Aflatoxin Control for Improving Health, Agriculture and Trade in Africa

Washington, DC – 26 January 2011

Agricultural Development and Post-harvest Losses

(why we need to better connect this to the Aflatoxin Initiative)

John E. Lamb
Sr. Agro-investment Strategy Advisor
Agriculture and Rural Development Department
The World Bank, Washington DC
You’ve all seen the demand side numbers...

- Population will reach 9.1 billion in 2050, 34% higher than today
- Nearly all of that increase will occur in developing countries
- Urbanization will continue at an accelerated pace, reaching 70%
- Income levels for many will be many multiples of what they are now, yet chronic poverty and hunger will persist
- To feed a larger, more urban and richer population while protecting the vulnerable, food production (net of food used for biofuels) must increase by 70 percent
- Annual cereal production will need to rise to about 3 billion MT from 2.1 billion MT today
- Annual meat production will need to rise by over 200 million MT to 470 million MT
Global yield growth for rice and wheat has been slowing down

**Rice**
- 1980s: 3.1% per year
- 1990s: 1.4% per year
- 2000s: 0.8% per year

**Wheat**
- 1980s: 2.9% per year
- 1990s: 0.9% per year
- 2000s: 0.4% per year
..and the supply side numbers don’t look good

...along with drought, flooding, pests or disease in key grain-producing regions, coupled with competition for land and increasing environmental regulation in developed countries.
Corn yield increases under best practice conditions have kept pace with population...

1980s: 2.2% per year
1990s: 2.5% per year
2000s: 3.5% per year

...which does mean a rise in per capita availability...
...yet an increasing share of global output is being diverted to biofuel use

- US used 80 million tons of corn (24%) for ethanol in 2007 and around 100 million in 2008 (31%)

- In effect, 75% of increase in global corn production from 2004-07 went for ethanol in US
These trends together have stressed the global food system...

Five Decades of Global Stocks-to-use Ratios for Cereals
..and contributed to great volatility in prices

![Monthly food price indices, Jan 2000 - Jul 2010](source: FAO)
The biggest challenge facing most developing countries is the risk of a big boost in food prices.

First, we need to increase food productivity and production in developing countries, especially in sub-Saharan Africa and with smallholder farmers. To do so, we need to fix problems all along the "value chain": property rights; R&D for seeds and inputs; irrigation; fertilizer; agricultural extension; credit; rural infrastructure; storage; and connection to markets.

The second problem is the volatility of food prices, often because of events outside poor countries' control. An interconnected combination of steps could help ensure that the most vulnerable countries and people get the nutrition they need. For example, we can increase public information on the quality and quantity of grain stocks to reassure markets and calm panic-induced price spikes. ..

Source: Newsweek, January 23, 2011
The G-20 should agree to "Put Food First."
(RBZ, 2011)
Senior officials are voicing similar messages

The agriculture ministers assembled in Berlin...

..appeal to the Heads of State and Governments in the G 20 and the relevant international organisations to endeavour to strengthen the ability of agricultural markets to function properly, to improve market transparency and market information and to fight the abuse and manipulation of prices.

Source: Communique of the Agriculture Ministers, Berlin, January 24, 2011)
Balancing future demand and supply sustainably – to ensure that food supplies are affordable
Ensuring that there is adequate stability in food supplies – and protecting the most vulnerable from the volatility that does occur.
Achieving global access to food and ending hunger. (This recognizes that producing enough food in the world so that everyone can potentially be fed is not the same thing as ensuring food security for all.)
Managing the contribution of the food system to the mitigation of climate change.
Maintaining biodiversity and ecosystem services while feeding the world.

Of course emphasis on food security is not new.
…but the recognition of the need to connect all relevant fields is indeed new

Policy-makers...need to recognise food as a unique class of commodity and adopt a broad view of food that goes far beyond narrow perspectives of nutrition, economics and food security. (Foresight, 2011)
In the UK, we throw away around one third of the food we buy.

Of that most could have been eaten – 61% or 4.1 million tonnes a year was avoidable.

The most common reason for food being wasted is that it’s left unused – 61% of the avoidable food waste or 2.5 million tonnes. Of this, 40% – almost one million tonnes – isn’t even touched and at least a tenth – 340,000 tonnes – is still in date.

We also cook and prepare too much, resulting in an additional 1.6 million tonnes of food waste a year.
The three pillars of food security are becoming four

- **Availability**: overall ability of the agricultural system to meet food demand
- **Access**: by individuals to adequate resources acquire appropriate foods for a nutritious diet
- **Utilization**: food safety, quality, use, water & sanitation
- **Stability**: risks of availability, access and utilization at all levels
Food availability involves: domestic production, import capacity, stocks and food aid

- Grow your own offshore
- Increase imports
- Reduce food losses
- Expand area
- Raise farm productivity
- Change cropping patterns
Food access involves: levels of poverty, purchasing power, prices, infrastructure & distribution

- Reinforce free trade
- Reduce post-harvest losses locally
- Improve logistics
- Give in-kind food aid
- Provide cash transfers, coupons, etc
- Moderate prices through controls or subsidies

Provide cash transfers, coupons, etc

Moderate prices through controls or subsidies

Reduce post-harvest locally

Improve logistics
Food utilization involves: quality, safety, care & feeding, clean water, health, & sanitation

Develop new products

Fortify existing products

Improve diets

Train foodservice operators

Improve safety stds and traceability

Educate consumers
Food stability involves: growing conditions, weather, price volatility, man-made disasters

- Use crop or weather insurance
- Create virtual stockpiles
- Establish warehouse receipts program
- Create physical reserves
- Develop more tolerant varieties
- Enhance transit and shelf life
Improved supply chain management is critical

- Increasing efficiency of the supply chain from farm to fork can
  - Reduce levels and volatility of prices by lowering friction and transaction costs
  - Lower variability in volumes, quality and condition of arrival by reducing losses of all kinds
  - Enhance farmer incomes and consumer welfare
- All of which differentially benefits the poor and rural dwellers
The situation that affects post-harvest loss management has changed since last food crisis

- Increasing competition from international markets after market liberalization
- Lack of assured markets for small farmers after state’s withdrawal from marketing
- Rise of more sophisticated value chains coordinated by emerging private sector
- Increased regional integration, with easier movement but limited quality monitoring
Changes since the 70’s (continued)

- Increased pest and disease pressure (e.g. spread of large grain borer and wheat rust) due to resistance to agrochemicals and climate change effects
- Tendency to reduce pesticide use for ecological, cost and marketing reasons
- Advances in technology (e.g. materials, and detection methods)
More erratic weather patterns have led to recurrent failures in harvest and consequent food shortages.

Much higher costs of fertilizer and energy starting in 2003 raised costs of production and transport.

Since 2006, and especially from 2008 onward, higher prices for agricultural commodities raised the stakes (and potential returns).
Over the past year the World Bank took another look at the PHL field to pave the way for revival.

Missing Food:
The case of postharvest grain losses in Sub-Saharan Africa

By Sergiy Zorya, Nancy Morgan, and Luz Diaz Rios under task leadership of John Lamb
Findings: Food losses in general take four different forms

1) Physical (i.e. volume shrinkage or deterioration in condition)

2) Nutritional (e.g. grain contaminated by aflatoxin)

3) Monetary (i.e. change in unit sales value)

4) Opportunity (i.e. loss of access to certain markets)
Findings: Main tools for achieving better PHL outcomes

- Better communication and learning regarding post harvest issues and opportunities
- Better institutional arrangements for grain marketing
- Better pest management
- Better postharvest grain management
- Better storage structures
- Improving adoption and use
Findings: Volume and value very hard to determine and specify, yet significant

- For cereals in Africa, 40-50 percent volume loss figure probably exaggerated
- APHLIS data suggests 10-20% of volume
- Even then, since total SSA grain production value averaged about US$27 billion 2005-2007, total PHL value may have been around US$4 billion
- That exceeds total food aid value over last decade, equals annual value of SSA cereal imports, and would have fed 48 millions at 2500 kcal/person/day
Evolution of approaches to supply chain loss reduction

Technology Push: focused on addressing constraints through introduction of particular technology or marketing arrangement considered most appropriate to a target group or institution

Many examples of good technological approaches, yet overall success rate has been low, due to (1) financial unsustainability; (2) misidentifying key constraints to adoption; (3) lack of cultural acceptability; (4) timeframes too short
Package approach: focuses on farm-level improvements through establishment of PHL baselines, followed by provision of technical assistance and transfer of a package of improved technologies and practices along different production and processing steps (e.g. harvesting, threshing, sorting, drying, pest control, farm storage, etc)
The main points of intervention for post-harvest loss reduction in relation to the supply chain
Market-Oriented Approach: concentrates on better linking producers to value chains by embedding loss reduction not only in the physical movement of product from field to point of delivery, but also backward and forward linkages, business relationships, flows of information and funds, risk and benefit sharing.
Main challenges

- Food losses are a systemic problem
- Data availability and quality are deficient
- Causes are multiple and complex
- Extent varies by context and source area, and can change over time
- Influenced by weather
- Each value chain is different
Main challenges (continued)

- Absence of clear incentives for change
- Competition for development resources even within burgeoning food security push tends to crowd out this field
- Lack of political will at every level exacerbates the situation
- Lack of ownership and champions
- Many potential intervention points
- Myriad potential solutions
Areas to work on to achieve better PHL outcomes

☑ Better communication and learning regarding post harvest issues and opportunities
☑ Better institutional arrangements for grain marketing
☑ Better pest management
☑ Better postharvest grain management
☑ Better storage structures
☑ Improving adoption and use
Development agencies, governments and the private sector need to agree on strategy.

**USE**
- Food
  - Feed

**SUBSECTORS**
- Crops
  - Terrestrial Animals
  - Aquatic Animals

**CATEGORIES**
- Grains
  - Oilseeds
  - Produce
  - Meat
  - Seafood

**COMMODITIES**

**MARKETS**
- Domestic
- Regional
- Global

**LOSS TYPE**
- Physical
  - Nutritional
  - Monetary
  - Opportunity

**RISK**
- Agricultural Pests
- Agricultural Diseases
- Zoonoses
- Pesticide Misuse
- Additives
- Contaminants

**INTERVENTION POINT**
- On-farm
  - Assembly Point
  - Storage Facilities
  - Distribution
  - Point of Sale
  - Point of Utilization

**ROI**

**MITIGATIONS**

**COST**

**BENEFIT**
What can government do?

- Give food losses higher priority
- Support public awareness campaigns (e.g. from the health and nutrition perspective)
- Direct publicly funded research to priority problems (e.g. aflatoxin in feed corn)
- Invest in critical public infrastructure (e.g. farm to market roads, regional drying and storage facilities that provide service)
- Support human capital development
- Improve policies (e.g. avoid crowding out private initiative) and regulations (e.g. protectionist measures)
What can relevant private industries do? (i.e. through associations)

- Improve standards (e.g. GAP, GMP, GDP, GIP) and their adoption
- Document best practices in post-harvest handling, storage and distribution
- Share supply chain management know-how through technical assistance and training (by category or commodity)
- Develop new or better risk management mechanisms and associated products (e.g. futures markets, hedging, weather index insurance)
What can private enterprise do at the firm level?

- Invest in critical capital assets (e.g. drying facilities, elevators, packing plants, cold stores, distribution centers, refrigerated trucks, bonded warehouses)
- Transfer company know-how to suppliers
- Reward continuous improvement
- Develop business service providers for technology transfer and train trainers
- Develop new products (e.g. detection, measurement, warehouse receipts)
- Support human capital development (i.e. at universities and technical schools)
Issues to discuss here

- Is the PHL reduction challenge analogous to that of aflatoxin control?
- If yes, what lessons learned are applicable?
- If yes, should we seek common approaches and interventions? (Which?)
- If yes, should we merge or at least coordinate the two efforts (why? How?)