expected, and the scheme was abandoned. The scheme relied on machinery that was difficult to get to the sites, where it suffered breakdowns that were difficult to repair in the bush. Subsequent attempts to use untried prototype machinery failed for lack of testing. In any case, the soils and conditions were unsuited to large-scale machine farming. (Johnson & Ruttan 1994)

In 1951 in Ghana, then the Gold Coast, the state set up a company to farm 12,000 ha at Gonja in the northern savannah using machinery. This soon failed, with only a small part of the area cultivated as the machinery could not be maintained, soils were compacted, and the topsoil eroded by the machines. Subsequent efforts in the late 1950s and 1960s to farm in the savannah on a large scale also failed. (Eicher & Baker 1982, Frimpong-Ansah 1991)

In 1971 Bud Antle, a California-based multinational, began to farm vegetables for air export from Senegal using two different modalities: a plantation, and contracting from local small farmers. The plantation, some 450 hectares large, was located only 38km from Dakar and used drip irrigation to produce melons, green beans, peppers and tomatoes. But the scheme ran into difficulties: soils were easily eroded by the large machines used, the machinery was costly to maintain, and prices in European markets were not always remunerative. By 1976 the operations were losing money and the state bought into the scheme, nationalising it. This lasted until 1979 when continuing technical problems and financial losses led to the operation being closed down. (Chasm 1983, Macintosh 1989)

In these cases technical ignorance is prominent, outsiders assuming that techniques deployed to good effect elsewhere will work in rural Africa. The ravages of heavy machinery on fragile soils and the difficulties of operating and maintaining machinery, with its demand for all-too-scarce skilled drivers and mechanics, have led to reduced yields and heavy operating costs.

These, however, are not the only problems that large farms encounter. Being formal companies they are often expected to comply with regulations that are rarely if ever applied to small farms: payment of legal minimum wages, provision of housing, education and health care to hired workers and their families, and taxation. In addition, being highly visible formal enterprises in rural areas they can be targets for informal payments to officials unusually anxious to check that the company is complying with rules, as well as for thieves looking to pilfer stores. All told, operating a large farm can be a costly business, running up spending that no small farm has to meet. (Paul Wagstaff, 2009, contribution to email conference)

This is not to argue that all large farms fail technically or operate at high cost in Africa. There are examples of large-scale farming that works well. The point is rather that large-scale farming is not always technically or financially the better option. While this may seem obvious, the tendency for unjustified optimism that big means better in farming remains unabated, even in countries with a record of failures. Ghana under President Kufuor is a case in point. Notwithstanding the rapid growth of agricultural production seen in the country since the early 1980s, achieved almost entirely by small farmers, and the well-known failures of large farms promoted by the late colonial and Nkrumah governments, ministers were seduced by the vision of modern, large-scale farms on the plains of Brong-Ahafo producing a rapid spurt to agricultural growth. Meanwhile across Africa since early 2008 all kinds of schemes have been announced by foreign companies to acquire land and farm on a large-scale for export back to the Gulf and East Asia to counter rising world commodity prices. Once again, it seems, outsiders discount the challenges of farming in Africa and assume that given technology and scale all will be well. History suggests otherwise.<sup>11</sup>

It is thus not surprising that large-scale farming in Africa, outside of the settler economies of Southern Africa, is largely confined to high-value and specialist ventures such as fruit, vegetables, flowers, intensive pigs and poultry; and where local processing plants, often fairly large-scale, are necessary for crops such as sisal, sugar, tea, rubber and coffee. These are cases where large capital investments

<sup>11</sup> It is a working assumption that successful large-scale farms in the Southern Africa economies were not an overnight success, and that the settlers learned how to farm Africa through trial and error, adapting their imported techniques (and indeed some crops and animals) to local conditions.

are necessary, or where industrial organisation of production generates physical productivity that cannot be achieved on small units.

## Conditions for smallholder development

The record shows that smallholder development has delivered agricultural growth in various places and at various times, and that growth is not always sustained. What, then, are the conditions under which smallholder development is possible? These are well-known. They include:

1. A favourable investment climate for farming. Critical here is a level playing field, that is that farmers can buy inputs, access finance and sell their produce on something like neutral terms in which they are not exorbitantly taxed by domestic policy, albeit implicitly, or having to compete with dumped food imports, or exporting to markets where prices have been depressed by the policies of OECD countries. A comparison of agricultural growth in Africa between the 1970s and 1980s, the former decade one of heavy negative protection of many farm sectors that eased during the 1980s, shows just how important negative protection can be.<sup>12</sup> It also implies that farmers can trade with relatively low transaction costs and are not exploited by agencies with monopoly power.
2. Investment in public goods that support agriculture, most notably agricultural research and extension, rural roads, education, health care, and, in some cases, irrigation and power supplies. It is probably not so much the amount that is spent by governments on agriculture, so much as on what is funded that counts: returns to spending on public goods seem to be high, while those to private goods may be lower (Fan & Rao 2003).
3. Developing economic institutions to allocate and protect property rights, to facilitate trading, to reduce risk and to allow collective action. This is a challenging agenda: in the absence of effective institutions market failures arise that ultimately prevent investment and deter innovation and initiative.

These first three elements might be seen as the public agenda.<sup>13</sup> In addition to which there is another condition:

4. The existence of demand that is transmitted effectively to the farm gate. Reviewing studies of agricultural development at village and district level in the 1970s and 1980s, the single main factor that stimulated spurts in agricultural growth appeared to be demand felt at the farm gate. (Wiggins 1995, 2000) That demand arose variously from urban growth domestically, from linking farmers to these markets by better roads; or from parastatals offering farmers in remote areas pan-territorial prices that discounted the cost of transport.

To these may be added a fifth condition:

5. That farmers conserve their land, water and other natural resources so that physical production can be sustained.

It is easy enough to specify these conditions, but the record of disappointments in African agriculture over the last thirty or more years shows that meeting them is no simple exercise. Problems arise in low income countries where public resources are limited and the range of apparently necessary investments is wide, exceeding any imaginable budget. In such cases, there are difficult strategic decisions to be made about the combination and sequences of policy and investments to follow; for which there is relatively little guidance in the literature. But matters have sometimes been made worse by misguided policy and poor governance.<sup>14</sup>

Much of the literature on African agricultural development explores these conditions: how they apply in different circumstances — including the extent to which farmers are close or remote from

<sup>12</sup> The argument was made powerfully by Krueger, Schiff & Valdés (1991). Most of the negative protection seen in the 1970s was indirect: the result of overvalued exchange rates and protection of domestic manufacturing.

<sup>13</sup> Poulton et al. 2006 in reviewing commercial farming in Africa summarise these conditions as: The enabling environment consists of macro-economic stability — exchange rates, inflation; functioning basic infrastructure, effective commercial banking, and an investment climate with secure property rights and predictable and low taxation. Not only this, but governments need to reinvest their tax take in better physical infrastructure, in research.

<sup>14</sup> The extent to which the problems of African agriculture can be put down to lack of resources for investment, or to poor governance, is highly controversial, with strong views held by either side.

the market, the quality and quantity of natural resources they can use, and population density (see, for example, Snrech 1995, Wood et al. 1999); and how they can best be met. This is not the place to revisit these arguments: for this paper it is sufficient to note that smallholder development requires certain conditions, and that — demanding as they may be — history suggests that they have been sufficiently met at various times and places for vigorous agricultural growth to occur.

## A frequent objection and a clarification

A frequent objection to arguments for small farm development in Africa based on history is that times have changed, and what might once have been possible no longer is. Ellis (2005) argues that 'Sub-Saharan Africa in the early 21st century is not Asia in the 1970s, and this needs to be well understood since otherwise invidious and unhelpful comparisons are made concerning the ability of SSA to replicate the Asian experience.'<sup>1</sup>

Amongst the factors seen as changing the possibilities for African smallholder development, especially in comparison to the conditions seen in Asia in the 1960s and 1970s, are:

- Changes in supply chains with increasing organisation of agricultural and food marketing by supermarket chains, resulting in demand for bulk deliveries of standardised produce with stringent quality criteria, sometimes with certification of production conditions to boot, to strict timetables. These could marginalise small farmers who, it is feared, cannot produce to such standards, giving a decisive advantage to large units, and leaving small farmers with access only to markets where lower prices apply to second-best produce;
- The difficulties of producing technical innovations for the diverse, rainfed ecologies of much of Africa, in contrast to producing improved seeds for the irrigated lands of Asia. To this may be added the increasingly private nature of agricultural research with correspondingly fewer incentives to produce innovations for small, and poor, farmers;
- The challenges of environmental degradation, water scarcity — and an associated paucity of opportunities to irrigate, and climate change. Some see Africa as suffering badly from soil erosion and degradation;
- That the kind of support to farmers seen in Asia in the past, particularly subsidies on fertiliser, irrigation water and rural power, is unthinkable today;
- The impact of HIV/AIDS on farming that in parts of Southern and Eastern Africa deprives affected households of labour and capital; and, until last year,
- The long-term decline in agricultural commodity prices that reduced the profitability of farming — and, by making imports ever cheaper, reduced the value of producing food domestically and thereby made arguments for self-sufficiency less compelling.

Against these changes can be set others that may imply equally good or better prospects for African agriculture and its smallholders, thus:

- Technically, advances in biotechnology may make it easier to produce innovations suited to African conditions. During the last two decades the spread of improved cassava and the generation of the new rice for Africa strains (NERICA) are two promising developments with widespread applicability for farmers;
- Rapid economic growth in Asia means that some countries are now importing some commodities, such as soy beans and palm oil, on a very large scale. So far that demand has been met by production from South America and South-Eastern Asia, but Africa could be a supplier as well.<sup>15</sup> The recent price shock has awakened interest in Africa as an exporter of food to Asia and the Near East. For those parts of Africa with underused land, as seen in the guinea savannah, and especially those along the Indian Ocean seaboard, there is the potential to produce and export, thereby relieving the constraint of limited local demand for additional production; and,
- The surge in production of biofuels seen when oil prices started to rise from 2006 onwards makes clear the potential for producing biofuels in Africa, and above in landlocked countries with spare land, to replace increasingly cost fuel imports. Across Africa studies are being carried out to assess this potential. If the economics are really as good as preliminary assessments suggest, then a major new opportunity exists for farmers.

<sup>15</sup> The planned acquisition of land in Madagascar by Korea's Daewoo was partly intended to produce palm oil.



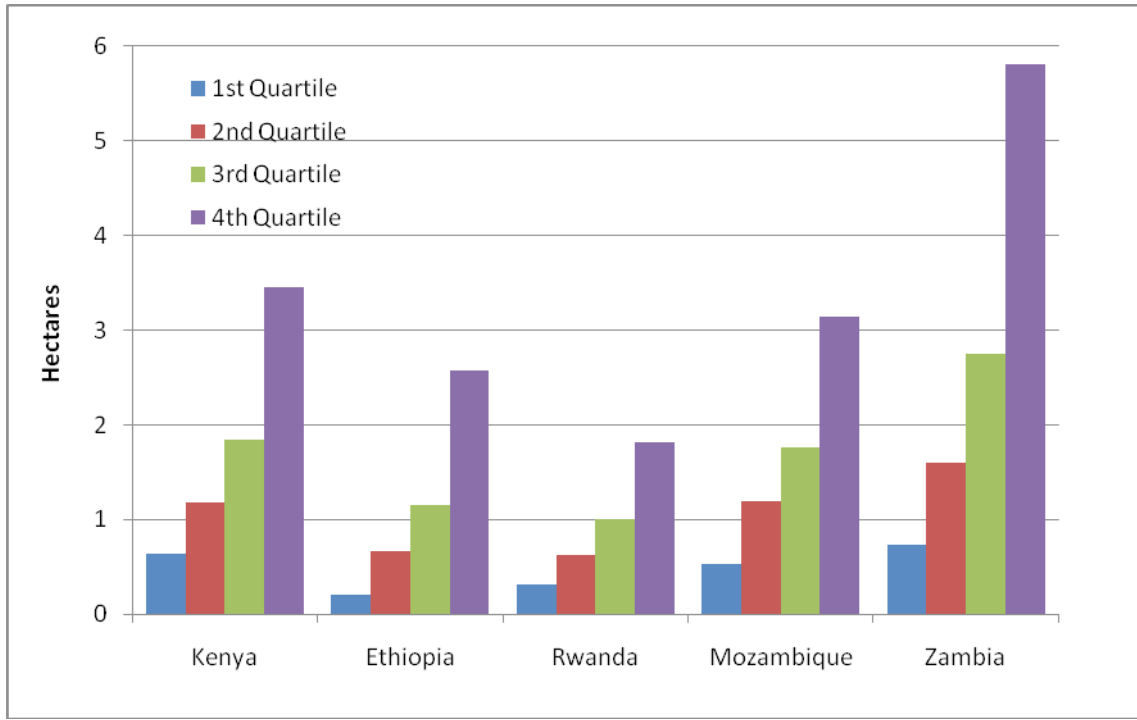
Weighing the balance of these different factors is more a matter of judgment than calculation. Those who argue that changed circumstances make former options inapplicable, need to bear in mind how quickly some circumstances can change, as seen most notably with concerns over the apparently inexorable decline of commodity prices that have evaporated in the last eighteen months.

But perhaps more important is that policy-makers need to be considering how to minimise the disadvantages and maximising the pluses. How much do the above factors affect smallholders as opposed to large farms? The clearest case is that of changing supply chains: if smallholder development is to achieve its potential, then finding effective ways to minimise transaction costs and allow small farmers to supply the emerging chains will be critical. Similarly, market failures in access to finance and inputs are likely to be more severe for small than large farms. It is not surprising, then, that some of the most energetic debates in the last few years in Africa have turned on how to ensure that small farmers can obtain fertiliser.

An important clarification in the debate concerns the nature of small farms. To some extent debates are obscured by unstated assumptions about the small farms that are in contention: is the debate about farms with the equivalent of two or three hectares of reasonable arable land, or is it about the land hungry who have access to plots of one hectare or less?

Recent surveys in Eastern and Southern Africa (Jayne et al. 2005), see Figure 5, show that generally only the top quarter of farmers have two or more hectares: often 50% or more have less than one hectare, and the bottom quarter have half a hectare or less. Concern over the prospects for very small, perhaps marginal, farms are thus highly pertinent.

**Figure 5: Land distribution amongst small farmers in Eastern & Southern Africa, late 1990s. Average land sizes for farmers by quartiles**

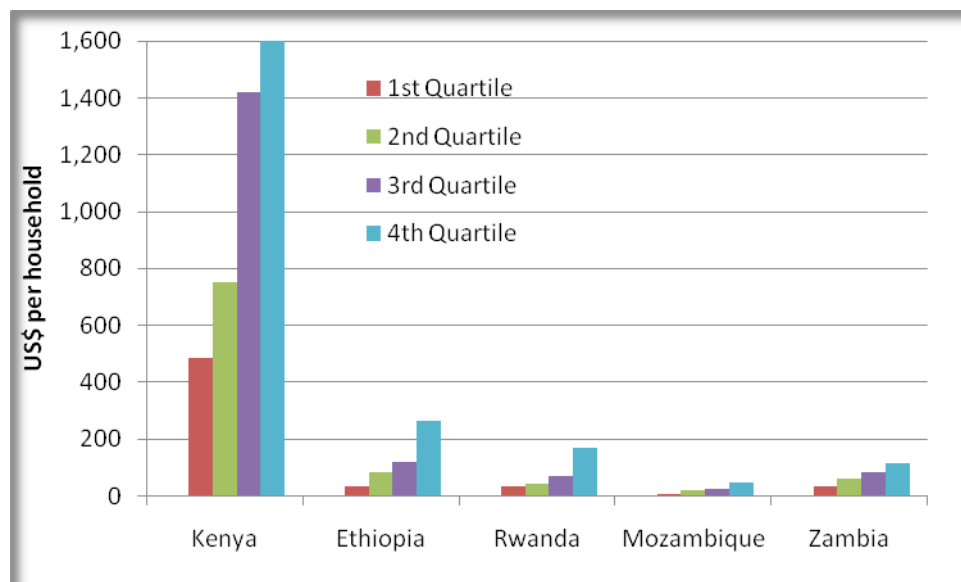


Source: derived from Jayne et al. 2005 reporting the results of surveys of small farmer communities carried out in the 1990s

Moreover, surveys in Africa that report the size of farms marketing produce often show that the bulk of marketed output from small farms comes from those that are towards the upper part of the range. For the same set of surveys, the value of marketed output by landholding quartile appears in Figure 6. Sales of grain in these five countries come from 20–50% of the smallholders in a normal year, and even then there is marked disparity between a very small group of relatively large and well-equipped smallholder farmers with 4 to 20 hectares of land, usually in the most favourable agro-ecological areas (about 1– 4% of the total rural farm population), accounting for 50% of the marketed output

from smallholdings who sell between 5 and 50 tons of maize per farm in a given year, on the one hand; and a much larger group of smallholder farms (20–30% of the farm population) selling much smaller quantities of grain, between 0.1 and 5 tons per farm, on the other. This leaves 50–70% of rural households who are buyers of staple grains. (Jayne et al. 2005) Similarly, Scoones et. al. (1996) write that in Chivi, southern Zimbabwe, an area of small farms on communal areas, fully 75% of marketed farm output in the early 1990s came from just 25% of farms.

**Figure 6: Value of marketed output, US\$/household, amongst small farmers in Eastern & Southern Africa, late 1990s, by landholding quartile**



Source: derived from Jayne et al. 2005 reporting the results of surveys of small farmer communities carried out in the 1990s

It is clear that there is considerable differentiation amongst small farms. Those who advocate the potential of small farm development need to recognise that most of the increased production, and hence increased earnings will accrue to only a minority of small farms. The implications of this will be taken up in the next, concluding section.

## Conclusions

This paper argues that small farmers in Africa have a record of agricultural growth that suggests that, yes, more farm output can be achieved largely through smallholder development — just as has been the case for the Asian green revolutions. The recent history of African agricultural development is highly uneven across countries, and very probably equally so between regions within them. The disappointments that have led some to pessimistic assessments of the continent’s prospects are real. But the same unevenness includes successes that are not always recognised. The implication seems clear: there are no specifically African disadvantages. If, for example, Burkina Faso, a small, landlocked country in the Sahel with at best modest natural resources, can raise its grain output — coming very largely from small farms — from the early 1960s by virtually the same margin as Vietnamese rice output<sup>16</sup>, then surely most other countries in Africa can similarly develop their agriculture.

Even if in general terms the elements for success are well known, since the detail is elusive, it is not necessarily straightforward to stimulate smallholder agricultural development. The challenges can

<sup>16</sup> Against a base of 1961/63, the index for the five-year average 2001/05 shows 367 for Vietnamese rice, and 369 for Burkina Faso grains. Over these four decades Vietnam registers one of strongest increases in grain production in Asia with Indonesia being amongst one of the few major nations outperforming it. [In 1961 Burkina produced 716k tonnes of grains: by 2004 the figure was estimated at 2.9M tonnes, according to FAOSTAT.]

be quite stiff in some cases. This, however, should not cause the effort to be abandoned in favour of untested alternatives, such as trying to create and support large farms, that face many if not all of the same issues. Most of the agenda for small farm development is common to any form of agricultural development, and some of it applies to all economic development; so special and unusual resources are not required. On the contrary, history shows examples where modest investments of public spending in a reasonably favourable policy context leads to strong response, in effort, innovation and investment by small farmers themselves — and those they work with in supply chains, such as traders.

A belief in the possibilities of agricultural development based on small farms, however, does not necessarily or probably mean that all small farmers will participate in growth to the same degree. On the contrary, it is likely that it will be minority of small farms that see the bulk of added production and sales.

This brings the argument back to the original question posed: that of smallholder agricultural development and the ultimate goals of poverty reduction and food security. If much of the growth takes place on relatively few (small) farms, does this mean limited impacts on poverty? The answer is no, not necessarily. Given the right kind of complementary actions, benefits can be spread more widely.

Cross-country econometrics show strong associations between agricultural development and poverty reduction, an association that tends to be stronger for Africa than elsewhere. For example, Irz et al. (2001) estimate that for every 10% increase in farm yields, there has been a 7% reduction in poverty in Africa, more than the 5% reduction estimated for Asia. Growth in manufacturing and services has no such effect. The 2008 World Development Report compiles the evidence as follows:

Among 42 developing countries over 1981–2003, 1 percent GDP growth originating in agriculture increased the expenditures of the three poorest deciles at least 2.5 times as much as growth originating in the rest of the economy ....

Similarly, Bravo-Ortega and Lederman (2005) find that an increase in overall GDP coming from agricultural labor productivity is on average 2.9 times more effective in raising the incomes of the poorest quintile in developing countries ... than an equivalent increase in GDP coming from non-agricultural labor productivity ...

Using cross-country regressions per region and looking at \$2-a-day poverty, Hasan and Quibriam (2004) find larger effects from agricultural growth on poverty reduction in Sub-Saharan Africa and South Asia, but larger poverty-reducing effects of growth originating in other sectors in East Asia and Latin America.

[World Bank 2007, Box 1.2]

It is not hard intuitively to explain why smallholder development, that probably sees immediate benefits to a few small farmers, has such an effect on poverty. Farming in Africa is generally intensive in labour, and especially so on small farms. When small farmers expand production they invariably have to hire in more labour and thus demand for rural labour rises to the benefit of land-poor neighbours who need additional work off their small plots. It is plausible, too, that supply of labour falls as some of the small farmers, with enhanced farm incomes, withdraw from occasional labouring. Then there are links from farming to the rural non-farm economy. More output means more jobs in supplying inputs, processing, and transport. Even more important, small farmers tend to spend much of their additional income locally on construction, services, and local manufactures such as furniture; so that links through consumption can be strong.

Formal modelling of such rural linkages in Africa have produced estimates of 1.35 for rural Sierra Leone in 1974–75 (Haggblade, Hammer & Hazell 1991) to estimates ranging from 1.31 to an extraordinary 4.62 for Burkina, Niger, Senegal and Zambia in the 1980s (Delgado et al. 1994, Delgado, Hopkins & Kelly 1994) — the very high estimates being explained as the result of isolation in rural Africa which means that any exogenous increase in farm earnings will be spent disproportionately on locally-produced goods and services.<sup>17</sup>

These effects are likely to be strengthened if there are complementary efforts to support the livelihoods of those with very small farms for whom a more commercialised small farming will not be a

<sup>17</sup> The multipliers for rural Africa reported by Delgado and colleagues have been criticised by de Janvry (1994) as being based on unlikely assumptions about the perfect elasticity of supply of non-tradables.

route out of poverty. Dorward (2009) presents a simple scheme to link such differences to policy implications, consisting of three options:

- **Stepping up:** intensify farming through improving transport, facilitating access to inputs and credit, investing in technology and through farmer organisation
- **Stepping out** into the non-farm economy by more education and skills, better health care, and providing potential migrants with information on opportunities, conferring on them transferable rights as citizens and facilitating remittances; and,
- **Hanging in,** providing social protection for those who have few assets and options, investing in technology for food staples to allow them to make best use of their small plots, and making sure that the next generation get a better start than their parents through primary health care, infant nutrition, and schooling.

The beauty of this formulation is that it sets several current debates in context. Yes, conventional agricultural development is needed for some farmers; but not for all: the technology of food staples for the very poor and near-landless may need to be different to that provided to small farmers with more potential, stressing innovations that save labour and use external inputs sparingly. The rural non-farm economy can be seen as complementary to agricultural development, rather than an alternative.<sup>18</sup> Social protection is an important way to deal with chronic poverty, but not the only measure. Finally, rural development matters, but it is not exclusive of urban development: rural areas and urban centres are linked so that demand from urban areas for agricultural produce, supply of inputs for farmers from industries based in cities, and opportunities for households to diversify by migrating to urban areas are all potential ways forward.

Finally, will smallholder development deliver food security? It will help: more food availability is likely to tend to push down food prices, while increased incomes for the poor are likely to mean greater access to food. But this will not be sufficient. A substantial part of the problem of child malnutrition in areas such as West Africa comes from disease, not food supply. For better nutrition, the continent needs to do as much to ensure access to clean water, sanitation, and primary health measures, as to grow more food — see Wiggins & Keats (2009) for a review.

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<sup>18</sup> The debate that poses the non-farm rural to the agricultural economy is somewhat sterile: most of the spending and policy that supports agriculture — rural roads, education, health care, power supplies — also supports the rural non-farm economy. The main element of trade-off concerns spending on agricultural research, and here the good news is that a small investment goes a very long way, so it is not necessary to commit major parts of the public budget to support farming alone.

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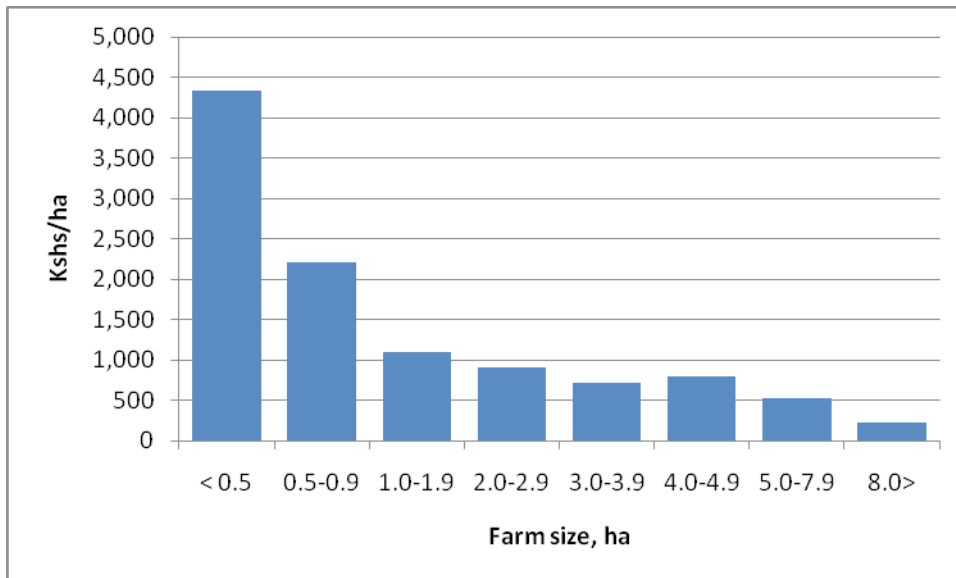
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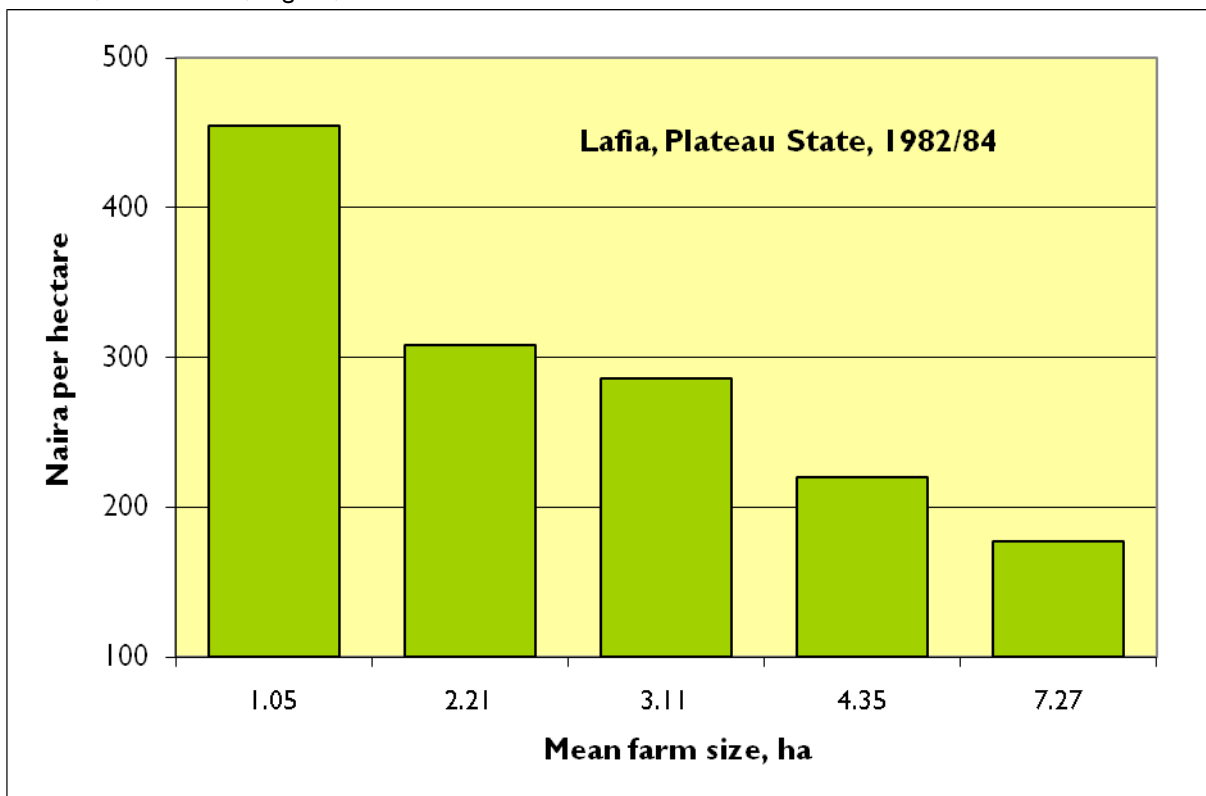
## Annex A: Evidence of the inverse ratio of farm size to production per hectare in Africa

A1: Kenya: smallholder areas, 1974/75: value of output by farm size



Sources: Dorling 1979, Tidrick 1979, quoted in Hunt 1984 (Tables 9.4 & 9.5)

A2: Lafia, Plateau State, Nigeria, 1982/84



Source: APMEPU, in Eyoh 1990, 1992





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