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RESEARCH INSTITUTE

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# Technology Promotion, Safety Nets, and Agricultural Productivity:

## Lessons from Asian Green Revolution

**Dr. Shahidur Rashid**

**Senior Research Fellow,**

**Development Strategy and Governance Division  
International Food Policy Research Institute**

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(CARD)**

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# Ice breaker

Two obvious questions:

1. What is ***price*** of a commodity?
2. Why public ***policy*** for agriculture?

Definition of price from economic textbook:

- a) The *scarcity value*
- b) Consumers maximize utility given a budget → demand curve
- c) Producers maximize profit → supply curve
- d) Intersection of demand and supply curve determines price

# Ice breaker (2)

## A simple definition

1. Price is the outcome of an exchange process, we call market.
2. Price can be only as good as the “process of exchange” or market can deliver. Price is right only if the market is right and vice versa.

## Why policies?

Market (process of exchange) cannot be right in the absence of good infrastructure, institutions, information, presence of moral hazard, and other market fundamentals.

1. Policies are set of public actions that addresses the above weaknesses in market fundamentals (called *market failures*).
2. Correction of market weaknesses can improve overall social wellbeing
3. However, when government intervenes in well functioning markets, social wellbeing can deteriorate (people get worse off)

# The talking points

1. A conceptual framework for linking input subsidies and price stabilization
2. Subsidies in technology promotion:
  - Input subsidies
  - Price stabilization
3. Linking rice price stabilization with social safety nets and ag productivity?
  - What have we learned about “do’s and don’ts”
4. Summary

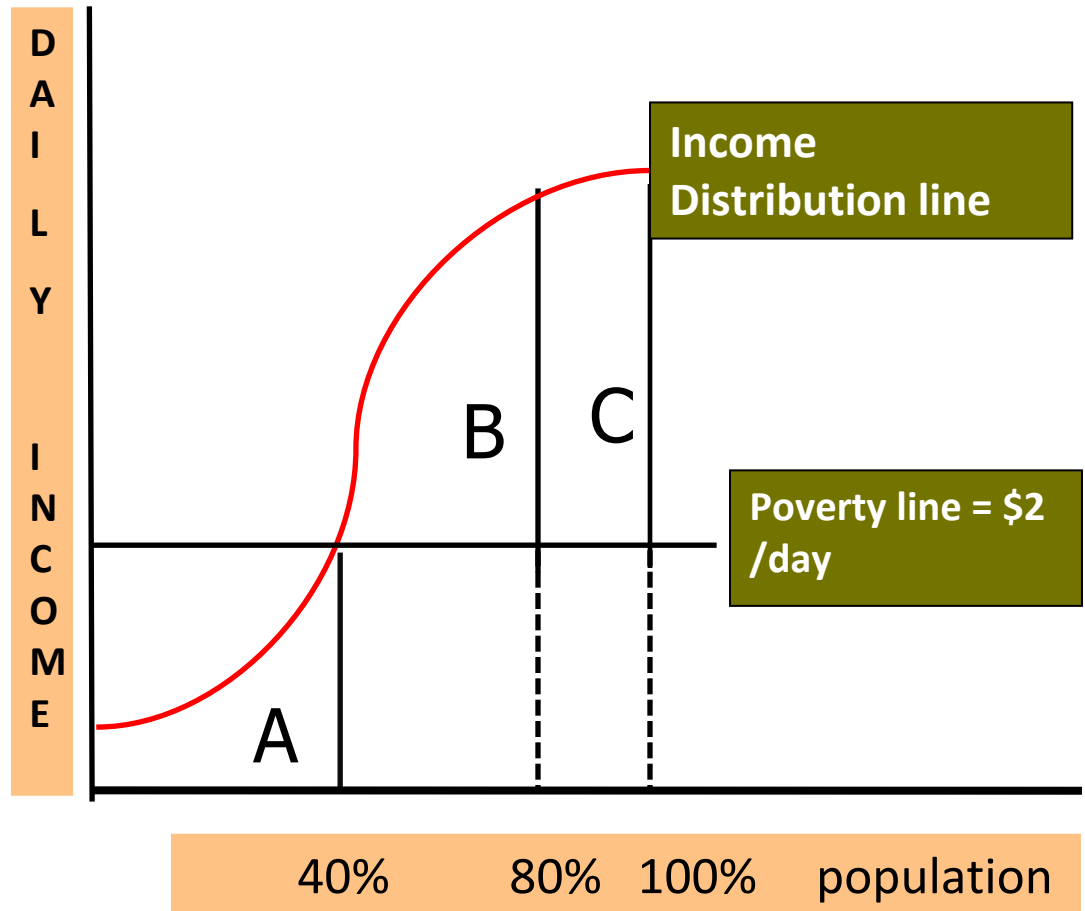
# Ag development and food policies

The S-shape curve:

S-shaped curve =  
Cumulative income  
distribution

Poverty line = \$2 /  
day

Proportion of people  
below poverty line =  
40 percent



# Ag Development and food policies (2)

Household / income groups	Key features	Policy focus
<b>Group A: Poor (bottom 40%)</b>	Below poverty line; food insecure; undernourished; cannot afford school	Provide <i>sustained</i> and effective safety net
<b>Group B: Normally self-sufficient, but vulnerable to shocks (middle 40%)</b>	Not poor enough to qualify for safety nets and not rich enough to support themselves in case of shocks	Livelihood protection supports to cope against shocks;
<b>Group C: Surplus farmers (top 20%)</b>	This group contributes the largest share of marketed surplus; can afford various market based instruments	Putt them on the path to commercialization. Link with risk management instruments.

## Technology promotion, productivity & food security

- ❑ Suppose CARD and its partners are trying to achieve the following policy goals:
  - ❖ Enhance rice productivity with new technology (*through group B and C*)
  - ❖ Ensure food security for the poor and vulnerable through safety nets programs (*supporting group A*)

What do policy makers need to know to achieve these goals?

- Are inputs and output markets for rice functional / robust / efficient?

# Technology promotion & Input subsidies

- What do we know about input subsidies?
- Two examples:
  - Input subsidies in promoting green revolution in India
  - Smart subsidies in Malawi



# Technology promotion & Input subsidies: India

	1960	1970s	1980s	1990s
<i>Returns in Agricultural GDP (Rs per Rs spent)</i>				
Irrigation Subsidies	2.24	1.22	2.6	n.s
Fertilizer Subsidies	2.41	3.03	0.88	0.53
Power Subsidies	1.88	0.95	0.66	0.58
Credit Subsidies	3.86	1.68	5.2	0.89
Agricultural R&D 1	3.1	5.9	6.95	6.93

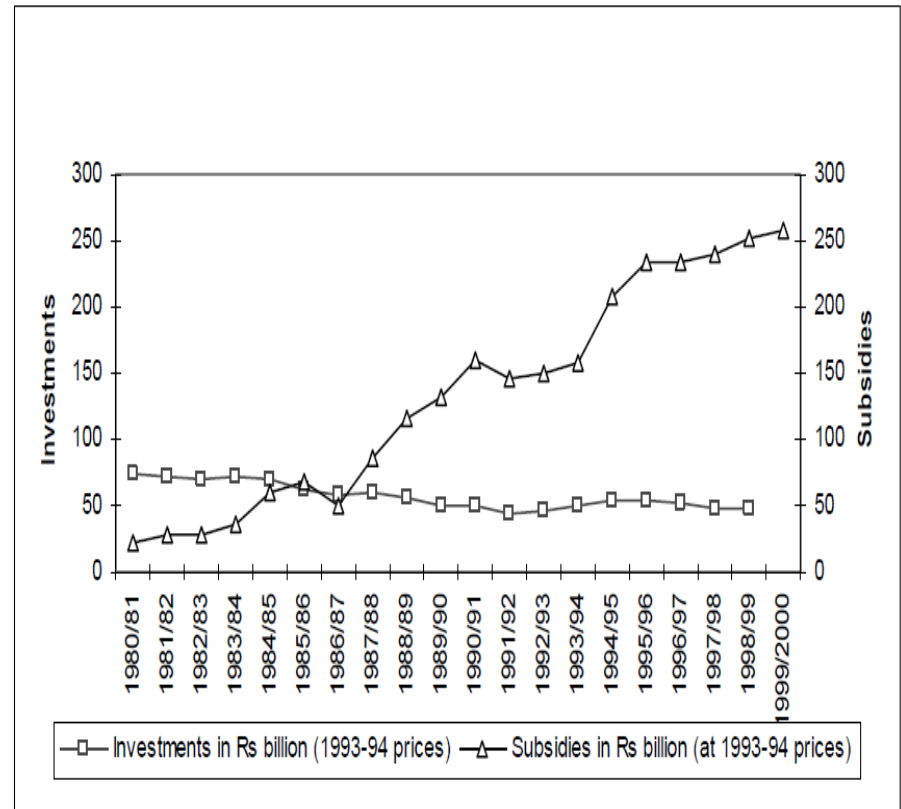
✓ Key Messages:

- Input subsidies had positive benefit-cost ratios in the early years of green revolution, but became insignificant or a benefit-cost ratio of less than 1 in the later decades.

# Technology promotion & Input subsidies: India

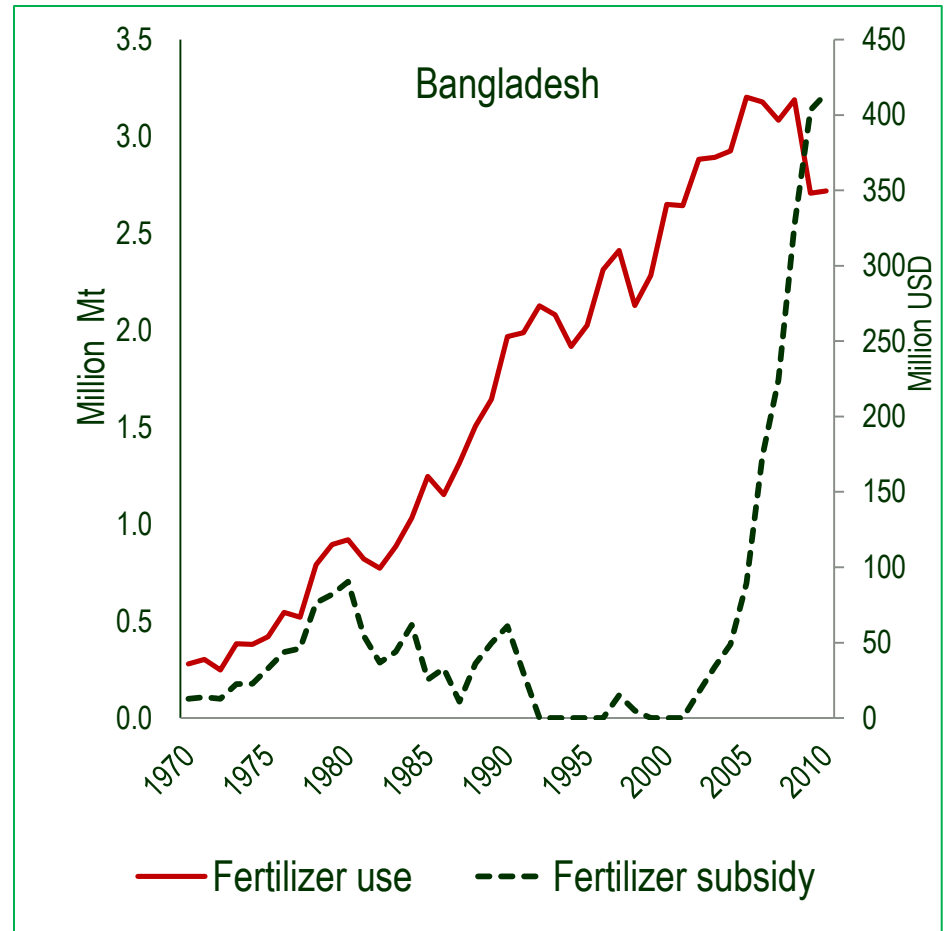
## What subsidies did to public investment:

- In the early years of green revolution, public investments in agriculture were higher than subsidies, but subsidies significantly outpaces since mid-1980s.



# Subsidies and fertilizer use in Asia

1. The relationship between subsidy and fertilizer consumption in recent decades is at best weak.
2. Fertilizer use continued to grow even when subsidies were withdrawn
3. This is true for other countries that liberalized and re-introduced subsidies



# Technology promotion & Input subsidies: Malawi

The following information are taken from Jayne et al. 2018:

Rationales:

There are many compelling arguments for fertilizer subsidies in Malawi. The following are a few of them:

1. Social benefits may be higher than private costs due to market constraints that disincentivize the farmers from using fertilizer
2. Malawi farmers are in low productivity trap; and supporting through subsidies can lift them up
3. There are clear market failures in Malawi's small holder dominated agriculture

# Technology promotion & Input subsidies: Malawi

## Impacts:

Literature has looked into the impacts of Malawi's input subsidies on various indicators:

1. Subsidies did lead to higher maize production
2. Impacts on poverty and food security is mixed
3. Evidence on yield increase is marginal

However,

1. There is strong evidence of crowding out commercial sectors; and the impacts on outputs can be biased upward.
2. Costs of achieving the goals have been very high, ranging from 22 to 45% between 2011 and 2014.

# Price stabilization

# Rationales for price stabilization

	Source of variability	Explanation
1	Weather-shocks → production variability	Supply shocks → large variation in grain prices
2	Poor infrastructure (including info) and high transaction costs	High transport cost limits trade between surplus and deficit region; and create wider gap in import and export parity.
3	Transmission of global price volatility	World prices are volatile and the volatility gets transmitted if a country is import dependent
4	Unimodal rainfall	Single harvest → greater seasonal variation in grain prices
5	Reliance on one staple	Makes demand for dominant staple inelastic (small supply shock → big change in price)
6	Trade barriers	Creates wider gap between import and export parity, which are bounds of domestic prices
7	Unpredictable policy interventions	Discourages private traders from investing in and carrying out storage and trade.

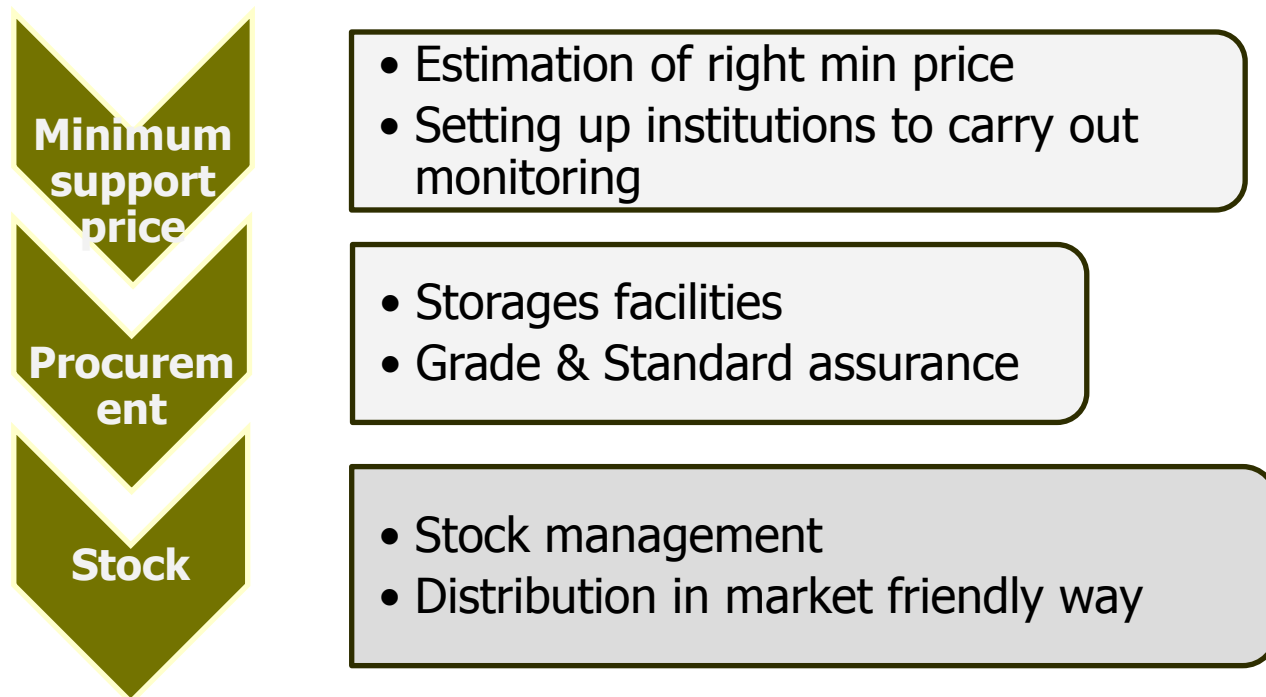
# Price Stabilization, productivity & food security

1. To enhance agricultural productivity, suppose a government does the following:
  - Invests in agricultural R&D to develop a new adaptable technology.
  - Disseminate this technology through massive extension programs.
2. Farmers adopt the new technology; and
  - There is bumper harvest, with prices hitting lower than costs of production → *market collapses*

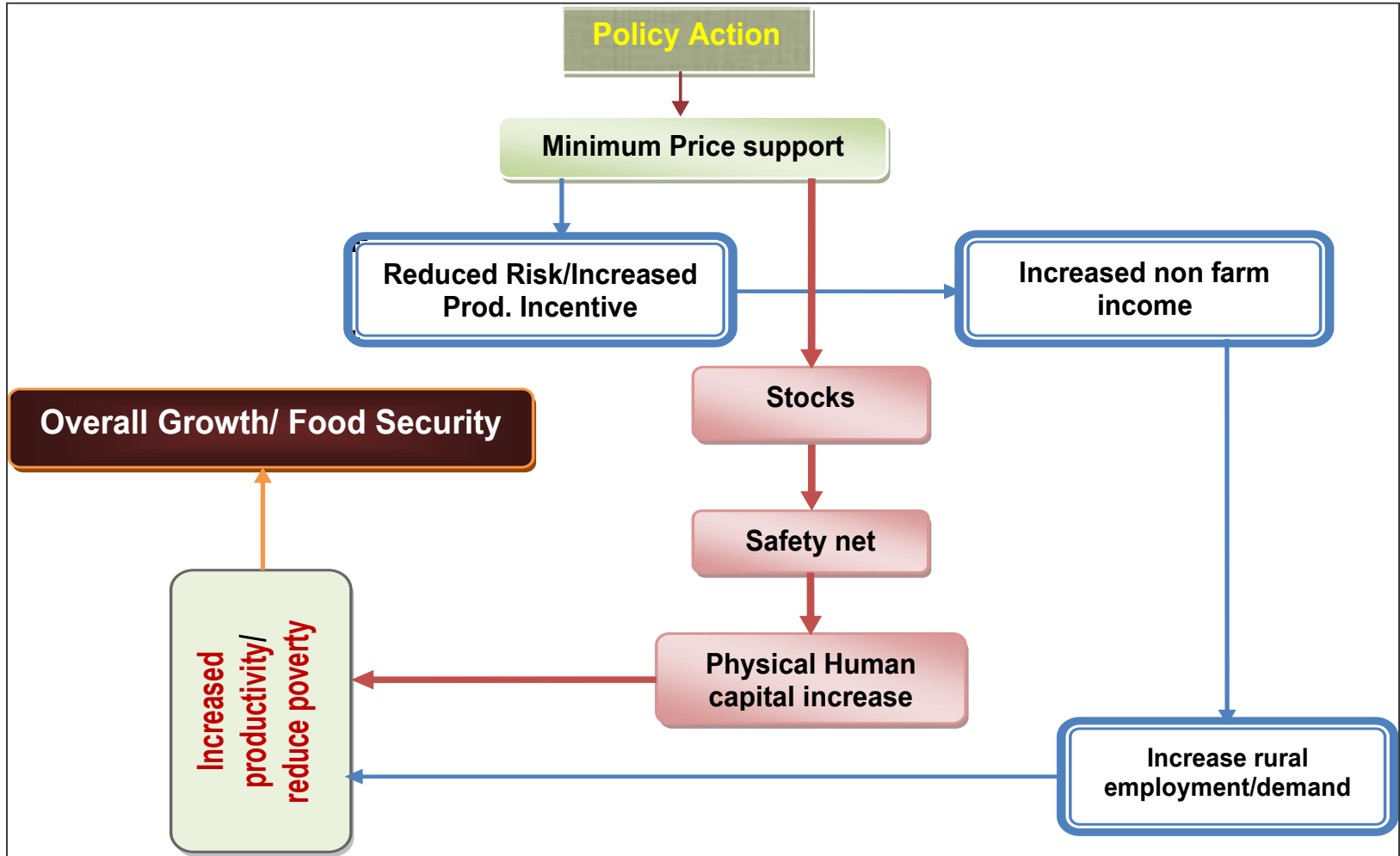


## Price stabilization, productivity & food security (2)

- A policy advisor steps in and suggests ensuring a minimum price so that farmers do not get discouraged by market collapse.



# Price Stabilization, productivity & food security (3)



# Linking with SGR & Safety Nets

## Price stabilization, Grain Reserves, and Safety Nets

1. Price stabilization programs involves holding stocks. A proven way to deal with the stock is effective linking with safety nets programs.
2. This links can be fostered even without enforcing floor and ceiling prices.
3. Ethiopia and Bangladesh have done it fairly effectively
4. On the other hand, in other countries (like India, Indonesia, Kenya, Zambia, etc) price stabilization program provide very expensive / distortive

# Experiences of implementing price stabilization

- Both developed and developing countries have practiced policies of managing price instability; but they vary widely across countries in terms of design and implementation
- Most African countries managed food price instability through marketing boards, which in some instance eliminated private sector
- Asian countries adopted dual pricing policies, where government control certain share of market, but majority of marketing activities were carried out by the private sector.

# Key elements of Asian dual price policies.

- ❑ **Two critical elements of success: (a) institutions, (b) appropriate regulations**

Prices commissions / food security monitoring research

Clear research support

- ❖ Monitor costs of production; determine floor and ceiling prices; provide market information (both domestic and international)

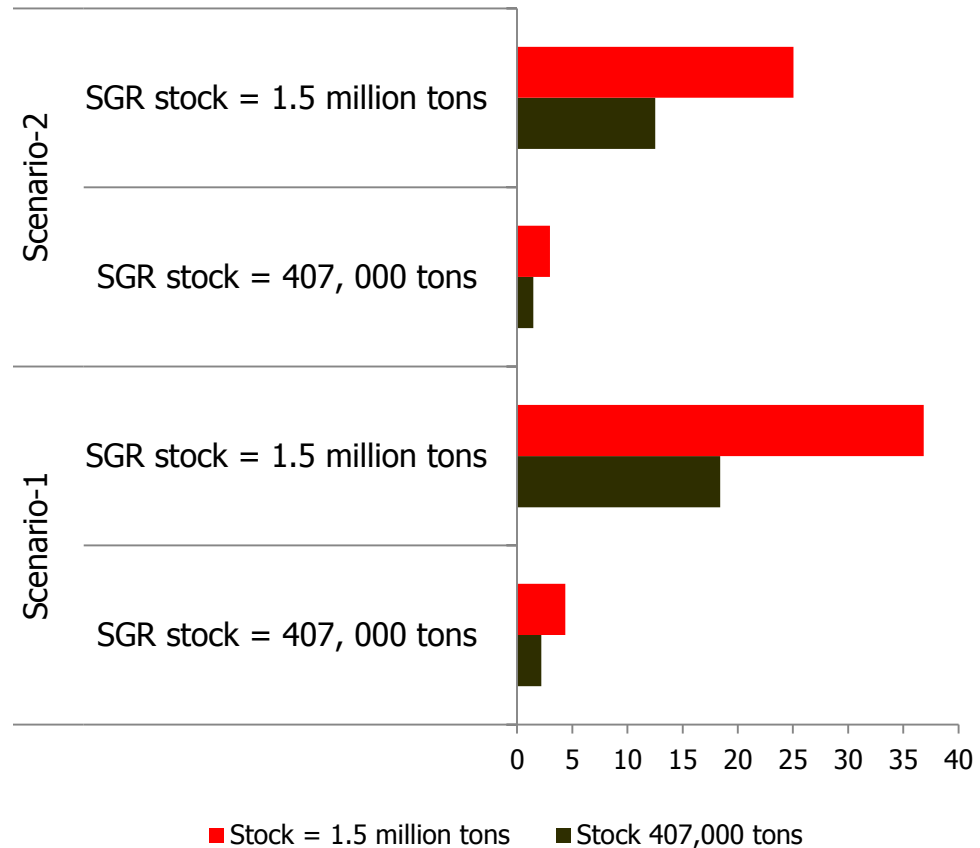
Linking price policies with social safety net program

- ❖ Price support to farmer → protection to vulnerable

Private sector remained dominant

# Challenges of price stabilization

- Implementation of these policies are expensive and require very large subsidies
- Government intervention through release of stocks negatively effect market development
- Large public sector stocks creates uncertainties in the markets.
- There can be large price depressing effects.



# Challenges of price stabilization (2)

Countries	Time Periods						
	1970-75	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
	Nominal Rate of Assistance (%)						
<b>India</b>	12.6	-7.4	4.1	67.5	2	-2.3	15.4
<b>Pakistan</b>	9.3	-11.8	-9.3	-5.9	-10.2	-2.6	1.2
<b>Indonesia</b>	-3.8	10.4	10.5	-1.9	-7.5	-9.7	13.9
<b>Bangladesh</b>		3.1	3.9	17.4	-2.4	-8	4

# Summary: Input Subsidy

## What have we learned?

1. Input subsidies do have positive returns in the early years of agricultural development
2. However, those programs become expensive / counter-productive once market fundamentals are developed.
3. While there are good rationales justifying subsidies, evidence on impacts are mixed in Africa

## What are the new ways of doing subsidies:

1. Provide targeted input subsidies including targeting by gender, land holding; and poverty status
2. With the availability of ICT, these programs can be implemented better in the future.
3. Have an exit strategy—don't let input subsidies crowd out other agricultural investment



# Summary: Price stabilization

- *Price stabilization* has been part of broader agricultural policies in many developing countries.
- In the literature, these types of policies are called (often interchangeably) buffer stock policies, food price stabilization policies, or dual price policies.
- These policies played important roles in promoting green revolution in Asia, but became prohibitively expensive in later years

# Summary

- Challenges of price stabilization
  - Price stabilization policies involve too many objectives, implemented through a complex management structure, and often involve very large public subsidies.
  - In the absence of effective coordination with safety nets and emergency programs, price stabilization can be
    - Expensive--replacing public funds from productive investment
    - Harmful to market development
- Opportunities
  - There is room for institutional improvements in most CARD countries.
  - Linking grain reserves with social safety nets, use of ICT in targeting, has the potentials for boosting local demand and increasing productivity

The art of public policy-making is to know when to introduce government interventions and when to withdraw. The common mistake is to forget the withdrawal part, leading to unsustainably high costs!!!

--Cummings, Rashid, and Gulati (2006)



Thank you!!