world development report

Agriculture for Development Ten years later



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The puzzle of neglecting agriculture for development

- Main message of WDR 2008: agriculture-based countries (most SSA) must invest more in Ag for growth and poverty reduction
- Observe an increase in public investment in Ag post-WDR in context of food crisis: from 3 SSA countries meeting the CAADEP 10% of public budget to Ag goal in 2007, to 10 in 2009; 60% increase in ODA to Ag in 2007-09 period
- **But effort not sustained**: down to 2 CAADEP-10% countries in 2014. Decline in investment in Ag R&D in SSA
- Widening gaps in fertilizer use, cereal yield, and irrigation between SSA and ROW
- Yet, a majority of **world extreme poor** households are in SSA (a rising share), rural, dependent on Ag
- And WDR 2008 message on more investment in Ag still advocated by WB, FAO, IFAD

- Note on selection: Poor in rural areas not due to self-selection: i.e., exit from rural poverty not due to urban structural transformation. To the contrary, escape from poverty observed more effective in Ag-rural context (Christiaensen)
- But rising **agro-pessimism** and **public neglect** of Ag: Why?
- **Hypothesis**: Low return to public investment in Ag discourages investment
 - World Bank (Goyal & Nash) explanation for low return: public investment diverted to unproductive subsidies
 - Additional interpretation (this presentation): low success with technological upgrading (yield and fertilizer gaps)
- Hence propose:
 - **o Revise technological upgrading model** from supplydriven to more demand-driven for disruptive innovations
 - Progress from focus on yield gains to labor calendars and agricultural/rural transformations

Outline

- 1. Designing a comprehensive agenda to use Ag-for-Dev
- 2. Making the agenda work
- **3. From supply- to demand-driven strategy for technological upgrading**
- 4. Beyond technological upgrading: labor calendars and transformations
- 5. Conclusion: creating demand for countries to invest in Agfor-Dev

1. Designing a comprehensive agenda to use Ag-for-Dev

- **Progress with understanding** how to use Ag-for-Dev in last 10 years: better data, more rigorous identification of causalities
- More attention to heterogeneity: typology of farm households → need customized/ differentiated recommendations and policies

• More attention to labor calendars:

- o Productivity per person per year low in Ag/NonAg (1/3.5)
 o But labor productivity per hour worked in Ag/NonAg not so different (1/1.5) (McCullough)
- o Number of hours worked per year in Ag/NonAg = 1/2.6
- Suggests that (1) **labor market** works in allocating labor across sectors, but (2) **labor calendars** in rural areas leave labor idle for extensive periods of the year



Malawi: Large difference between urban and rural household labor calendars

Data source: LSMS-IZA

• More attention to transformations: Filling rural labor calendars requires: Asset building (AB), Green Revolution (GR), Agricultural Transformation (AT), Rural Transformation (RT), and ultimately Structural Transformation (ST)

Stages of transformation	Processes
Asset building	Access to land and human capital for the
	landless and sub-family farmers
Green Revolution	Adoption/diffusion of HYV seeds and fertilizers
	for staple crops
Agricultural Transformation	Access to water for irrigation
	Ag diversification toward high value crops
	Development of value chains and contracting
Rural Transformation	Mechanization and land concentration
	Development of land and labor markets
	Growth of a rural non-farm economy (RNFE)
Structural Transformation	Rural-urban migration
	Urban-based industrialization and services

The AB-GR-AT-RT-ST sequence

2. Making the agenda work

- **AB-GR-AT-RT-ST sequence** worked well in China, Vietnam, Chile, Brazil
- **But stuck at GR in SSA =** Puzzle of technology adoption:
 - o ATAI studies of constraints to technology adoption using RCTs. Useful to design ways of overcoming constraints.
 - Results show approximate 30% ceiling on adoption in SSA with heterogeneity
 - Credit: Works when used, but only needed by 1/3 of farmers
 - Insurance: Works when used, but only adopted by 10% of farmers at market prices
 - Information: Social learning limited by heterogeneity
 - Product markets: Fertilizer use declines rapidly with distance to market as needs a fertilizer/grain price ratio < 4

- Characterization of limits to adoption reveals critical importance of customizing supply-side of technology:
 o Farmers circumstances: Complementary factors needed for chemical fertilizers to be profitable:
 - Soil acidity: only 8% of farmers in Zambia have soils with sufficient acidity to profitably use basal applications of fertilizer (Burke, Jayne, et al.)
 - Soil carbon content: only 55% of farmers in Kenya have soils with sufficient organic matter to use fertilizer profitably (Marenya and Barrett)
 - **o Farmers' objectives**: Else than pure profit, toward laborsaving, risk reduction, nutrition enhancement. Need careful User Need Assessment
 - Farmers capacity (education, skills, capacity to notice): Need technologies simple to adopt (Sub1 has identical agronomic practices as Swarna) (Macours)

3.From supply- to demand-driven strategy for technological upgrading

- Analogy with INSEAD Red Ocean-Blue Ocean approach
- Red approach = Supply-driven: starts with existing technologies (seeds, fertilizers) and focuses on experimentation to remove constraints on adoption
 But adoption limited by 1/3 ceiling
- Blue approach = Demand-driven: starts with User Needs Assessment to proceed to design and a business model. Then focus on experimentation for adoption and impact.
 o Can go beyond 1/3 upgrading with customized offers corresponding to heterogeneity and WTP
- This suggests a **three-steps approach to research** for technological upgrading:

Design phase

User Needs Assessment

Insights and ideas for design

Prototype and business model

Piloting phase

Testing, willingness-to-pay experiment

Fail fast, feedback, improvement

Experimentation phase

Adoption RCT: identification and removal of constraints

Impact RCT and natural experiment

A three stages approach to technological upgrading

- There has been neglect of phase one to go beyond the 1/3 ceiling
- Design phase has used participatory breeding and Local Agricultural Research Committees (CIAL-CIAT), but in need of evaluation and improvement

4. Beyond technological upgrading: Labor calendars and transformations

- Research on AT requires a return of attention to

 Farming systems and land calendars
 Year-round smoothing of labor calendars
- Research on RT requires spatial/territorial approaches, with emphasis on labor and land markets, inter-sectoral linkages and local ADLI/S, GE effects, and dynamic/treadmill effects o This requires more emphasis
 - On natural experiments due to time and space dimensions
 - On estimated structural models or calibrated based on experiments

5. Conclusion: Creating a demand for countries to invest in Ag-for-Dev

- WDR 2008 recommendation on higher investment in agriculture remains valid and widely endorsed
- But has not been broadly implemented due to low returns from investment in agriculture for development
- More complete strategy consisting in an **AB-GR-AT-RT-ST** sequence is promising, but stuck a GR stage in much of SSA
- Need a more effective strategy to go beyond the 1/3 ceiling to technological upgrading at the GR stage
- Suggests the need for a more **demand-driven** approach that recognizes heterogeneity (Blue strategy): phase one research for User Needs Assessment and design of business models
- Also need extend **research to AT and RT** in priority over ST
- This will help **create political will** for countries to use Ag-for-Dev by making it more privately and socially profitable

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