Future Agricultures

Briefing

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The Global Fertiliser Crisis and Africa

Political and media attention has rightly been focused on recent increases in food and energy prices and their impacts on consumers and national economies, particularly poor consumers and poor economies but much greater increases in fertiliser prices have received much less attention in industrialised economies. The impacts of these fertiliser price increases on many countries in Africa, however, are potentially very damaging in their effects on food security, poverty, and long term economic growth. In the many African countries that are heavily dependent on agriculture the impacts of high fertiliser prices and scarcity will extend beyond farmers to affect consumers, export earnings from cash crops, exchange rates, and the whole economy.

Fertiliser price increases

Fertiliser prices have risen dramatically in the last two years, more than oil and staple and cash crop prices (see figure 1). The scale and significance of these price increases is even more dramatic when fertiliser price changes are compared with changes in the prices of the crops they are used to produce. Table 1 shows that the real price of DAP, a major phosphate fertiliser, has increased by 320% over the last two years, and the real price of urea, a major nitrogenous fertiliser, has increased by 160%. Increases in real prices of major food crops were much smaller, though still substantial (increases in rice prices were roughly the same as increases in urea prices). Prices of oil and of export crops, for example cotton, were much more static. Much of the fertiliser price increases have occurred in the last 12 months, and while DAP and crop prices appear to have flattened in the last month or so, urea prices have continued to rise.

Box 1: Fertiliser use in Africa

Many African economies are heavily reliant on agriculture, as it accounts for a large percentage of GDP and employment. Productivity and fertiliser use tend to be low, with average African cereal yields under 1.0 metric tonnes per ha and fertiliser use rates of 8kg/ha in the early 2000s comparing with cereal yields of 2.4 tonnes per ha or more and fertiliser use of 80 kg/ha or more in Asia and Latin America (Morris et al., 2007). The small amounts of fertiliser used in Africa (about 1% of the global total) nevertheless make a critical contribution to production of food and export cash crops in some countries, and in these countries increased fertiliser use is an important component of strategies for increasing agricultural productivity, food security, poverty reduction and wider economic growth.

The environmental costs of low fertiliser use are high. Current rates of fertiliser use are associated with very serious losses of soil nutrients and declining soil fertility, while low yields contribute to deforestation and encourage extensive cultivation on marginal and fragile land. Inappropriate fertiliser use also has environmental costs – producing green house gases, polluting water courses and sometimes damaging soils. These problems demand soil management systems that integrate organic and inorganic fertiliser management to maximise yield responses to small quantities of inorganic fertiliser and to promote improved soil structure and ecology. They should not, however, be seen as arguments against increasing fertiliser use from its current very low base.

Causes

There are a number of reasons for these dramatic increases in fertiliser prices. Demand has increased as a result of higher food prices and increased use in biofuel production. Supply has been affected by increasing energy costs (which are particularly important in producing nitrogenous fertilisers), the introduction of export tariffs on some fertilisers (for example by China in April 2008), and capacity limits in expanding production to meet rising demand – particularly for phosphate rock. These influences have to be seen in the context of large shifts of funds into commodities, particularly into commodity index funds. These shifts have been encouraged by the fall in the value of the US dollar and low US interest rates, with the development of new commodity index investment instruments and funds (Masters, 2008).

The Future Agricultures Consortium aims to encourage critical debate and policy dialogue on the future of agriculture in Africa.
The consortium is a partnership between research-based organisations in Africa and the UK.
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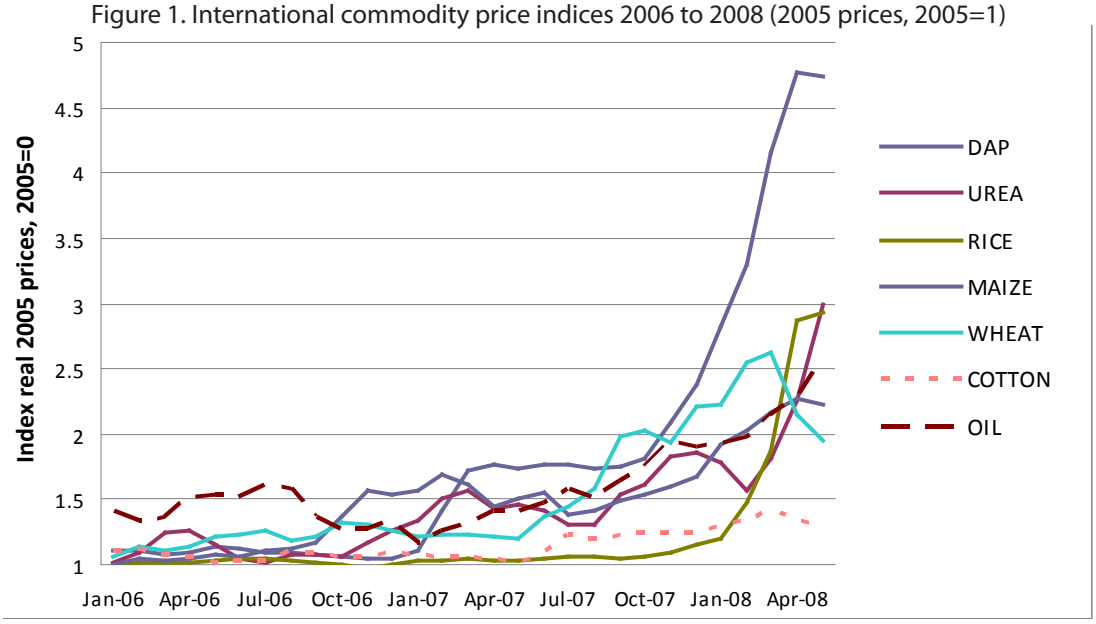
Figure 1. International commodity price indices 2006 to 2008 (2005 prices, 2005=1)



Source: World Bank data (2006-08)

Consequences

Fertiliser producers have generally posted large increases in profits as prices have risen more than costs. Impacts on fertiliser traders and importers are more ambiguous and often negative. Traders with large stocks gain if increasing fertiliser prices allow them to increase sales prices of existing stocks. They may suffer from reduced sales volumes if higher prices lead to reduced demand by farmers (as discussed below) however, and they may also find it difficult to raise the working capital to buy more expensive fertiliser stocks. The general uncertainty in fertiliser and other commodity markets, and the potential for this to increase the likelihood of political interventions, also increases traders' and importers' risks.

Farmers are hurt by high fertiliser prices in terms of both the *profitability* of fertiliser use and the *affordability* of its purchase. Fertiliser price increases generally decrease farm incomes and fertiliser profitability, unless cost increases from higher fertiliser prices are more than offset by revenue increases from higher crop prices. Table 1 shows that proportional increases in international fertiliser prices over the last two years have been higher than price increases for both staple food commodities and export cash crops. With already low and variable returns to fertiliser use on staple crops in most countries in Africa (Meertens et al, 2005), the recent increases in fertiliser prices mean that either fertiliser use and food production will fall, or food prices must rise dramatically for continued profitable fertiliser use in food production. The very serious effects of this on food insecurity and poverty for poor consumers are illustrated with estimates from Malawi in Box 2.

Table 1: International fertiliser and crop prices increases, May 2006 to May 2008

DAP	318%
Urea	160%
Rice	185%
Maize	108%
Wheat	61%
Beverages	41%
Cotton	29%

Source: World Bank data (2006-08)

High fertiliser prices pose even greater problems regarding farmers' ability to purchase fertilisers, i.e. affordability. Fertiliser use by most smallholder farmers in Africa has been severely limited by lack of access to savings or credit for purchasing fertilisers, even at the fertiliser prices prevailing in the last few years: high fertiliser prices will make it unaffordable for many of the few farmers who could previously afford it.
At the same time, higher food prices, while raising food returns from fertiliser use to some extent, have a negative impact on real incomes and savings of the many African farmers who produce less food than they consume – and this will further exacerbate their problems in affording fertiliser purchases without subsidies. However the ability of governments to afford subsidies is also undermined by high fertiliser prices. Again this is illustrated with figures from Malawi in Box 2.

The impacts of high fertiliser prices on different countries' national economies depend on the importance of agriculture in the economy, major crops grown, climate, and reliance on fertiliser imports. Fertiliser manufacturing countries can gain from higher export prices and/or impose export tariffs to reduce domestic prices, but this is not an option for African fertiliser import-

ing countries. These countries face increased fertiliser import costs and difficult choices. Unless fertilisers are subsidised, use is likely to fall, reducing food and export crop production, with increased food import bills and reduced export earnings. High food prices, likely food shortages and low export crop production would have very damaging effects on welfare, balance of payments and economic growth in some countries. There will also be high environmental costs of reduced fertiliser use.

The costs of subsidising fertiliser are also high. Economic returns will vary between countries, but, as illustrated by a comparison of break-even and import parity prices for maize in Malawi, economic returns to fertiliser use on staple crops may be severely reduced at current prices.

The same will be true for cash crops. The costs of input subsidies will also increase drastically. Nevertheless, welfare, livelihood, environmental and wider growth benefits from the continued use of fertiliser should also be high, and are not sufficiently allowed for in simple cost-benefit analyses. Current high prices of imported food also lead to strong political pressures for countries to be more self sufficient in food – and to subsidise fertiliser imports to achieve this.

There are strong welfare, economic, environmental and political arguments for encouraging continued fertiliser use despite the current high prices. There are also encouraging

Box 2: Impacts of increased fertiliser prices in Malawi

Average expenditure per person in Malawi is around US$250 per year. Many Malawians spend over 25% of their income on their staple food, maize. 97% of Malawian farmers grow maize, devoting around 50% of their cultivated land to producing the crop, but 60% of Malawian farmers consume more maize than they produce and have to supplement their own maize production with market purchases. Affordable maize prices are thus critical to the Malawian economy and to the well-being of the population. Malawian farmers face particularly high fertiliser prices due to the costs of transporting low volumes from the coast and then into rural areas – and as a result farm gate fertiliser prices are double, or more than double, international prices. The table below shows how changing urea prices affect the minimum maize price needed for use of urea on maize to be profitable, with two different grain to nitrogen response ratios – average and above average (but readily achievable by "better" or better trained farmers). Break-even prices are calculated using a widely accepted rule of thumb that the value of the extra production from fertiliser needs to be at least twice the cost of fertiliser, to compensate farmers for the extra costs and risks involved.

The table shows that in the past two seasons break-even prices have been between pre- and post- harvest prices. Importantly, they have been some way below import parity prices, which (due to Malawi's landlocked status and poor infrastructure) are too expensive for poor consumers to afford without external assistance. In 2008/9, however, the break-even price for profitable fertiliser use will be more than double the break-even price the previous year and, with an average nitrogen response rate, will be roughly equal to the expected price of importing maize from South Africa. One way or another, therefore, Malawi faces the grim prospect of maize prices that will cause severe hardship and will increase already high malnutrition and poverty rates.

Malawian breakeven maize prices with changing urea prices

Grain:N response ratio	Year	Urea price		Malawi maize prices $/tonne			
		Europe $/tonne	Farm $/tonne	Break-even	actual pre-harvest	actual post harvest	Import Parity*
15	2006/7	220	470	136	160	100	350
	2007/8	290	592	172	430	140	335
	2008/9	630	1285	372	??	??	370
20	2006/7	220	470	102	160	100	350
	2007/8	290	592	129	430	140	335
	2008/9	630	1285	279	??	??	370

* SAFEX June prices (forward price for 2009) plus $100 transport etc Source: adapted from Poulton and Dorward, 2008

The increase in international fertiliser prices also has major impacts on farmers' and on the country's ability to afford fertiliser purchases. From 2003/4 to 2006/7 the cost of one 50 kg bag of urea without any subsidy cost a little over 10% of median annual per capita rural expenditure, but few households had either savings or access to credit that would allow them to purchase fertiliser. The 2005/6 to 2006/7 fertiliser subsidies led to increased production by making fertiliser purchase affordable for households who could not afford it (or access credit) at unsubsidised prices. At 2008/9 prices the same bag, with no subsidy, will cost around 30% of median per capital expenditure. A 70% government subsidy of the same fertiliser volume as in 2006/7 would lead to an approximate 170% increase in the cost to government of subsidising fertiliser, to US$160 million in 2008/9 (more than 10% of the entire national budget) - only to deliver to farmers a subsidised price in 2008/9 roughly the same as the unaffordable unsubsidised price in 2006/7. To deliver the same volume of fertiliser at the same (affordable) subsidised price in 2008/9 as in 2006/7 would require government fertiliser subsidy expenditure of over US$200 million, over three times the cost in 2006/7, and around 17% of the 2007/8 national budget.

Sources: SOAS et al. (2008), National Statistical Office (2005), Ministry of Agriculture (2006)

model forecasts that over the next 10 years both food and fertiliser prices will fall back to their 2007 and 2005 levels respectively. These models did not, however, predict the current high prices, and though rapid falls back to 2007 fertiliser prices are predicted for 2008/9, further price reductions will be much slower.
In the meantime African governments and fertiliser importers face the following major and immediate difficulties, which are likely to continue, though hopefully with diminishing severity:

- Global fertiliser supplies are tight and individual African countries are very small players in global fertiliser markets where suppliers prefer to sell large bulk orders

- Short term finance costs are very high

- If finance and fertilisers can be accessed, countries have to manage reduced economic returns and increased fiscal and balance of payments constraints from large investments in high cost fertiliser acquisition and subsidisation

- Large scale subsidy programmes offer the best option for mitigating the impacts of high fertiliser prices but are difficult to implement efficiently and effectively, and their costs are very difficult to control.

Action Required

Recent major commitments by international donors to increase investments in agriculture are very welcome. So, too, are ongoing negotiations - involving the international community, fertiliser suppliers, African Governments, NEPAD and the African Development Bank - to access fertiliser and financing. The outcome of these negotiations will be very important.

It is also important that there is greater clarity regarding the extent to which these extra commitments are actually new commitments of extra funds, rather than reallocations of funds previously committed elsewhere. Extra funds should also, as far as possible, be disbursed as grants rather than loans: countries' longer term fiscal, balance of payments and economic growth conditions will be adversely affected if repayment of extra cost of fertiliser purchases and subsidies adds to their debt.

credit: EC/Story workshop

There also need to be rigorous mechanisms for distribution of subsidised fertilisers. Rationing systems must direct subsidised fertilisers where they are needed most and will give the highest returns, with clear procedures and safeguards preventing subsidy diversion and corruption. There may, for example, be the need for a two tier system of subsidised fertiliser allocations, first to sub-sectors and then to users within these. It is essential that subsidy programmes do not undermine private sector distribution systems.

Long term challenges faced by high fertiliser costs must also be addressed. Greater investments should be made in research, extension and, where appropriate, subsidies promoting more integrated soil fertility management with greater use of organic materials, better soil health and more efficient and environmentally beneficial use of inorganic fertilisers.

Investments should also be made in developing public and private sector infrastructure and coordination mechanisms in fertiliser production (where appropriate), procurement, packaging, distribution and access.

As fertiliser prices hopefully fall in the long term, this will then provide a foundation for increasing both their use and their effectiveness in raising sustainable agricultural productivity.

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