Review of Experiences from Asia: Possible Lessons for Africa

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Objective

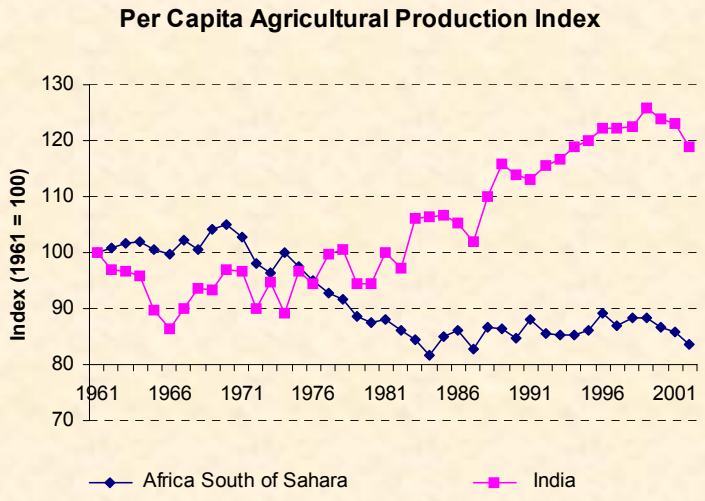
- **Examining the potential role of the public sector in input market development, by looking at:**
  - **How it contributed to the success of the green revolution in India**
  - **What lessons from India's experience can be drawn for Africa, and**
  - **What the future options are for Africa**

Why now?

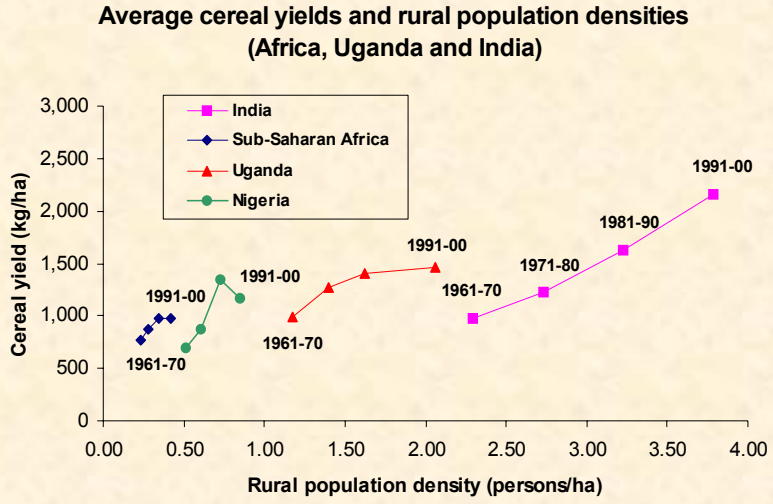
Like India in the 1960s,

- **Africa faces severe national food crises and is becoming increasingly dependent on foreign assistance to meet its food needs.**
- **There is a growing commitment to agricultural development and food security in Africa (e.g. NEPAD).**

Impact of India's Green Revolution



Dramatic growth in yields



Rapid growth in input use

	1961-70	1971-80	1981-90	1991-00
Fertilizer use (application rate, kg/ha)				
India	7.2	23.4	54.6	90.6
Sub-Sahara Africa	2.5	5.7	8.7	9.1
Irrigation use (percent of arable and permanent crop land)				
India	16.9	21.2	25.8	32.3
Sub-Sahara Africa	2.6	3.0	3.5	3.7

The public sector role

India's experience with the green revolution (GR) can be described in terms of the sequence of public interventions…..

1. **investments that preceded the GR (irrigation, power and rural roads), and**
2. **research and extension in major food staples**
3. **policy interventions in input and output markets during the GR (e.g. input subsidies, procurement, rural banking)**
4. **focusing first in high potential areas, and moving later (80s) into low potential (and mostly rain-fed) areas.**

By 1995…..

- **Road density had increased to 5,704 km per 1,000 sq km, from a 1970 level of 2,614 km**
- **Almost 90% of the rural areas had access to electricity**
- **Area under irrigation doubled (from about 16% in 1970 to 32% in the 90s**
- **Fertilizer application rates increased more than 10-fold (7kg/ha to 91kg/ha, 1960s – 90s)**

Lessons and challenges for Africa

- **Less irrigation potential**
  (e.g. costs of building small irrigation systems can reach up to US$8,300/ha, over three times what it would cost in South Asia)
- **Diverse and rainfed farming systems require different and much more site specific technology solutions (irrigation and fertilizer use is not always appropriate)**
- **Poor state of Africa's rural infrastructure**
  (e.g. in 1960 India had a density 40 times that of Africa today)

Lessons and challenges, cont.

- **Low population densities and landlockedness (challenges for input and output market development)**
- **Government commitments to agriculture**
  (e.g Shenggen's study of Uganda)

Policy conclusions for Africa

1. **Infrastructure investments are critical (rural roads in rural infrastructure, irrigation)**
2. **Research and extension needs to appropriately targeted to a wide array of diverse, rainfed farming systems.**
3. **Increasing fertilizer use where appropriate (subsidies may have a temporary merit)**

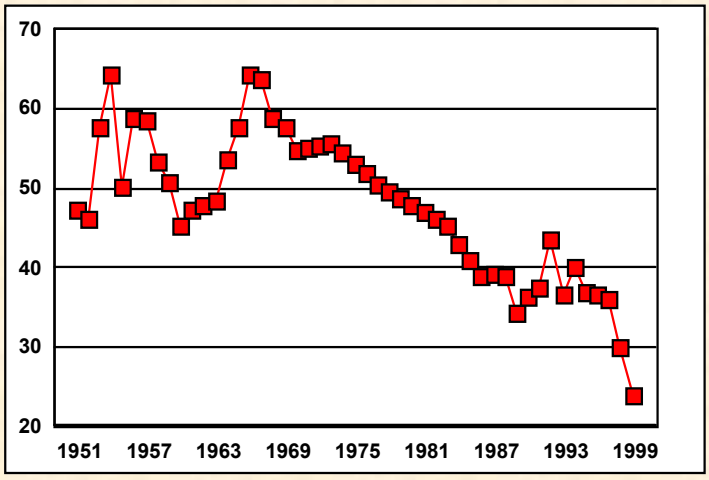
Policy conclusions for Africa, cont.

4. **Strengthening effective rural financial services and insurance against shocks for agriculture need greater attention**
5. **Transforming marketing institutions to enable farmers and processors to compete in world markets**
6. **Building greater coordination at the regional level (market reforms and trade liberalization, product quality and standards, and physical infrastructure)**

Investment, Subsidies, and Pro-poor Growth: Evidence from India and Africa

Shenggen Fan

Poverty Incidence in Rural India



Poverty In Uganda

	1992/93	1993/94	1994/95	1995/96	1997/98	1999/2000
National	55.5	52.2	50.1	48.5	44	35.2
Central	45.5	35.6	30.5	30.1	27.7	20.3
East	59.2	58	64.9	57.5	54.3	36.5
West	52.8	56	50.4	46.7	42	28.1
North	71.3	69.2	63.5	68	58.8	65.8
Rural	59.4	56.7	54	53	48.2	39.1
Central	52.8	43.4	35.9	37.1	34.3	25.7
East	61.1	60.2	66.8	59.4	56.8	38.4
West	53.8	57.4	51.6	48.3	43.2	29.5
North	72.2	70.9	65.1	70.3	60.7	67.7
Urban	28.2	20.6	22.3	19.5	16.3	10.3
Central	21.5	14.2	14.6	14.5	11.5	7.4
East	40.6	30.5	41.5	31.8	24.8	15.7
West	29.7	24.9	25.4	16.2	19.9	5.6
North	52.6	46.2	39.8	39.6	32.6	30.6

Measuring the Impact: Method and Data

Method: Simultaneous Equation System

Public investment and subsidies reduce rural poverty through many channels such as improved growth in agricultural production, rural non-farm employment, and migration.

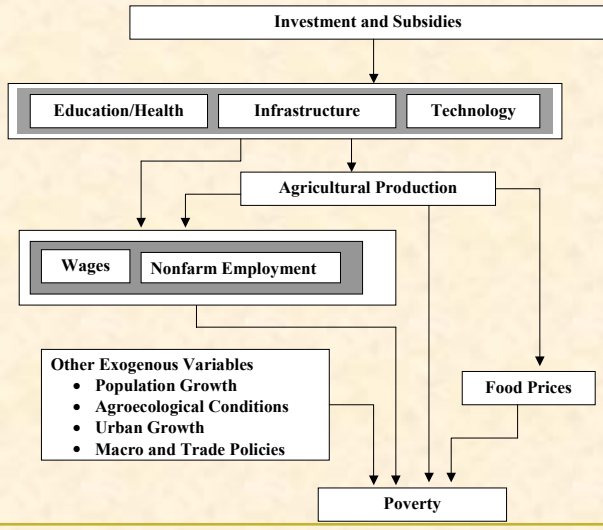
Data:

India — **Regional data over time (panel data)**

14 states over 1966 to 1998

Uganda — **Household Survey data for 1992, 1995, 1997, and 1999**

Impact of Public Spending on Poor



Returns in Ag GDP, India

	1960s	1970s	1980s	1990s
Returns in Agricultural GDP (Rps per Rps Spending)				
Roads	3.07	3.48	2.92	4.29
Education	1.20	1.49	0.95	1.26
Irrigation Investmen	0.51	1.06	1.02	0.07
Irrigation Subsidies	0.69	1.20	-1.18	0.24
Fertilizer Subsidies	4.51	1.26	0.88	-0.65
Power Subsidies	2.26	1.29	0.30	0.07
Credit Subsidies	2.05	0.62	0.08	-0.20
HYV-Agricultural R&	3.11	1.89	0.39	n.s.

Returns in Poverty Reduction, India

	1960s	1970s	1980s	1990s
Number of Poor reduced per Million Rps Spending				
Roads	229.42	722.44	517.02	473.90
Education	14.37	129.65	167.52	154.45
Irrigation Investment	41.63	125.01	115.86	6.33
Irrigation Subsidies	56.71	142.49	n.s.	24.32
Fertilizer Subsidies	367.74	149.80	99.75	n.s.
Power Subsidies	184.11	152.85	33.72	7.22
Credit Subsidies	167.66	72.95	9.06	n.a.
HYV-Agricultural R&D	253.90	223.51	44.34	n.s.

Returns to Investment in Uganda

Investment	Central	East	North	West	Uganda
	Benefit-Cost Ratio				
Agricultural R&D	23.09	17.82	20.75	32.19	22.73
Education	2.05	3.51	2.10	3.80	2.72
Feeder Roads	17.51	25.37	14.76	26.87	20.94
Murram Roads	n.s.	n.s.	n.s.	n.s.	n.s.
Tarmac Roads	n.s.	n.s.	n.s.	n.s.	n.s.
Health	0.85	0.57	0.23	0.60	0.56
	No. of Poor Reduced per Million Shilling				
Agricultural R&D	40.22	109.77	309.38	106.80	107.18
Education	3.57	21.60	31.38	12.62	12.81
Feeder Roads	25.92	132.74	187.01	75.73	83.88
Murram Roads	16.82	49.03	61.04	40.32	40.02
Tarmac Roads	10.69	54.11	647.97	38.75	41.35
Health	1.49	3.52	3.40	1.98	2.63

Major Findings

Pre-conditions are important for the Green Revolution to happen:

- **Irrigation**
- **Fertilizer**
- **HYV (agricultural research)**
- **Credit**
- **Human capital**
- **Infrastructure**

Major Findings

The India case study indicate that the relative magnitudes of the effects of various factors have been different over time.

- **For example, fertilizer subsidies was crucial to the adoption of HYVs during the green revolution period, and therefore contributing to poverty reduction.**
- **But as more and more farmers have adopted HYV, continued subsidies may lead to inefficiency of the overall economy.**

Major Findings

- **Agricultural research, education, and rural infrastructure are the three most effective public spending items in promoting agricultural growth and poverty reduction.**

Major Findings

The trade-off between agricultural growth and poverty reduction is generally small among different types of investments and between regions.

For agricultural research, education, and infrastructure development, they have large growth impact as well as large poverty reduction impact. Regional analysis suggests that more investments in many less-developed areas not only offer the largest poverty reduction per unit of spending, but also lead to the highest economic returns.