# SPECIAL FEATURE

## A Forced Abrupt End to Food Dependency: Implications of High Oil Prices

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One need not be an economist to realize the rapid changes being wrought on agriculture due to the high fuel prices, it only requires a quick insight into what is happening in the US corn belt. A whole new economy is kicking in, with huge public and private investment, with promises of rapid profits, now that the pundits are promising that oil prices will never again drop below $50 a barrel, and it is presently well above $60. Fifty dollars is the magic threshold number that renders the technologies of turning quality grain into ethanol, and food oils to biodiesel profitable in the USA, where they only pay half for fuel at the pump than most of the developed world. Some of us have ranted for years that we must genetically engineer the 2 billion tons of straws and stovers to contain less and/or modified lignin. So far more polysaccharides could become available for cellulase degradation that would support such technologies[1]. The biofuel industry has not targeted this waste substrate; at $50 a barrel they are happy to use quality grain – taking the food out of peoples' mouths. This is not just excess grain – this is whatever the market will bear in competition with petroleum, and will lead to higher grain prices around the world.

This huge investment in factories to quickly reap a bonanza will clearly stabilize the bottom price for grain at a much higher price than at present. The good side is that subsidies will no longer be needed in the west, and the African farmer will no longer have to compete with "dumped" grain, i.e. grain sold below the actual production costs. But the African farmer will have to gear up to production, instead of subsistence. The scary side is that there will no longer be stocks available for famine relief in times of need. There never will be "over production", "set-aside" or surpluses again as long as oil is more than $50 per barrel. Even with all excess grain going to biofuel production, it will only make a small dent in the total fuel needs of the west and growing fuel needs in Asia. The magic fifty dollars also renders nuclear energy a viable alternative for much of the fuel, but it takes nearly a decade to build a nuclear power plant, and that is after the decision is made to build one. Such decisions are not fast in coming, and other alternative energy sources (e.g. wind, solar) cannot match the magnitude of the shortfall, no matter how appealing they might look.

The only viable take home message from this is that Africa must quickly prepare itself to go it alone vis-a-vis its food security. The question: "should we accept transgenic maize as food aid?" will be moot in a very short time, as such maize will no longer be available – it will be running someone's automobile. Africa must quickly come to the realization that it must rapidly shift from subsistence agriculture, with yields a third of global averages to productive agriculture to feed Africans. It can do this only by having good seed bred and available, fertilizer available at near international prices, and not an unjustifiable four times these prices. There must be extension services that get to the farmers and teach

the most sustainable, cost-effective practices. An infrastructure with good storage facilities is critical to ensure storage for times of need, as well as an equitable price to the farmer. If India could get such a storage infrastructure going decades ago, Africa has few excuses for not doing so other than a lack of will except for a willingness to be dependent on foreign food aid.

The key needs described above started with good seed (and not the long ago discredited but still repeated mantra of "farmer-saved seed", so often mouthed by those who never watched how good seed deteriorates season after season in the hands of all but the very best farmers – the few who grow "certified" seed). The good seed must be of more crop species than presently grown, and it must be adapted to local conditions. It should come with as many built-in resistances as possible; resistance to abiotic stresses, high fertilizer use efficiency, resistance to African insect, rodent, and avian pests during cultivation and storage, resistance to indigenous diseases and the debilitating mycotoxins their pathogens produce, along with resistance to that scourge of much of Africa, the parasitic witchweeds (*Striga* spp.). Good breeding can surely help, but where decades of breeding have proven ineffectual, the biotechnology sector must kick in[2]. This must be done in more species than maize, as crop biodiversity is also an essential element of food security. Biotechnology priorities should not be haphazard, but based on evaluations of need. Biotechnology will play an important role, a role that will be useless if the other institutional and infrastructural issues are not addressed. And they must be dealt with quickly, as biofuel plants are quickly coming on line, sucking up the grain that came to Africa. Africa may have thought it need not produce and store grain for winter – but winter is on the way.

**References**

[1]Gressel, J. and A. Zilberstein. 2003. Let them eat (GM) straw. Trends in Biotechnology 21:525-530.

[2]Gressel, J., A. Hanafi, G. Head, W. Marasas, A. B. Obilana, J. Ochanda, T. Souissi, G. Tzotzos. 2004. Major heretofore intractable biotic constraints to African food security that may be amenable to novel biotechnological solutions. Crop Protection 23:661-689