

# Some evidence of poverty reduction through improved agricultural performance in the developing world

*Ahmad Anwar Ismail*

*Faculty of Agro Industry and Natural Resources  
Universiti Malaysia Kelantan*

## Abstract

History shows that different rates of poverty reduction over the past five decades have been closely related to differences in agricultural performance- particularly the rate of growth of agricultural productivity.

In Asia, the rapid productivity gains of the Green Revolution increased producers' incomes, raised labourers' wages and lowered the price of food. In addition, new livelihood opportunities were generated when success in agriculture provided the basis for economic diversification. However, despite decades of investment in new agricultural technology and rural development, hunger and poverty continue to plague large areas of the developing world. The problem is particularly acute in sub-Saharan Africa, where progress towards the Millennium Development Goals is slowest.

While increasing agricultural productivity perhaps remains the single most important determinant of economic growth and poverty reduction, serious doubts are emerging as to whether agricultural productivity can be further increased, where it is most needed, and what part, if any, small scale farming will play in future. Development experts need greater understanding of the links between agricultural productivity and poverty. They also need to assess just how far they have changed and the extent to which small scale agriculture can remain a ladder out of poverty for millions of people living in rural areas.

In this paper what we know of the impact of agricultural performance on poverty reduction in the developing world is reviewed, while some emerging issues and questions that arose are addressed. This paper is intended solely to stimulate public discussion.

**Keywords:** agricultural productivity, green revolution, poverty reduction, millennium development goals

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## **Introduction**

Poverty has fallen rapidly over the last 50 years, but at different rates around the world. Asia has achieved the most rapid poverty reduction, particularly China, but also India and Southeast Asia. In contrast, little if any progress has been made in sub-Saharan Africa where the number of people living on less than USD 1 a day – the internationally agreed definition of absolute poverty – has doubled over the past 20 years (World Bank, 2004). Historically, rates of poverty reduction have been very closely related to agricultural performance – particularly to the rate of growth of agricultural productivity. Simply put, this indicates that the countries that have increased their productivity the most have also achieved the greatest reductions in poverty.

In Asia rapid productivity gains, achieved largely through the technological advances of the Green Revolution, provided a fast track route out of poverty by directly increasing producers' incomes and labourers' wages, by lowering the price of food and by generating new livelihood opportunities as success in agriculture provided the basis for economic diversification.

However, despite decades of investment in new agricultural technology and rural development, hunger and poverty continue to plague large areas of the third world. The problem is particularly acute where people depend on rain-fed agriculture, in particular sub-Saharan Africa, where the impact of new technologies has been less apparent and agricultural productivity has generally stagnated and even fallen in some areas (Nkamleu, *et al.*, 2003).

Achieving the Millennium Development Goal (MDG) of halving the proportion of people living in absolute poverty by 2015 will depend largely on increasing agricultural productivity, which remains perhaps the single most important determinant of economic growth and poverty reduction. However, serious doubts are emerging as to whether agricultural productivity can be increased where it is needed most, and what part, if any small-scale farming will play in future.

### **Agriculture, growth and poverty**

#### **State of world poverty**

The percentage of the world's population living on less than a US dollar a day fell from 40.4% to 21.1% between 1981 and 2001 (World Bank, 2004). Even though world population grew by an estimated 1.5 billion over the same period, the numbers of people living in absolute poverty fell by almost 400 million to around 1.1 billion. These figures, while still presenting a picture of massive global poverty, represent probably the fastest rate of poverty reduction ever witnessed (Table 1).

**Table1. Percentage and numbers of population living below the US\$1 per day poverty line, 1981-2001 (Source: *World Bank, 2004*)**

Region	% of population living below US\$1 per day			No. of people living on less than US\$1 per day (million)		
	1981	1990	2001	1981	1990	2001
East Asia and Pacific	57.7	29.6	14.9	795.6	472.2	271.3
China	63.8	33.0	16.6	633.7	374.8	211.6
Europe and Central Asia	0.7	0.5	3.7	3.1	2.3	17.6
Latin America & Caribbean	9.7	11.3	9.5	35.6	49.3	49.8
Middle East and North Africa	5.1	2.3	2.4	9.1	5.5	7.1
South Asia	51.5	41.3	31.3	474.8	462.3	428.4
India	54.4	42.1	34.7	382.4	357.4	358.6
Sub-Saharan Africa	41.6	44.6	46.9	163.6	226.8	315.8
<b>Global figure</b>	<b>40.4</b>	<b>27.9</b>	<b>21.1</b>	<b>1481.8</b>	<b>1218.5</b>	<b>1092.7</b>

In terms of the proportion of people in absolute poverty, significant reductions occurred in most regions between 1981 and 2001. Progress was most rapid in East Asia, primarily China, where the proportion of the population living in absolute poverty decreased from almost 64% to just 17%. Elsewhere the progress was steady with the exception of sub-Saharan Africa.

In terms of the numbers of the numbers of people living in absolute poverty, the picture is very different. Almost the entire reduction in numbers between 1981 and 2001 can be attributed to progress in China along with generally small and disappointing reductions in other parts of East Asia, India and the Middle East. But in sub-Saharan Africa, the number of people in absolute poverty has effectively doubled.

Changes in rural poverty figures tend to closely follow changes in national poverty figures, primarily because poverty in the developing world is largely a rural problem.

Moving away from the broad geographical distribution of poverty described above, the characteristics of poverty remain rather consistent:

- Poverty remains a predominantly rural problem: 75% of the world's poor live in rural areas (IFAD, 2001);
- Poverty is concentrated amongst women, children and elderly;
- Poverty is most concentrated amongst vulnerable groups and castes, landless people and ethnic minorities who often live in remote rural areas (World Bank, 2004).

### **Mixed progress in recent performance for agriculture productivity**

Total agricultural production has increased rapidly and the FAO 2004 figures indicate that between 1961 and 2001, the global cereal production more than doubled (from 900 to 2100 million tons) far outstripping the rate of population growth. In the developing world, overall, per capita food production rose by over 50% between 1961 and 2001 (IFPRI, 2002). This has ensured that world food prices have declined in real terms; Mitchell and Ingco (1993) report a fall of 78% in food prices as a whole from 1950 to 1992.

Some of this increase reflects an expansion of the area under agriculture – particularly in Africa – but global yields have also increased over the same period, reflecting an increase in productivity through the introduction of new technologies and a major expansion of water availability and irrigation.

Agricultural performance in Asia over the past many decades has been remarkable. Between 1961 and 2001, cereal production in the region's developing countries increased from 309 to 962 million tons, a rate of increase far in excess of population growth. In the same period the expansion of agricultural land was comparatively modest (from 1.0 to 1.4 billion hectares). The growth in output came mostly from increasing agricultural productivity. For instance, cereals productivity nearly tripled from 1.2 to 3.3 tons/ha between 1961 and 2001 in developing Asia (all figures from FAO, 2004). This rate of productivity growth has an enormous impact on economic development and poverty reduction.

In contrast, over the same period, the production of basic cereals in sub-Saharan Africa grew only fourfold, from 40 to 116 million tons, but the increase in production barely kept pace with population growth. In addition, productivity increases were very small. Thus while cereals productivity in Africa rose by half (from 0.8 to 1.2 tons/ha), most of the output growth came from using more land and labour, not more productive use of those resources. The area of agricultural land in Africa expanded from 1 million to 1 billion hectares during 1961 and 2001 (FAO, 2004). Weak productivity growth in agriculture had serious consequences for economic development and poverty reduction.

### **Evidence on poverty reduction brought about by agricultural growth**

Growth in agriculture, at the macro-economic level, has been consistently shown to be more beneficial to the poor than growth in other sectors. Analysis reveals that agricultural productivity has probably been the single most important factor in determining the speed and extent of poverty reduction during the past few decades. Much of this evidence is derived from the Green Revolution in Asia – examples from Africa are noticeably fewer.

Pro-poor benefits of growth in agriculture is glaringly seen in India where Datt and Ravallion (1996) showed that rural sector growth reduced poverty in both rural and urban areas, while economic growth in urban areas did little to reduce rural poverty. For a

number of Southeast Asian countries, Warr (2001) provided evidence that growth in agriculture significantly reduced poverty, but this was not matched by growth in manufacturing. Gallup *et al.* (1997) showed that every 1% growth in per capita agricultural GDP led to 1.6% growth in incomes of the poorest 20% of the population – much greater than the impact of similar increases in the manufacturing and service sectors. Numerous other studies reveal similar results, but emphasize the important qualification that the degree to which agricultural growth reduces poverty is usually conditional upon initial distribution of assets (land in particular) and the initial level of inequality (Bourguignon and Morrison, 1998; Timmer, 1997; de Janvry and Saddoulet, 1996).

In terms of the role of agricultural productivity in reducing poverty, Thirtle *et al.* (2001) concluded cross-country regression analysis that, on average, every 1% increase in labour productivity in agriculture reduced the number of people living on less than US\$1 a day by between 0.6 and 1.2%. No other sector of the economy shows such a strong correlation between productivity gains and poverty reduction.

### **Understanding how increased agricultural productivity reduces poverty**

The report by DFID (2004) put forth four ‘transferring’ mechanisms which critically link changes in agriculture performance (more especially productivity increases) to progress in reducing poverty. These are: (i) direct and relatively immediate impact of improved agricultural performance on rural incomes, (ii) impact of cheaper food for both urban and rural poor, (iii) agriculture’s contribution to growth and the generation of economic opportunity in the non-farm sector, and (iv) agriculture’s fundamental role in stimulating and sustaining economic transition as countries (and poor people’s livelihoods) shift away from being primarily agricultural towards a broader base of manufacturing and services.

*The direct impact on rural poverty.* Poverty remains a rural problem and agriculture is generally central to rural livelihoods. Some 70% of the workforce in sub-Saharan Africa and 67% in South Asia are at least partly engaged in agriculture (Maxwell, 2001). Therefore any improvement in rural incomes should – if only by sheer weight of numbers – have a major impact on poverty.

The most useful assessments of the impact on poverty of changes in agriculture are those that follow farming communities’ experiences over a long-term period (Lanjouw and Stern, 1998; Hazell and Ramasamy, 1991). These studies showed that agricultural productivity gains have raised rural incomes in two ways: by directly increasing farmers’ incomes and, of particular importance to the poorest, by increasing employment opportunities and wages.

*The impact of reduced food prices.* From the mid-1960s, when Green Revolution technologies began to be adopted widely, increases in the production of staple foods in most developing countries have comfortably outstripped population growth. Given this significant increase in per capita supply, and the relatively low elasticity for demands for

basic foods, the real market prices of the major traded grains have been in almost continuous decline since the early 1950s (DFID, 2004). At the individual country level, increased production of food grains has often had a dramatic effect on reducing prices. This is of great benefit to the poor, both in urban and rural areas where many people buy and grow their own food.

*Agriculture's contribution to growth and the generation of economic opportunity in the non-farm sector.* Agriculture remains the economic heart of most developing countries. In Asia, where economic growth and diversification have been most rapid as against Africa, agriculture still provides jobs for 60% of the working population and 27% of Gross National income. Given agriculture's relative dominance in the economy, it remains the most likely source of significant growth in most developing countries. More immediately, fluctuations in the agriculture performance are felt quickly, not only in the agriculture sector, but also in the wider non-farm economy.

The extent to which changes in agricultural performance influence the wider economy is determined by the size of the 'multiplier' – a measure of the extent to which a unit change in income earned in agriculture causes a change in income in the non-farm sector (Thirtle *et al.*, 2001). He suggested that the size of the multiplier will vary between places and over time, reflecting differences and changes in factors such as the amount of farm income spent on imported goods or saved. He substantiated his argument by presenting evidence from a number of studies and found multipliers ranging from 1.35 to 4.62. These studies illustrate that agriculture – given its size and the impact of multipliers – is the most crucial sector for promoting broader economic growth and has greater knock-on effects than any other sector.

*Stimulating and sustaining economic transition.* The relative decline of agriculture's importance to the economy and people's livelihoods is an evitable and desirable consequence of successful economic development. Rapid economic growth, sustained poverty reduction and substantial wealth creation have historically resulted from economic diversification, with less reliance on agriculture and more on manufacturing and services. However, history shows that most countries cannot successfully industrialize without first achieving significant improvements in agricultural performance – particularly productivity. This holds true for Europe, North America, Japan and the emerging countries of Asia where industrialization has been very clearly agriculturally led (Timmer, 1988).

### **Emerging issues and questions**

Some pertinent questions arise the primary ones are (i) can agriculture still provide the means for poverty reduction, (ii) are significant improvements in agricultural productivity possible, and (iii) what are the best agricultural development strategies.

### ***Can agriculture still provide the means for poverty reduction?***

Asia's progress in freeing millions from poverty over the last 40-50 years can be largely attributed to the region's success in increasing agricultural productivity. It was also important that wider circumstances, policies and measures allowed agricultural productivity to occur, and ensured its impact on the wider economy. However, the Asian experience stand in sharp contrast to Africa, where productivity has been stagnant, rates of economic growth disappointing and poverty is on the rise.

Given the above scenario, it is easy to conclude that without a significant improvement specifically agricultural productivity the outlook for growth and poverty reduction in Africa remains bleak. But Africa does not have the monopoly on poverty – the largest numbers of poor people live in rural Asia. While many live in remote areas (or those that are weakly integrated into the wider economy), many also live in places that have witnessed the full effect of the Green Revolution, but its impact on their poverty has been limited.

Few doubt that achieving the MDG of halving the number of people living in absolute poverty by 2015 will require a significant improvement in agricultural performance, particularly in Africa. But in looking at the future and the likelihood of this being achieved, differences of opinion emerge around two key questions:

1. Do the conditions exist for agricultural productivity to be increased where it is most needed and what part, if any, can small-scale agriculture play in achieving this?
2. Given quite fundamental differences in context between Asia and Green Revolution and today's poorest countries, will the historical relationship between agricultural growth and poverty reduction continue to hold true.

The view taken on both these questions will have major policy implications.

### ***Are significant improvements in agricultural productivity possible?***

Increasing the pace of poverty reduction – most critically in Africa – will depend upon the extent to which productivity can be increased through a step change in agricultural performance. Simply increasing output at current productivity levels (and even this appears difficult in some places) will have little long term impact on growth or poverty. While a consensus exists on the need to increase productivity, opinion is divided on whether rapid productivity gains, similar to those seen in Asia during the Green Revolution can be achieved elsewhere.

Much of this debate focuses on whether the economic and physical preconditions that enabled the Green Revolution to happen exist in those regions as yet untouched by this kind of transformation. Inevitably this debate seeks to contrast Asia's success with Africa's failure, but such a stark characterisation of debate should be dealt with cautiously. There have been incidences of rapid productivity improvement in Africa (Wiggins, 2000) and the lives of millions of poor people in Asia remain unchanged despite the Green Revolution (Rosset *et al.*, 2000).

***What are the best agricultural development strategies?***

There is probably less agreement amongst development agencies now on the best (in terms of impact on poverty and hunger) strategy than at any time over the last half-century or longer (Ashley and Maxwell, 2001). This is particularly true of Africa. Some key points in the debate as documented in the report by DPID (2004) are summarised here.

*Where should development efforts be focused* to achieve the greatest return in terms of reducing poverty and hunger? Should they be directed on high potential areas where development options are greatest, or in the poorest areas where there are fewer potentials and options, but where poverty is greatest?

*Who should they be focused on?* Here the debate sees at least three positions:

1. Accept the demise of the peasantry and work with large-scale farmers whose success will act as catalyst to generate wealth and jobs for those whose farms are not viable
2. Work with smallholders, but accept the fact that most innovation, investment and commercialization will come from only that portion with more land and capital than their neighbours. Some claim that these farmers will then create enough jobs locally, through hiring labour and spending on local goods and services, to boost the welfare of other farm households (David *et al.*, 2000).
3. Focus on the poorest and most disadvantaged smallholders to beat poverty and hunger and reduce vulnerability directly.

*Should they focus on less favoured areas?* These include poor households in areas of low agricultural potential that are remote from markets and supplies and inputs. On this question two positions easily come to the forefront:

1. Employment opportunities in the rural non-farm economy in remote areas are often limited. Thus, in spite of poor prospects in farming, people are heavily dependent on crops and livestock for their livelihoods. The promotion of and investment in agriculture should therefore be viewed as a safety net provision in itself, irrespective of whether such agriculture is contributing to growth.
2. In many of these cases, food security will be assured more by the ability to buy in food, rather than by trying to produce more. The questions posed for such areas those of jobs and incomes. The difficulty lies in trying to create jobs where resources are scarce and markets remote. The answer probably lies in a combination of marginal agriculture, forestry, fishing, tourism, public employment in provision of services and physical infrastructure, public transfers for social protection and regional equity, and in migration to alternative opportunities (Hite, 1997). Agricultural development may not be, in these areas, be a prime mover in reducing poverty and improving food security.

*What is the role of technology?* Should development efforts focus mainly on yield-raising technology or on less intensive approaches that minimise variation? Which would be a better option – high yielding hybrid maize with fertilizer applications or low yielding open-pollinated varieties requiring less fertilizer?



*Which crops?* Should the emphasis be on crops that will be largely consumed within the household or on income generating cash crops?

## **Conclusion**

Contrasting answers to the various questions raised produced different policy positions. Those who are optimistic about the role of smallholders emphasise the need for increased direct investment in agriculture and rural development, with support focusing on creating institutions that will encourage and support smallholder-led agricultural development. They believe it is important to improve the productivity of staple food crops that are not traded internationally, but consumed by the poor and trade locally.

On the other side, the smallholder pessimists emphasise the need to achieve the best outcome possible from rapidly changing global markets for agricultural produce. They believe that commercial production of non-staple cash crops should be encouraged, particularly those that result in strong links to the non-farm sector where the main source of employment for the rural poor would be found. Influencing international policy processes to ensure access to developed country markets is a priority for this position, as is improving the human capital assets of the rural poor so they can take up opportunities in growth areas as they occur.

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