

Agriculture in a modern world

Lecture 7

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Outline

- Structural transformation
 - + Agriculture vs. Non-agriculture
- Rural – urban interactions & migrations
 - + Lewis model
 - + Harris-Todaro model
- Agricultural development strategies



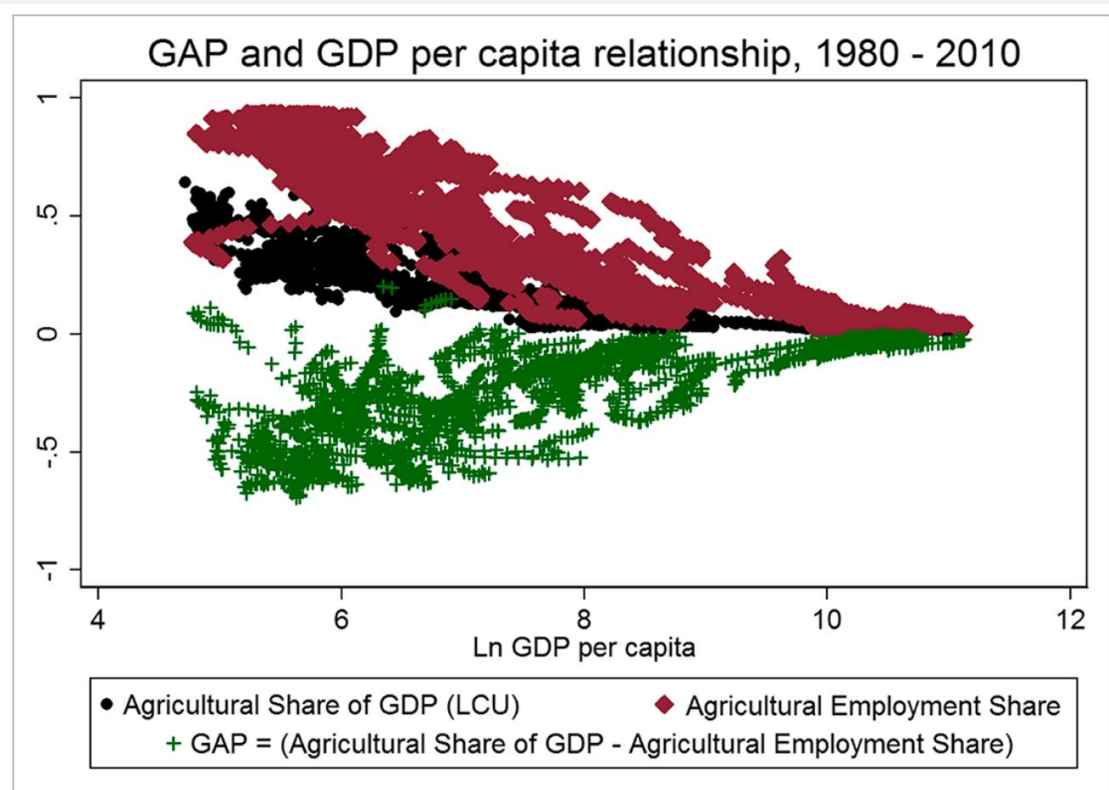
Structural transformation

- Starting from agriculture through higher productivity, agriculture provides food, labor, and savings to the process of urbanization and industrialization
- What did we observe?
 - + A declining share of agriculture in GDP and employment
 - + A rural-to-urban migration that stimulates the process of urbanization
 - + The rise of modern industrial and service economy
 - + A demographic transition from high rates to low rates of births deaths (associated with better health standards in urban areas)
- The gap in labor productivity between agricultural and nonagricultural workers approaches zero when incomes are high enough and the two sectors have been integrated by well-functioning labor and capital markets



Structural transformation

- In the early stages, there is a substantial gap between the share of the labor force employed in agriculture and the share of the GDP generated by that labor force



- This gap narrows with higher incomes, reflecting better-integrated labor and financial markets
- However, gains in farm productivity have been quickly lost in lower prices. Farm incomes usually fall behind incomes earned in the rest of the economy



Structural transformation

- In many countries, this structural gap actually widens during the periods of rapid growth
 - + When overall GDP is growing rapidly, the share of agriculture in GDP falls much faster than the share of agricultural labor in the overall labor force
- After labor productivity in the two sectors begins to converge, the turning point in the gap has been moving to the right over time, requiring progressively higher per-capita incomes before the convergence process begins
- Most of the time the integration of farm labor into the nonfarm economy takes a long time. The productivity gap is then difficult to converge through economic growth alone, and this requires political tensions to protect the agricultural sector.



Structural transformation

- Finding efficient policy mechanism that will keep the poor from falling off the pathway altogether has occupied the development profession for decades. There are three key lessons:
- *First*, the structural transformation has been the main pathway out of poverty for all societies, and it depends on rising productivity in both agricultural and non-agricultural sectors (and the two are connected)
 - + agricultural labor could migrate from farms into jobs with even lower productivity in the informal service sector, creating urban poverty
- *Second*, in the early stages, the process of structural transformation widens the gap between labor productivity in the agricultural and non-agricultural sector, pressuring on rural societies to adjust and modernize
 - + The agricultural surpluses generated in rich countries because of high prices caused by support for farmers by government then cause prices lower than would be expected in world markets and a consequent undervaluation of agriculture in poor countries.



Structural transformation

- *Third*, despite the decline in relative importance of the agricultural sector, leading to the world without agriculture in rich societies, the process of economic growth and structural transformation requires major investments in the agricultural sector itself.
- For poverty-reducing initiatives to be sustainable over long periods of time, the indispensable necessity is a growing economy that successfully integrates factor markets in the rural with urban sectors and stimulates higher productivity in both.
- Getting agriculture moving in poor countries is a complicated, longrun process that requires close, but changing, relationships between the public and private sectors. The process of agricultural development requires good economic governance to work rapidly and efficiently.



The Lewis model

- Structural transformation: resources move out of one sector to fuel the growth of another
- Lewis model: labor and resources move from a 'traditional sector' to a 'modern sector' with capital accumulation
 - + The traditional sector has surplus labor (labor can be removed without loss in output, the marginal product of labor = 0)
 - + So, labor moves to the modern sector (industrial sector, and later service sector)
- In order to absorb labor, the modern sector needs capital accumulation to increase demand for labor, but will also induce more rural-urban migration.

Assuming the family farm uses "traditional" techniques of production where land is fixed, we neglect the use of capital inputs. After a certain level of labor input, there is no significant effect on output.

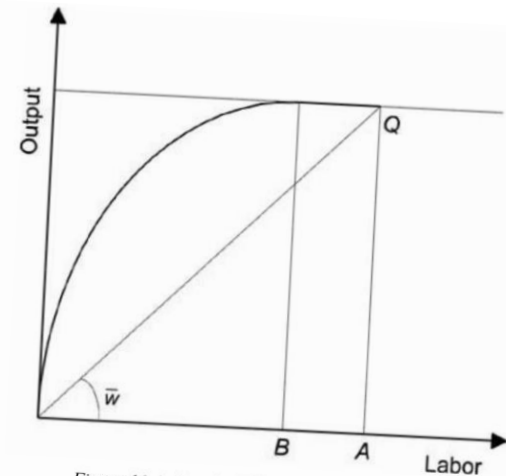


Figure 10.1. Surplus labor on the family farm.

Debraj Ray Ch10.2.2



The Harris-Todaro model

- Harris-Todaro model adds informal urban sector
 - + 3 sectors: *rural sector*, *formal urban sector*, and *informal urban sector*
- Formal urban pays high wage, but small demand, while rural and informal sectors have low wages (why?)
 - + Not everyone can absorb into formal sector. If they fail, they will return to urban informal sector while rural sector is like a relatively sure thing.
 - + More labor can be absorbed in any sector at a lower wage.
 - + With wage differential, there is a rural-urban migration.
- To alleviate persistent migration between the sectors, the wages in the two sectors must be equalized.

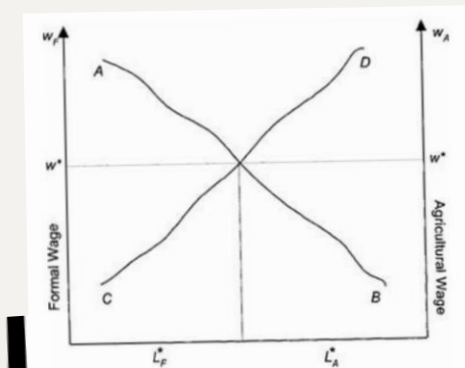


Figure 10.4. Market equilibrium with flexible wages.



The Harris-Todaro model

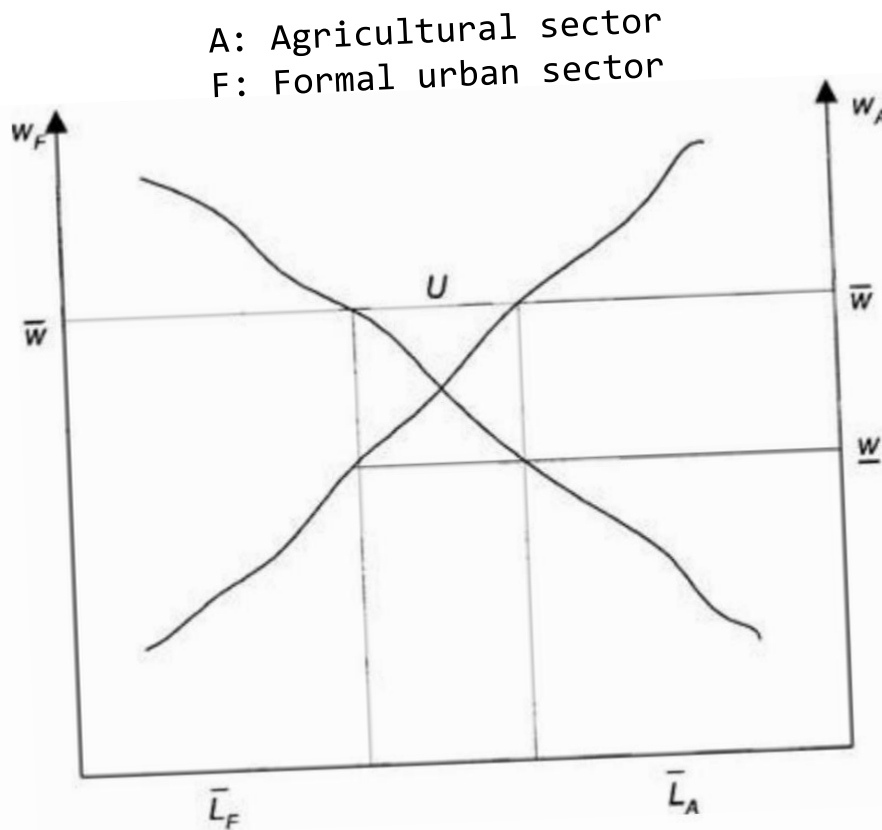


Figure 10.5. A floor on the formal wage.

Debraj Ray Ch10.3

- The minimum formal wage $\bar{w} > w^*$
- The private-sector formal firms will hire no more than the amount $\bar{L}_F$
- If all the remaining individuals are employed in the agricultural sector, the wage in the agricultural sector must drop to $\underline{w}$
- This cannot be an equilibrium state for the economy, because with full employment in both sectors, workers will wish to migrate to the sector with the higher wage.

The Harris-Todaro model

Expected wage in the urban sectors

- $E(w) = p\bar{w} + (1 - p)(qw_I + (1 - q)0)$
- $E(w) = p\bar{w} + (1 - p)qw_I$
- If there is no unemployment:
- $E(w) = p\bar{w} + (1 - p)w_I$
- p is a probability of getting a formal sector job

$$p = \frac{\bar{L}_F}{\bar{L}_F + L_I},$$

- $\bar{L}_F + L_I$ is the measure of the total number of potential job seekers.

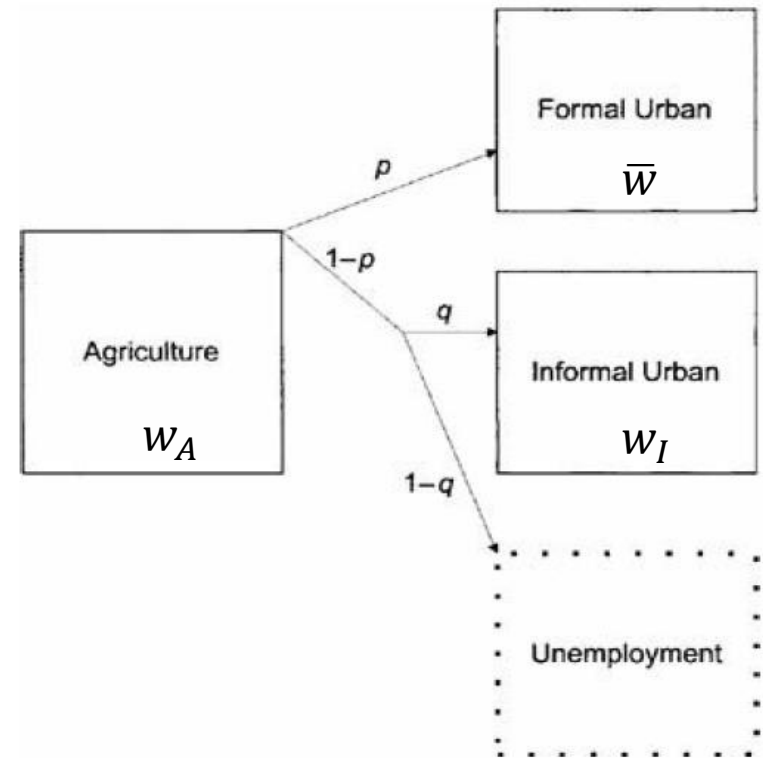


Figure 10.6. Options open to a potential migrant.



The Harris-Todaro model

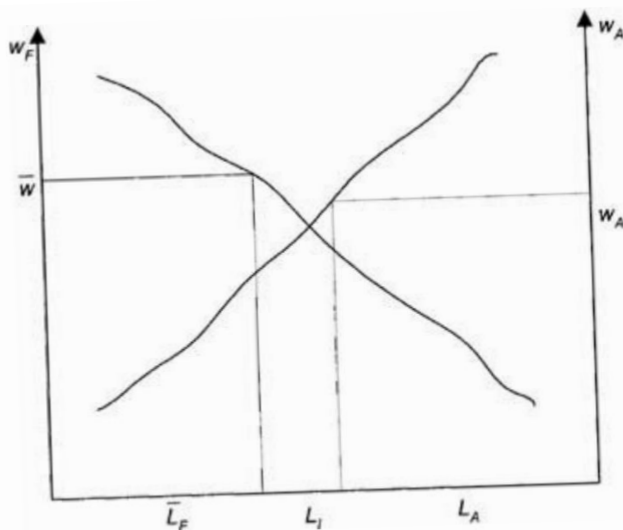


Figure 10.7. Harris-Todaro equilibrium.

- The equilibrium agricultural wage is given by
- L_A people are employed in agriculture
- L_F people are in the formal urban sector, obtain $\bar{w}$
- And the remainder, L_I take refuge in the informal sector where they obtain an income of w_I

- Migration from the rural sector may be thought of as an irreversible decision, at least for the proximate future.
- Migrants compare expected income from migration with the actual income received in agriculture.
- An equilibrium where no person wishes to migrate from one sector to the other happens when:

$$\frac{\bar{L}_F}{\bar{L}_F + L_I} \bar{w} + \frac{L_I}{\bar{L}_F + L_I} w_I = w_A$$

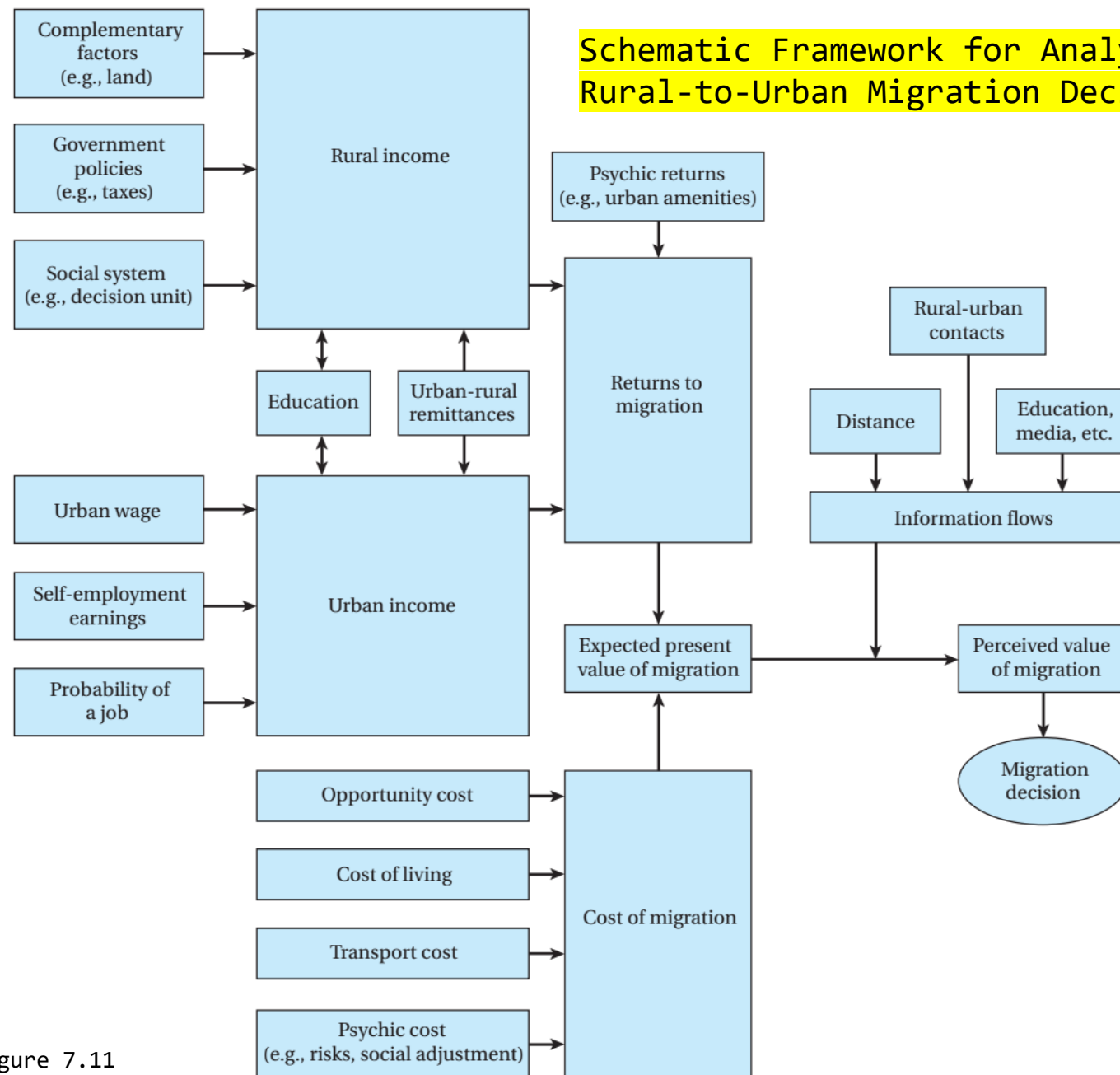


Figure 7.11
Todaro 11th edition

Source: Derek Byerlee, "Rural-urban migration in Africa: Theory, policy, and research implications," *International Migration Review* 3 (1974): 553. Copyright © 1974. Reproduced with permission of Blackwell Publishing Ltd.

The Harris-Todaro model: the paradox of urban job creation



- Urban informal sector is often responsible for problems originated from unregulated economic activities.
- Government policies can aim to enlarge urban formal sector.
 - + Offering urban businesses various setup incentives (such as tax holidays)
 - + Ongoing investment incentives (such as better treatment in the credit market).
 - + The government might itself expand the demand for formal labor by expanding the employment of public sector enterprises.



- Imagine that the formal labor demand curve shifts out and to the right, so that, in particular, labor demand at the wage rate $\bar{w}$ rises from $\bar{L}_F$ to $\bar{L}'_F$
- Such policies initially reduce the size of the informal sector, by simply initially channeling people from this sector into the greater number of formal jobs that are now available.
- Relative to the initial outcome, L_F rises and L_I falls.
- This raises the probability of getting a formal job. Consequently, the expected urban wage must initially rise, as $\frac{\bar{L}_F}{\bar{L}_F + L_I}$ is **initially** rise.

How slums expand?



The paradox of urban job creation: how slums expand?

- But the initial increase cannot be fully persistent. Rural–urban migration picks up. More migrants enter the urban sector.
- The informal sector now begins to increase once again.
- First, as the labor force in agriculture falls, the agricultural wage tends to rise (by how much it rises will depend on the slope or elasticity of the agricultural absorption curve).
- Second, as migration continues, the expected urban wage once again begins to fall (relative to the initial sharp rise).
- $\frac{\bar{L}_F}{\bar{L}_F + L_I}$ begins to decrease as migration continues, and this brings down the probability of getting a formal job (relative to what prevailed just after the institution of the policy) and the expected urban wage drops with it.



The paradox of urban job creation: how slums expand?

- In the process, we have a new allocation of labor in the three sectors ($\bar{L}'_F, \bar{L}'_A, \bar{L}'_I$), which satisfies the new Haris-Todaro equilibrium condition:

$$\frac{\bar{L}'_F}{\bar{L}'_F + L'_I} \bar{w} + \frac{L'_I}{\bar{L}'_F + L'_I} w_I = w'_A$$

- w'_A is the new agricultural wage, $w'_A > w_A$
- it must be the case that the new expected wage in the urban sector exceeds the old expected wage. The only way in which this can happen in the model is if

$$\frac{\bar{L}'_F}{\bar{L}'_F + L'_I} > \frac{\bar{L}_F}{\bar{L}_F + L_I}$$

- The size of the urban labor force has expanded, the informal sector may well expand.
- Attempts to increase the demand for labor in the formal sector may enlarge the size of the informal sector, as migrants respond to the better job conditions that are available.



A white quadcopter drone is shown in flight, hovering over a vast, green agricultural field. The drone is positioned in the upper center of the frame, with its four propellers visible. The field below is filled with rows of green plants, likely crops, stretching towards the horizon. The sky is a pale, hazy blue. The entire image is framed by a thick black border.

Agricultural development strategies

- Still, rural development is needed. Focus will be on agricultural sector and interlinkages with non-agricultural sector
- Three different agricultural strategies/policies that view development of agricultural sector as a means to speed the overall process of development
 - (i) a free-market strategy
 - (ii) an activist government strategy directed toward small farmers
 - (iii) an intermediate strategy recognizing government failures as well as market failures

Timmer: The Agricultural Transformation (1988)



(i) Free-market strategy

- The agricultural sector must decline in proportional output terms and absolutely in the labor force, and the long-run decline in basic agricultural commodity prices due to technical change emphasizes that society is best served by getting resources out of agriculture as rapid as possible
- There is a problem of declining real incomes in agricultural sector under the impact of rapid technical change domestically and lower world prices for the output (with more open economies)



(ii) Interrelated strategy

- Johnston and Mellor (1984) present an 'interrelated strategy' and the need for government in strategic design and program implementation. Agricultural growth not only satisfies the need for food to meet nutrition requirements, but also fosters a favorable employment-oriented demand structure as well.
- This strategy is mainly directed by government planners while private sector only plays a small role as small farmers, and focus on closed economy
- 3 key elements to meet all objectives of agricultural development:
 - + Massive investment in human capital through nutrition, health, and family planning services
 - + Creation of the complex, rural organizational structures seen in Japan and Taiwan that provide services to small farmers while serving as a voice for their interests
 - + Investment in rapid technical change appropriate to these small farmers to raise agricultural output and rural incomes



(iii) Market policy strategy

- This strategy calls for government policy interventions into market outcomes but uses markets and the private marketing sector as the vehicle for those policy interventions.
- It recognizes market failures in agriculture and extensive government failures in implementation of economic tasks.
- Main focus: how to cope with segmented rural capital and labor markets, poorly functioning land markets, the welfare consequences of prices instability in commodity markets.
- However, government interventions still have many flaws, or sometimes make matters worse.
- Way to solve these problems: try to clearer understanding the necessary interaction between the public and private sectors



(iii) Market policy strategy

- Dilemma objectives: agricultural performance as its capacity to feed the population regularly and cheaply, or as its ability to provide fair incomes to farmers
- Market policy path believes in using interventions into the prices determined in markets, not by leaving markets alone or by doing direct activities by the government.
- It requires that government intervention be based on an empirical understanding of economic responses to a change in policy and the political repercussions from them.



Agricultural policy to induce technical and institutional change

- For agricultural transformation, we need a mix of appropriate **new technology**, **flexible rural institutions**, and **market orientation** that offers farmers rewards for their efforts and for the risks they face from both nature and markets.
- Agriculture is characterized by stronger constraints of land on production than other sectors. Hence, agricultural growth may be viewed as a process of easing the constraints on production imposed by inelastic supplies of land and labor.
- Nonagricultural sector absorbs labor from agriculture and supplies modern technical inputs to agriculture. These inputs can be substituted for land and labor.
- New high-yield seeds and fertilizer also relax land constraints.
- The advance in technology is itself a function of institutional innovation. In this process, we see that shifts in the demand for institutional change are induced by changes in relative factor supply and technical change.

