

Conservation Farming, Food and Productivity

Rising food prices here to stay?

The recent *'Global Food and Farming Futures Future of Food and Farming Report'*, commissioned by the British Government warns that the current status of global agriculture is incapable of responding to an increasing world population that is expected to plateau at 9 billion by 2050 and that the world is threatened by a major food crisis within 20 years unless action is taken urgently.

The report, following two years of research by 400 scientists in 34 countries, was drafted by the British government's office for science and presented in London recently by the UK's chief scientific adviser, John Beddington.

According to the report, the frailties in global agriculture were exposed during 2007 and 2008 after price increases in grain and other basics added 100 million people to the list of those suffering hunger throughout the world, the author said. 'Farmers will have to grow substantially more food from roughly the same amount of land – with the exception of tracts that could be brought into use in Russia, while simultaneously cutting greenhouse gases by up to 60 per cent by 2050'.

The report also suggests that up to 30% of all food grown is wasted. In developing countries the losses are caused by poor transport, storage and refrigeration, while in richer countries the wastage is most often caused by consumers throwing away food. Urging the use of genetically modified crops, the report suggests that decisions about the acceptability of new technologies need to be made in the context of competing risks rather than simplistic versions of the precautionary principle i.e. the potential costs of not utilising a new technology must also be taken into account.

The report also notes that the lack of equity in the world is highlighted by the fact that one billion people go hungry daily, one billion more lack the vitamins and minerals necessary for a healthy life, while one billion in the West are obese and "substantially over-consuming".

In a recent article *'The Great Food Crisis of 2011'*, published by the Foreign Policy magazine, Lester Brown of the Earth Policy Institute warns that rising food prices are here to stay and will only get worse in the face of climate change, increasing population, water scarcity and soil erosion. "Whereas in years past, it's been weather that has caused a spike in commodity prices, now its trends on both sides of the food supply/demand equation that are driving up prices. On the demand side, the culprits are population growth, rising affluence, and the use of grain to fuel cars. On the supply side: soil erosion, aquifer depletion, the loss of cropland to nonfarm uses, the diversion of irrigation water to cities, the plateauing of crop yields in agriculturally advanced countries and climate change".



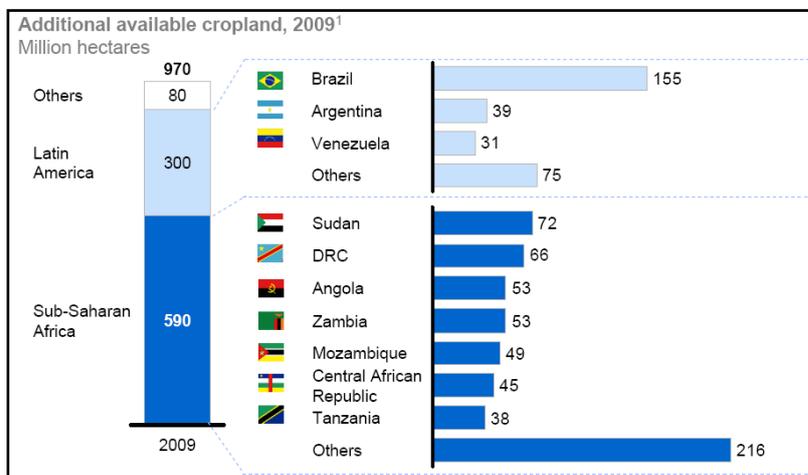
In a report in March 2011 the FAO said its global price index hit a record high in December, outstripping levels in 2008 when soaring food prices triggered riots in several countries.

Droughts, floods, high energy prices are cited by various commentators as the culprits for the spike. Nevertheless, investors seem to agree with Beddington Brown and many others. FAO for example calculates that food

production must increase by 70% over the next 40, years to keep abreast of demand, that commodity and prices may fluctuate in either direction in the short term but in the longer term the trend will continue inexorably upwards.

Foreign Investment in African Agriculture

The acquisition of huge tracts of agricultural land in Africa by foreign governments directly or through sovereign wealth funds and by multinationals, investment banks, hedge funds, private equity firms and speculators reflects this expectation. Africa has about 250 million hectares of land under production with about a further 800 million hectares of uncultivated land suitable for rain-fed crop production of which Zambia has 53 million hectares. McKinsey estimates that Africa has the potential to increase agricultural output from \$280 billion per year 2010, to \$880 billion by 2030 and in doing so become a major exporter of food stuffs.



Source McKinsey Global Institute 2010

Investment by sovereign funds reflect the fact that many countries across the world are facing fundamental problems in their efforts to produce enough food to meet growing demand because they don't have access to the basic natural assets in the scale they require i.e. climatic conditions, appropriate soils, and water resources (World Bank 2008). For example, large areas of China, South Asia, the Middle-East and North Africa are maintaining irrigated food production systems through the unsustainable use of groundwater resources (IWMI 2007).

Interest from private capital is based on the assumption that in the medium term the demand for agricultural commodities will continue to outstrip supply and explains why there are currently about 45 Private Equity firms ready to invest more than US \$2 billion in African agriculture over the next three to five years (WSJ 2010). Most of these are targeting large-scale commercial agricultural investments as the best way to generate the returns their investors expect.

The notion that foreign investment in agriculture is a key to Africa's food security, particularly when it is aimed at supporting smallholder agriculture and sustainable farming is not new although many would argue that programmes sponsored by donors (public capital) over the past 40 years have delivered few if any results.

The advent of foreign investors wishing to secure cheap sources of food to placate their consumers back home or to provide attractive returns for their shareholders is a relative new and trickier scenario. Headlines such as economic re-colonisation and land grabbing provide ample opportunity for fierce altercation fuelled by political dogma, genuine social concerns or unbridled polemics. Some of the savvier private equity investors are of course aware of these pitfalls, and are designing investment vehicles to serve the interests of shareholders and also the small-scale farming communities in which they operate. This is not a new idea, for years the concept of linking small-scale out-growers to private commercial agriculture has been bandied about in Zambia - mainly by donors or arm chair planners who don't appreciate the costs involved or the fact that commercial farmers have neither the time nor the inclination to expose themselves to the risks. With a few exceptions, the cotton industry in Zambia provides the sole example of large corporate agriculture engaging smallholders for the production of a specific commodity and the risks

relating to volatile world prices, exchange rate fluctuations, inadequate legislation to control pirate buying and marginal yields have plagued the industry for years.

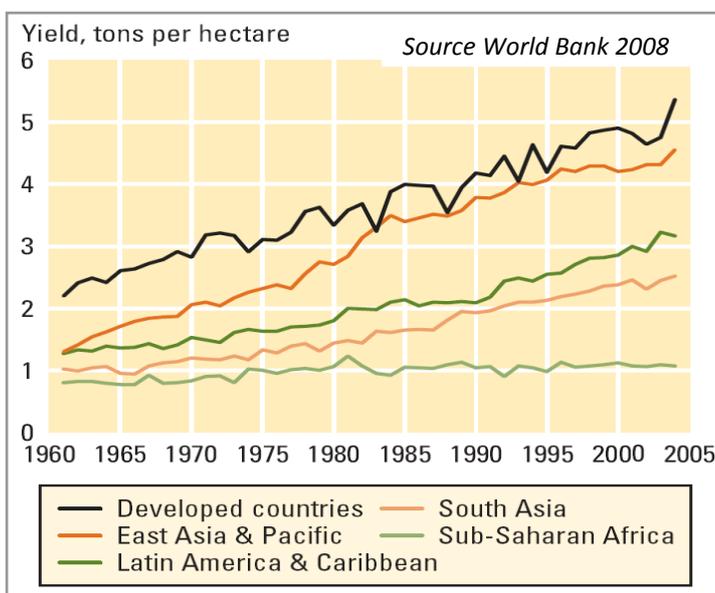
Serving the interests of foreign shareholders and small-scale farming communities at the same time is a tall order but not necessarily impossible. Some major philanthropic organisations are beginning to consider alternatives to the approaches that have delivered so little for African farmers over the past 4 decades.

In essence, they are looking for viable commercial structures that provide clearly demonstrated benefits to local communities are environmentally friendly and provide a transparent and replicable business model that can become self sustaining. Basically, the model would involve a joint venture with private equity in which the philanthropic capital is injected on concessional terms to finance specific infrastructure and services required to engage local communities living in close proximity to the corporate hub. The philanthropist may or may not require the eventual repayment of his initial investment but would at least be secure in the knowledge that his contribution would have far better chance of achieving his objectives than donating it to a spendthrift multinational NGO. No doubt all sorts of investment models will emerge over the ensuing years scattered throughout a backdrop of fuzzy social welfare programmes, food aid and a myriad of other community initiatives that mushroom and generally vanish without a trace.

Conservation Farming and Productivity

From our rather limited perspective at the CFU it goes without saying that if small-scale farmers are the target productivity must be increased significantly and to achieve this Conservation Farming (CF) is the way to go. Here we must clarify some common misconceptions.

The first is that the benefits take several years to emerge. This is not the case. Independent research has shown that all else being equal, farmers can increase their yields from 25% to 100% plus in year 1 depending on the farmer's previous situation. The medium and long term benefits arising from soil improvement are equally important but are of less significance to hard pressed smallholders who are more concerned about their immediate circumstances.



The second is that CF land preparation is more labour intensive. The contrary is true. If you are a hoe or an ox farmer labour inputs are significantly lower. This should be obvious because the basis of CF is Minimum Tillage and therefore reduced soil disturbance. The costs to establish and maintain crops are less too. If you prepare your land with a tractor or prepare it for other farmers as contractors do in Kenya and parts of Tanzania, you can reduce your per/ha fuel consumption by 50% or more by converting to MT. Hoe and ox farmers who learn how to use herbicides properly, (sales to the small-scale sector over the past 3 years have jumped fivefold) can reduce labour inputs and costs for weeding further and expand area under cultivation.

The third misconception often proposed by researchers is that much 'local adaptation' will be required if CF is to take off in different agro-regions and countries, that blanket recommendations are dangerous and much more research is needed. This idea confuses 'tillage' with 'cropping'. 'On the ground' must be separated from 'above the ground'. Ploughing, harrowing, overall digging and ridge-splitting are the conventions that blanket what the vast majority of smallholders do to establish their crops across the continent.

Min Till and Zero-Till are the 'non negotiables' on which CF/CA is built and they provide a foundation that can accommodate a wide range of agronomic practices, planting configurations, crops and cropping systems suited to local conditions including rotations, inter-crops, relays, and agro-forestry trees.

Some alternative CF-Min Till and conventional land preparation methods are shown below with fuel and labour input comparisons. MT costs are always lower although there will be substantial variation depending on the type and condition of soils.



Ploughing: Fuel consumption 13-15 litres/ha



MT Ripping: Fuel consumption 6-7 litres/ha



Hoe Overall digging: Labour 70 to 90 days/ha



Hoe MT: Labour 35 to 40 days/hectares

MT ripping by private tillage service providers is gaining ground in Zambia and within the next 5 years we expect to see around 200 operators doing about 50,000 to 60,000 hectares of land prep for small and medium scale clients. The 20 or so operators already providing this service cannot keep up with demand. This is no surprise because it's cheaper than hiring in oxen to plough, you can plant on time - a huge plus, break up compact layers – less crop stress in dry periods, and if you are a hoe farmer benefit from a massive reduction in labour inputs.

The same benefits apply to ox farmers who convert from ploughing to MT ripping. It takes about 14 hours to plough 1 hectare and about 4 hours to rip the same area. MT ox service provision is another growth area with customers reaping similar benefits. Combining the proper use of herbicides with MT land prep confers further advantages including the opportunity to increase area occupied by alternatives to Maize!

CF is all about reducing costs and labour inputs, making more efficient use of purchased and on-farm inputs while increasing yields. In a word it's about productivity, about what all farmers strive for.

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