Global Food Policy and Food Security Symposium Series

Water and Agriculture in a Changing Africa: What might be done?

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May 23, 2013
Stanford University
Water and Agriculture in a Changing Africa:
Impressions from a practitioner on what might be done

John Briscoe
Stanford University
May 2013
1. My qualifications (or lack thereof) on the subject

2. Water and development:
   a) In rich and middle-income countries
   b) In Africa

3. Agriculture:
   a) In rich and middle-income countries
   b) In Africa

4. Some thoughts on a way forward for Africa
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Some parts of the world have benign hydrology and others malign hydrology...
Rainfall Variability and GDP

Source: Brown and Lall 2007
Rainfall Variability and GDP

Bubble Size = GDP per capita
(Blue = low interannual variability of rainfall)

Wealthy nations share a small window of favorable climate (low variability; moderate rainfall)
Rainfall Variability and GDP

Bubble Size = GDP per capita
(Blue = low interannual variability of rainfall)

Developing countries face more challenging climate conditions

Monthly Rainfall Variability

Mean Annual Rainfall
Water supply & sanitation

Irrigation & drainage

Energy

Environmental services

Other uses including industry and navigation

Source: Global Water Partnership
Agriculture is dominant in almost all water-stressed basins
What is “the water crisis” that keeps leaders awake at night?
Four overarching megatrends will shape the world in 2030:

- Individual Empowerment.
- The Diffusion of Power.
- Demographic Patterns.
Business Leaders (WEF 2012)
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Societies face two types of water risk...

Probability of flow

Type A risks: Probability of droughts

Type B risks: Probability of floods
Level of Risk

Level of Development

Link 1: Risk affects development
An example – how 19th century New England benign hydrology

An easily-mobilizable “water platform”
(for energy, transport, factories and people)
The response when Boston “achieved water security” in 1848 (from Cochituate)
Other forms of taking advantage of benign hydrology to build a water platform for growth...
Secure, low-cost navigation changed the history of the US (and the food security of Europe)
But the quest for water security is a two-way street

Level of Risk

Level of Development

Link 1: Risk affects development

Link 2: Development affects risk
A country with a growing economy could invest to make parts with malign hydrology productive....
What societies do to reduce risk ....

Infrastructure

Institutions
1. By reducing vulnerability to drought
C6 - Degree of Changed Hydrological Conditions

Landscape Health Project

Indicative Map Only

Legend

- IUZ-EUZ Degree of Changed Hydrological Condition
  - Moderate to Major Change
  - Moderate Change
  - Minor to Moderate Change
  - Minor Change

Notes: Data Source: Expert opinion, and BRG Landuse map
Data Currency: 1999
The Tasmanian boundaries indicate IBRA6 Regions.
Figure 1.2 Water Storage Capacity in the Rich and Poor Worlds (cubic meters per capita)
What actually happened?
Water Use and GVA in Agriculture in MDBasin

Source: Natl Water Commission
INSTITUTIONS affect water security

1. By reducing vulnerability to drought
2. By reducing vulnerability to floods
The historic 1927 flood

- Anarchic management and terrible economic and social devastation

- The main lesson:
  - In a major flood the river can not be constrained by levees
  - Have to “make room for the river”
    - A broad participatory process
    - Designates floodwaters and backwater areas
    - Compensation
The great test of 2011:
Peak flows (cusecs) similar to 1927
Flooded Areas
1927 Flood vs 2011 Flood

- “Extra” water on designated backwaters and floodways
- Process orderly and consensual
- Flooded area 60% less in 2011
The now-MICs did what the rich did, and built infrastructure for security and water-enabled growth.
Rates of return on investment by development of water infrastructure

Type 1: Infrastructure investments
Type 2: Management investments

Developing → Developed

Figure 1.2 Water Storage Capacity in the Rich and Poor Worlds (cubic meters per capita)
The impacts of creating “a water platform for growth”

The example of Bhakra Dam in NW India

Irrigated 7 million hectares and provided 2800 mw of power
Bhakra stimulated broad-based regional growth (with indirect effects as large as the direct effects....)

Bhakra had a huge positive impact on the poor (not counting the million migrant workers from Bihar each year....)

Source: Bhatia, 2003
The NET effects of water infrastructure + green revolution techniques on the poor in India?

Net effect:
Unirrigated districts (< 10% of cropped area irrigated) --- 69% are poor
Irrigated districts (> 50% of cropped area irrigated) --- 26% are poor
Profound implications for social indicators….

- Returns to five years of education in India:
  - 32% in irrigated districts
  - 0% in unirrigated districts
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Figure 1.2  Water Storage Capacity in the Rich and Poor Worlds (cubic meters per capita)
Hydropower in different regions
Developing countries, with shallow domestic capital markets need help to finance their water infrastructure ...
• Historically the World Bank, the US and other rich countries helped, but...

• Rich people who have a lot of dams (we have built 1000 days of storage on Colorado) don’t like dams any more...

• And oppose dams even in quite different circumstances (e.g. Pakistan which has 30 days of storage on the Indus...)
..rich countries have a lot of say at aid institutions like the World Bank...

World Bank lending for hydropower in US$ millions
But the world is changing..

The Middle Income Countries (India, Brazil and especially China) are filling the gap left by rich countries who used to help....
Whereas the World Bank now finances about 5 dams, the Chinese finance over 300 outside of China in the developing world.
World Bank turns to hydropower to square development with climate change

World Bank President Jim Yong Kim attends the Fragility Forum this month in Washington. The forum discussed ways for fragile nations to improve their economies, their infrastructure and the well-being of their citizens.

By Howard Schneider, Published: May 8

The World Bank is making a major push to develop large-scale hydropower projects around the globe, something it had all but abandoned a decade ago but now sees as crucial to resolving the tension between economic development and the drive to tame carbon use.
Climate change projections and priorities
Average Projected Changes in Precipitation for years 2080 to 2099 (mm per day)

Effects of land use changes are also very large (and sometimes in the opposite direction...)

Fraction of precipitation originating from evaporation from the land surface

precip recycling ratio for January, van der Ent et al. 2010
Bottom line

• Climate change science is in its infancy
• The best preparation for a non-stationary climate is to:
  – Focus on known variability
  – Develop infrastructure and institutions which are resilient
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Story of this section

• What I have learned, first-hand...
  – Bangladesh
Fatepur village
Fatepur 1976:
No protection from the annual floods...
Fatepur, Bangladesh, 1976: Lives of utter misery...
The Government (with ADB support) planned to build an embankment around the island...
My prediction (as a young environmental socialist...)

- The embankment would benefit the rich and further impoverish the poor....

What happened?
A simple and astonishing change

- Water control and “green revolution” meant going from one low-yielding to three high-yielding crops a year
- A revolution in aquaculture
The story of big fish and little fish

The induced social changes...

- Higher wages and more regular employment
- Markets where there were none before
- Life expectancy of women:
  - 47 years in 1976
  - 67 years in 1998
Social conditions in Fatepur, 1998
Assessments of causes of progress?

- **By the IFIs**
  - A major World Bank Poverty Assessment:
    - Progress is due to NGOs and social services
    - (Virtually) nothing on infrastructure

- **By the NGOs**
  - NGO services
  - Denunciation of the embankment by NGOs because of “environmental damage”

- **By the people:**
  - The embankment
  - Roads and bridges
  - The garment industry
  - BRAC and Grameen? Oh, yes, but NGOs will not cooperate….

- **Mine?**
  - At the end of the day it is about productivity
  - Infrastructure (even badly done) matters a lot
  - Modern agriculture matters a lot
  - Beware of diagnoses of single issue NGOs and donors
Story of this section

• What I have learned, first-hand...
  – Bangladesh
  – Brazil
Brazil's agricultural miracle

How to feed the world

The emerging conventional wisdom about world farming is gloomy. There is an alternative

Aug 26th 2010 | From the print edition
Big portions
Brazil’s agriculture, world share 2009, %

- Production
- Exports

<table>
<thead>
<tr>
<th>Product</th>
<th>Production</th>
<th>Exports</th>
<th>World rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange juice</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sugar</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Soyabean</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Chickens</td>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Coffee</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Beef</td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Pork</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Maize</td>
<td></td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Cotton</td>
<td></td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: United States Department of Agriculture
Between 1985 and 2006, Brazilian agricultural production grew by 77 percent
Going with the grain

Brazil’s:

grain production, tonnes m

area planted, hectares m

Source: Brazilian Ministry of Agriculture
Huge increases in production with 90% due to TFP...
The same pattern as US agriculture: (much) more with (much) less

Brazil’s public investment in agricultural research was one key
“China and Russia favour physical science.”

Brazil's scientific papers are focused on agriculture, plant and animal sciences.

http://www.economist.com/blogs/graphicdetail/2013/02/focus-4
What did Embrapa do?

1. **THE SOIL**: Embrapa poured industrial quantities of lime onto the soil to reduce levels of acidity.

2. **PASTURE**: Embrapa went to Africa and brought back a grass called *brachiaria*. Patient crossbreeding created a variety, called *braquiarinha* in Brazil, which produced 20-25 tonnes of grass feed per hectare, many times what the native *cerrado* grass produces and three times the yield in Africa.

3. **FARM PRACTICES**: pioneered and encouraged new operational farm techniques. Brazilian farmers pioneered “no-till” agriculture. In 1990 Brazilian farmers used no-till farming for 2.6% of their grains; today it is over 50%.

4. **SOYBEANS**: Embrapa turned soyabean into a tropical crop. It has also been importing genetically modified soya seeds and is now the world's second-largest user of GM after the United States.
Major gains from GMOs: Productivity and environment...
And so the MICs are 8 of 10 largest users of GMOs...
A (crucial) issue is scale
• Green Revolution technology, centered on seeds, was largely scale neutral; small farmers could participate, especially as new rounds of crop breeding made the modern varieties less variable in yield and thus less risky.

• (Today’s) new technologies involve higher capital inputs (and) mechanization (and) require high levels of education, (and) may disadvantage smaller farms
Table 3—Transaction cost advantages of small and large farms

<table>
<thead>
<tr>
<th>Transaction</th>
<th>Small-farm advantage</th>
<th>Large-farm advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unskilled labor supervision, motivation, etc.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Local knowledge</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Food purchases and risk (subsistence)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Skilled labor</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Market knowledge</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Technical knowledge</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Inputs purchase</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Finance and capital</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Land</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Output markets</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Product traceability and quality assurance</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Risk management</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

In Brazil, big is beautiful

- **BIG**: 30% (1.6m) farms are large commercial operations which produce 76% of output.
- But there was and is a strong movement (MST) opposed to large-scale agriculture, GMOs...
- Which was (and is) a part of the PT
AGRONEGÓCIO: INIMIGO DO MEIO AMBIENTE
Pragmatic politics:
Roberto Rodriguez and Lula
In Brazil, big is beautiful

- Pragmatism…

But Brazil worries about small farmers, too
In the Sao Francisco Valley in the North East

- 10 x more water than the Murray in Australia
- 1/10 of the value added in irrigation
- Decades of projects with small farmers which failed to take off
- Except when the small farmers became linked to entrepreneurial farmers
The Brazilian response?

Can we have our cake and eat it too?
• An ongoing attempt – through a “reverse concession” to build on this organic model

• Concession awarded to an agribusiness operator on two criteria:
  – **FINANCIAL (35%)**: Whoever requires least investment from the government
  – **SOCIAL (65%)**: Whoever presents a more compelling model for integrating at least 25% of the irrigable land to small farmers who will be integrated to the production chain of the agribusiness user.

• [www.pontal.org/project.html](http://www.pontal.org/project.html)
My reading of the lessons from Brazilian agriculture

• Assess comparative advantage and play to it
  – Continuity with political change is key
• Understand that there is no silver bullet
• Be patient and persistent (Ag research spending)
• Be pragmatic (Lula and Roberto Rodrigues)
• Be realistic (about scale)
• Be innovative (about scale and PPPs – Pontal)
A side-note on Brazil and the development community
The IASSTD of 2008, just as the global food crisis hit...

- Eulogizes “small-scale and organic”
- Denounces Brazilian (scale, technology) model...
- Denounces GMOs
Brazil has followed the opposite prescription from that of the advocacy community.

For most NGOs:
- Small and organic is beautiful.
- They frown on chemical fertilizers and loathe GMOs
- They think it is more important for food to be sold on local than on international markets.

Brazil’s strategy is the opposite:
- Brazil's farms are many times the size even of American ones.
- Farmers buy inputs and sell crops on a scale that makes sense only if there are world markets for them.
- They depend critically on new technology.
- Brazil's progress has been underpinned by the state agricultural-research company and pushed forward by GM crops.

Brazil represents a clear alternative to the growing belief that, in farming, small and organic are beautiful.
Story Line

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The performance of African agriculture
Grain Yields Around the World

Interpretation: Grain yields (in metric tons per hectare) rise from lowest (dark blue) to highest (dark red).
Source: Center for Sustainability and the Global Environment (SAGE), University of Wisconsin.
CHART 1: AVERAGE YIELD OF CEREAL BY COUNTRY
Maize yields Hg/Ha

TANZANIA

Source: FAOSTAT
A typical African example

• Nigeria should be able to feed itself but patently fails to do so. It spends about $11 billion a year importing food and is the world’s largest buyer of rice.
• Less than half of Nigeria’s arable land is now used; only 10% of farmland is “optimally” used.
• The biggest impediment may be lousy infrastructure: crumbling roads and patchy supplies of electricity and water..
• Nigerians proportionally use a tenth as much fertilizer as their Indian counterparts.
GROWTH OF TFP IN AGRICULTURE
% PER YEAR – Africa missing out then...

<table>
<thead>
<tr>
<th>REGION</th>
<th>1970-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>0.31</td>
</tr>
<tr>
<td>Latin America</td>
<td>1.02</td>
</tr>
<tr>
<td>Asia</td>
<td>1.51</td>
</tr>
<tr>
<td>North America</td>
<td>1.49</td>
</tr>
<tr>
<td>Europe</td>
<td>1.26</td>
</tr>
</tbody>
</table>

and now...

<table>
<thead>
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<th>1991-06</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.31</td>
<td>0.86</td>
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<td>Latin America</td>
<td>1.02</td>
<td>2.44</td>
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<tr>
<td>Asia</td>
<td>1.51</td>
<td>2.62</td>
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<tr>
<td>North America</td>
<td>1.49</td>
<td>1.91</td>
</tr>
<tr>
<td>Europe</td>
<td>1.26</td>
<td>1.52</td>
</tr>
</tbody>
</table>

What Africa has

- Low cultivation intensity...
- FAO 2009: 80% of the world’s reserve agricultural land is in Africa and South America
Interpretation: The darker the shading, the larger the percent of the land under that pixel that is in crops.
Source: Center for Sustainability and the Global Environment (SAGE), University of Wisconsin.
What Africa has

- Land quality not worse than Brazil’s “uncultivable cerrado”
Inherent Land Quality Assessment

Soil Resilience

<table>
<thead>
<tr>
<th>Soil Performance</th>
<th>LOW</th>
<th>MEDIUM</th>
<th>HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>7</td>
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<td>2</td>
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</tr>
</tbody>
</table>

Muller Projection

Scale: 1:10,000,000

Legend:
- Dark red: LOW
- Dark blue: HIGH

World Land Quality Map

Inherent Land Quality
What Africa has

• Land...
• Water...
Climate Constraints

Plate E. Climate constraints.

Source: International Institute for Applied Systems Analysis
What Africa has

• Land...
• Water...
• **Potential**
Max Potential Value of Agricultural Output (US$/ha)

4 regions:
- little land for expansion/low yield gap - Asia, Europe, Australia, MENA
- land available but low yield gap – much of the Americas
- big yield gap but little land available – most populous SSA/C.America
- big yield gap/land available – sparsely population SSA countries (e.g., DRC, Angola, CAR, Madagascar, Mozambique, Sudan, Tanzania, Zambia)

Source: Deininger, Arezki & Selod, 2011
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Africa needs MORE...

• Fertilizer...
Feast or Famine

Nearly half the people on the planet wouldn’t be alive if not for the abundant food made possible by nitrogen fertilizer. Yet its benefits have not reached everyone. In sub-Saharan Africa, where 239 million people go hungry in a year, crops fail as soil is stripped of nutrients, and farmers can’t afford to buy fertilizer. Elsewhere overuse pollutes waterways and releases greenhouse gases.

JEROME N. COOKSON AND LAWSON PARKER, NGM STAFF
SOURCE: PAUL C. WEST, INSTITUTE ON THE ENVIRONMENT, UNIVERSITY OF MINNESOTA
Africa needs MORE...

• Fertilizer...
• Infrastructure...
Electricity
Hydropower in different regions

- Europe
- North America
- South America
- Asia (excl. China)
- Africa
- China
In other words, the region that probably needs fertilizer the most also has to pay the most for it, and much of Africa doesn’t have the prosperity to make this an easy stretch. The high prices result in large part from infrastructure and trade networks that aren’t developed enough to create a low-cost and competitive market.
Figure 2.1 Average Transport Prices: A Global Comparison in 2007

Africa needs MORE...

• Fertilizer...
• Infrastructure...
• **Irrigation**...
FIGURE 1.1 Irrigated and Rain-Fed Shares of World Arable Land and Crop Production

- World arable land
  - 15% irrigated
  - 85% rain-fed

- World crop production
  - 42% from irrigated lands
  - 58% from rain-fed lands
Irrigation in SSA

• Green revolution was also a blue revolution
• SSA has large untapped water resources for agriculture. Only around 4 to 5% of cultivated land is irrigated, two thirds of which is accounted for by Madagascar, South Africa, and Sudan. The potential exists to bring an additional 20mha or more of land under irrigation
• overall water withdrawals for agriculture are still limited in Sub-Saharan Africa: irrigation uses less than 3 percent of total renewable resources compared to 36 percent in South Asia and 51 percent in the Middle East and North Africa.
An example of potential

The Zambezi River Basin
A Multi-Sector Investment Opportunities Analysis

Figure 2.1. Irrigation levels considered in this analysis (ha)
Annual irrigated area, in hectares
Figure 1.2 Water Storage Capacity in the Rich and Poor Worlds (cubic meters per capita)

- Ethiopia: 40
- Pakistan: 150
- India: 150
- China: 2500
- Brazil: 3400
- Australia: 4700
- U.S.: 6000

Note: The values represent cubic meters of water storage per capita.
Africa needs MORE...

• Fertilizer...
• Infrastructure...
• Irrigation...
• Knowledge...
Ghana

• Observation by a Ghanaian CEO of a MNC:
  – *Once the best and brightest Ghanaians went into engineering*
  – *Now they become anthropologists (because NGOs dominate the job market, and this is the skill they want....)*
Africa needs MORE...

• Fertilizer...
• Infrastructure...
• Irrigation...
• Knowledge...
• **Institutional capacity...**
• Wittfogel’s classic is much disputed....
• But SSA was (regrettably) never accused (like India and China) of having irrigation spawning “(Oriental) despotism”
• Manufacturing has not advanced – same (small) share of GDP as in the 1970s.

• (As ag becomes more industrial, implication is that this will be very difficult.)

• Pervasive problem is high cost of production, related largely to poor infrastructure. Anyone trying to do business is constantly stymied by power cuts, impassable roads and leaky water pipes.
“What separates the countries that advance from those that don’t is primarily ability to implement..”
Irrigation in Africa...

• Is clear that Africa does not easily create hierarchical institutions that manage networked infrastructure.

• My own experience with irrigation in the Limpopo Valley in Mozambique post independence...
Africa needs MORE...

• Fertilizer...
• Infrastructure...
• Irrigation...
• Knowledge...
• Institutional capacity
• **Foreign Direct Investment....**
Two views

• Persistent low levels of public investment in agriculture
• Non-existent or shallow domestic capital markets
• And therefore a natural turn to foreign direct investment
• FDI projects can help create implementation capacity
The facts: These countries are the key recipients of FDI in land in Africa.

**FIGURE 2.2. FOREIGN INVESTMENT STOCK IN SELECTED COUNTRIES**

Data source: UNCTAD (2008a)
FDI naturally goes first where there is underutilized capacity  

Mali’s Office du Niger
A (relative) success: Mali’s Office du Niger

- A project started in 1932
- A 60,000-hectare scheme
- Some success from small (average 3 hectare) farmers
  - Between 1982 and 2002:
  - rice yields have quadrupled,
  - horticulture contributed more than 50 percent of gross value of rice output
  - cropping intensities have increased, and food security has improved.
  - But large parts of the command area remain undeveloped, 80 years later..
- Capital and know-how needed to farm the whole potential area
The Office du Niger search for FDI

- A Sino-Malian joint venture is developing 20,000 ha that had not previously been irrigated.
- In 2008 the Malian government awarded a 50 year renewable lease for 100,000 ha of un-irrigated farmland to Malibya, a subsidiary of Libya's sovereign wealth fund.
a recurring theme is, from the perspective of African governments, the relatively low importance and value of financial transfers compared to the expected broader economic benefits such as employment generation and infrastructure development.

international land deals may constitute a development opportunity in recipient countries – by bringing capital and know-how, creating employment and developing infrastructure.
But it is easier said than done....
Guy Scott, Zambia's vice-president and a farmer himself, aired concerns that the majority of promises made by foreign investors do not materialize.

Mr. Scott's point was not that foreign investors are unscrupulous, merely that farming is a complex business while raising capital is about painting the rosiest picture possible.
• Difficult business environments, a shortage of indigenous entrepreneurs, the small size of the potential investments, lack of access to markets, and the discouraging experience of working directly with small-scale sponsors have constrained IFC engagement and performance in Sub-Saharan Africa.

• These factors have pushed it toward a focus on foreign sponsors and export-oriented or niche local or regional businesses, such as palm oil and rubber.
The challenge of expectations

• None of this is easy, nor is success ever going to be complete
• This provides an easy opening for severe criticisms from anti-globalization, human rights-oriented NGOs
“commoditization of global agriculture has aggravated the destabilizing effects of these large-scale land grabs.”
SOLD! Oxfam campaigners project a giant sold sign on to the White Cliffs of Dover to highlight the issue of land grabs.

Oxfam research shows that big land deals in poor countries are leaving people homeless and hungry. Families are being unfairly evicted from their land and left with no way to grow food or earn a living.
How should Africa respond to these external views?
The wisdom of donors....

Source: OECD 2006a
A precipitous decline, in part because of… (WDR 2008)

• “increased competition for ODA, especially from social sectors…..

• and opposition from environmental groups that saw agriculture as a contributor to natural resource destruction and environmental pollution”
Who followed the donors’ lead and who followed the other path?
Growing Asia did not follow the donors’ prescriptions...

**SPENDING ON AGRICULTURE:** (Lipton)

- Asia in the 1960s typically allocated 20% of public spending to agriculture;
- SS Africa today allocates 5-10%.

**SPENDING ON AGRICULTURAL RESEARCH:**

- Asian countries spent nearly five times the amount spent by countries in Sub-Saharan Africa on agricultural research per hectare over the period 1980–2003 (Alene and Coulibaly 2009).
Again, Brazil spending on ag research
Observations from Brazil....

- can the miracle of the cerrado be exported, especially to Africa, where the good intentions of outsiders have so often shriveled and died?
No silver bullets and no short cuts

- “We went to the US and brought back the whole package [of cutting-edge agriculture in the 1970s],” says President of Embrapa.
- “That didn't work and it took us 30 years to create our own. Perhaps Africans will come to Brazil and take back the package from us. Africa is changing. Perhaps it won't take them so long. We'll see.”
Aspiring Africa

Pride in Africa’s achievements should be coupled with the determination to make even faster progress

Mar 2nd 2013 | From the print edition
“believing in a more prosperous African future requires a healthy dose of optimism, but not a leap of faith”
The great question for African leadership

• Will it listen to the still-persistent western aid narrative which has served it so badly:
  – “Don’t build dams”
  – “Reduce spending on agriculture”
  – “Concentrate on the MDGs and social goals”
  – “Stay away from GMOs”
  – “Don’t encourage large-scale agriculture”
  – “Don’t allow FDI in agriculture”

• Or will it learn and adapt the lessons from Brazil, China and other MICs?
In short

• Will Africa focus on its real problems “The politics of the belly”

• Or will it succumb, again, to the western “politics of the mirror”?