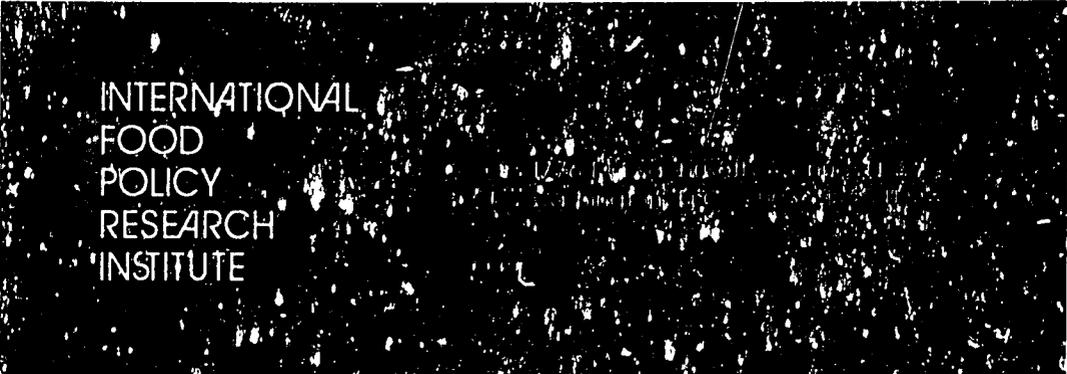


Linkages between Agriculture and the Overall Economy

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Linkages between Agriculture and the Overall Economy

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The linkages between the agricultural and nonagricultural sectors of an economy are many and varied. They operate through intersectoral movement of production factors, such as labor and capital, as well as goods and services. With increased agricultural productivity and reduced labor requirements per unit of output, labor tends to move out of agriculture, especially when the population is increasing. In most developing countries, the percentage of the population engaged in agriculture, which is often 60% to 70%, exceeds the percentage of gross domestic output that is contributed by agriculture, usually 30% to 40%. Labor productivity is low in agriculture. However, in many developing countries in recent years, the proportion of the population engaged in agriculture has tended to decline, not so much in response to increased agricultural productivity, but rather as a result of the pressure from increased poverty and unemployment in agriculture.

Also, the growth in the agricultural sector generates surpluses which contribute to expanding investment in the nonagricultural sector. Either financial institutions mobilize and transfer savings for investment in the nonagricultural sector, or the public sector mobilizes agricultural surpluses by fiscal and commercial policies to invest in the nonagricultural sector.

Agriculture as a Source of Savings and Foreign Exchange

Because agriculture is important as a source of national income in many developing countries, attempts to mobilize substantial savings for national investment need to rely heavily on the agricultural sector: the lower the level of per capita income, the higher the percentage of national income originating from agriculture. The relative importance of agriculture as a source of employment and income is seen in Table 1. Even if agriculture is not an important source of overall national income or employment, it may still be a very significant source of income in a particular region within a country.

Table 1. Agriculture's share of GDP, employment and exports, selected years, 1964-84

Country group ²	Share of agriculture (percent) in					
	GDP		Employment		Exports ¹	
	1964-66	1982-84	1965	1980	1964-66	1982-84
Low-income countries	42.8	36.3	76.0	72.0	58.6	32.8
<i>Africa</i>	46.9	41.3	84.0	78.0	70.7	68.4
<i>Asia</i>	42.5	35.7	74.0	71.0	54.0	25.9
Middle-income oil exporters	21.8	14.8	62.0	50.0	40.8	13.6
Middle-income oil importers (excluding major exporters or manufacturers)	25.2	18.0	63.0	53.0	54.2	44.8
Middle-income oil exporters (major exporters or manufacturers)	19.3	12.1	50.0	36.0	56.9	20.2
Developing countries	30.2	19.9	66.9	63.2	52.3	22.0
Industrial countries	5.1	3.1	13.7	7.1	21.4	14.1

SOURCE: World Bank (1986).

1. Includes reexports.

2. Data for developing countries are based on a sample of 90 countries.

Frequently in a depressed or underdeveloped region of a middle-income or even a high-income country, the majority of the population derive their income from agriculture, and agricultural progress and its stimulating impact on the nonagricultural activities within the region are crucial for regional development. Substantial population migration is seldom a feasible way to solve poverty and unemployment, especially in the short and medium term, even though with improved infrastructure and education over time, expanding opportunities in the industrial sector would provide income and employment to the migrating population.

In most developing countries, investment resources are mobilized from the agricultural sector by means of commercial, exchange rate, and fiscal policies. In many countries, taxes on agricultural exports are often the major source of government

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revenue, while an overvalued foreign exchange rate depresses the return on many agricultural exports in domestic currency below world market prices. At the same time, the domestic industries have access to agricultural inputs that are priced below the world market. Also, quantitative restrictions on industrial imports protect manufacturing industries. This generates the high profits in the import-substituting domestic industries, and provides resources for investment in the industrial sector. The heavily protected domestic industries squeeze agriculture in two ways. First, the prices of industrial inputs used by agriculture and of the manufactured goods consumed by farmers rise above world prices and shift the terms of trade against agriculture. Second, higher profits from investment in the industrial sector divert private savings from the agricultural sector to the industrial sector.

In general, the producers of export crops are paid less than world prices (Table 2). In some cases, domestic prices are as much as 30% below world prices, as estimated at the official rate of exchange. In recent years, the price of food crops has been raised above the world price in several countries to encourage domestic food production. However, in many cases, domestic prices of both food and export crops are lower than world prices, if the latter are estimated in terms of scarcity price or equilibrium rate of foreign exchange. With an overvalued exchange rate, the domestic price equivalent of world prices of internationally traded commodities is depressed below what farmers would have received at an appropriate exchange rate.

The mobilization of resources away from the agricultural sector is inevitable in the early stages of development. The critical factor is whether the resources mobilized in the agricultural sector are invested within that sector to an extent which is commensurate with its needs and the opportunities for profitable investment. Also relevant are the mechanisms through which resources are mobilized from agriculture for investment within and outside agriculture. To extract resources by turning trade terms against agriculture through overvalued exchange rates and quantitative import restrictions is not a very efficient measure. Furthermore, it acts as a disincentive and depresses agricultural growth – the very source of surplus in the early stages of development. Direct taxation of agricultural income and land is a more efficient way to mobilize resources. However, administrative and institutional constraints in many developing countries make them rely heavily on taxes from commodity exports and imports. At the same time, this provides an opportunity for the government to channel resources back to agriculture through public expenditures.

Public expenditure devoted to agriculture in many countries is no more than 11% to 15%, which falls far short of what is required in terms of agriculture's importance as a source of income and employment. The agricultural sector provides 60% to 70% of total employment. Both private and public investment in agriculture must be raised

Table 2. Direct and total nominal protection rates, 1975-79 and 1980-84 (in percent)

Country	Product ¹		1975-79		1980-84	
			Direct	Total	Direct	Total
Argentina	Wheat	(X)	-25.1	-41.4	-12.7	-49.4
Brazil	Wheat	(F)	35.2	3.4	- 6.5	-20.2
	Cotton	(X)	13.4	-18.5	2.6	-11.1
Chile	Wheat	(F)	10.8	33.2	9.3	2.0
	Grapes	(X)	1.0	23.4	0.0	- 7.3
Colombia	Wheat	(F)	4.8	-19.7	8.9	-25.3
	Coffee	(X)	-7.0	-31.5	- 4.9	-39.1
Dominican Republic	Rice	(F)	19.6	2.1	25.7	6.3
	Coffee	(X)	-14.9	-32.4	-32.3	-51.6
Egypt	Wheat	(F)	-13.6	-36.8	-21.0	-34.9
	Cotton	(X)	-36.3	-54.4	-21.8	-35.7
Ghana	Rice	(F)	79.2	13.2	118.4	29.4
	Cocoa	(X)	25.6	-40.4	34.0	-55.0
Ivory Coast	Rice	(F)	7.6	-24.9	15.5	-10.0
	Coffee	(X)	-31.5	-64.1	-25.2	-50.8
Korea	Rice	(F)	90.8	73.1	86.2	73.9
Malaysia	Rice	(F)	37.8	33.5	68.0	58.4
	Rubber	(X)	-25.2	-29.5	-18.3	-27.8
Morocco	Wheat	(F)	-7.4	-19.0	- 0.1	- 8.0
Pakistan	Wheat	(F)	-12.5	-60.8	-20.6	-55.2
	Cotton	(X)	-12.3	-60.6	- 7.3	-41.8
Philippines	Rice	(F)	1.2	-26.0	0.1	-28.2
	Copra	(X)	-10.7	-37.9	-26.0	-54.3
Portugal	Wheat	(F)	14.5	9.2	25.9	13.1
	Tomatoes	(X)	17.1	11.8	17.1	4.2
Sri Lanka	Rice	(F)	17.8	-16.8	10.6	-20.8
	Rubber	(X)	-28.5	-63.1	-31.3	-62.7
Thailand	Rice	(X)	-27.7	-43.1	-14.9	-34.0
Turkey	Wheat	(F)	27.8	-12.5	- 3.3	-38.6
	Tobacco	(X)	1.8	-38.4	-27.6	-62.9
Zambia	Corn	(F)	-12.8	-54.3	- 8.8	-65.9
	Cotton	(X)	-13.4	-55.0	- 4.6	-61.7

SOURCE: Krueger et al. (*in press*).

1. F = food crops, X = export crops.

beyond current levels in most developing countries if agricultural growth and, consequently, overall growth are to be accelerated.

An important link between the agricultural and the nonagricultural sectors (which is closely related to agriculture as a source of savings) is that in many developing countries agriculture provides the majority of foreign exchange for essential imports. The relative contribution of agriculture to export earnings in developing countries is shown in Table 3. Agriculture's contribution to foreign exchange earnings is high even in countries where the percentage of national income derived from agriculture or the proportion of employment provided by agriculture is small, for example in Latin America. As the rate of development accelerates, demand for imported investment goods and intermediate inputs goes up rapidly. Under these circumstances, increasing agricultural exports remains a key source of foreign exchange. Agricultural exports provide the needed foreign exchange component – capital equipment and

Table 3. Agricultural exports from developing countries as a percentage of total exports, disaggregated by per capita income

	Per capita income ¹		
	Less than \$400	\$400–1600	More than \$1600
Agricultural exports as a percentage of total exports	(Percentage of countries in income categories)		
More than 80	61.1	30.3	12.5
60–80	11.1	39.4	25.0
50–60	11.1	–	25.0
40–50	8.3	6.1	12.5
30–40	2.8	15.2	12.5
Less than 30	5.6	9.1	12.5

SOURCE: Based on UNCTAD (1981).

1. Not all columns total 100% because of rounding.

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intermediate inputs – to enable domestic savings to be fully utilized, and thus help remove foreign exchange constraints on domestic investment.

Consumption and Production Linkages

In addition, there are intersectoral linkages of two different types: consumption and production. The part of the income generated in the agricultural sector which is spent on nonagricultural goods and services provides the consumption linkage: the higher the level of per capita income in agriculture, the higher the percentage of total expenditures spent on nonfarm goods and services.

At the same time, the nonagricultural sector provides markets for food and agricultural raw materials. The forward production linkages are processing, marketing, distribution, and the further fabrication of agricultural goods for use in the nonagricultural sector. The trade and commerce sector in developing countries, especially in rural areas, is predominantly engaged in marketing and distributing agricultural commodities.

Nonagricultural inputs provide a backward production linkage because the agricultural sector uses fertilizer, pesticides, irrigation equipment, and other mechanical equipment to harvest, plow, weed, and transport agricultural commodities.

In countries where agriculture either constitutes a large percentage of national income or provides a major source of employment, the growth linkages generated by agricultural development are likely to be strong because the impact on the total economy through production and consumption linkages is also likely to be strong. Technical progress, which contributes to increased production and higher incomes in the agricultural sector, stimulates overall growth. The higher the rate of technological progress, the more widespread is the impact on large and small farmers, traditional and cash crops, and arid or irrigated land. This affects not only agricultural growth but also the rest of the economy.

The impact of technological progress on employment in agriculture depends on the growth rate and growth pattern in output; the latter is the composition of output and choice of techniques. Technological progress in the form of biological and chemical innovations is usually widely diffused with a time lag affecting both large and small farmers. Usually there are no economies of scale in such innovations, and therefore small farmers benefit from them, provided they have access to credit and to inputs that increase yields.

Mechanical innovations, however, tend to be labor saving. In many developing countries, mechanization has been encouraged by a public policy of keeping labor

more expensive and capital cheap, resulting from either a high wage policy or a low interest rate policy, including an overvalued foreign exchange rate. Mechanization, however, does not necessarily have an overall negative impact on employment. The effects of direct negative employment through displacement of labor in some agricultural operations such as plowing or harvesting may be compensated by the creation of additional employment through a higher cropping intensity, as well as in the production, maintenance, and repair of equipment. A larger aggregate output and a higher cropping intensity, such as multiple cropping due to mechanization, increases agricultural labor requirements. Thus, the type and nature of technological progress in agriculture is relevant to the magnitude and intensity of intersectoral linkages. A recent study, for example, indicates that in many Asian countries during the 1970s, a 10% increase in value added in agriculture led to a 3% to 4% increase in employment (Ahmed, 1988).

Technological Progress, Food Price, and Overall Economic Growth

One important way in which agricultural progress affects overall economic growth is by reducing food prices. When demand for food is fueled by either increasing per capita income or population growth, cost-reducing technological progress reduces food prices and offsets any inflationary pressure in the economy.

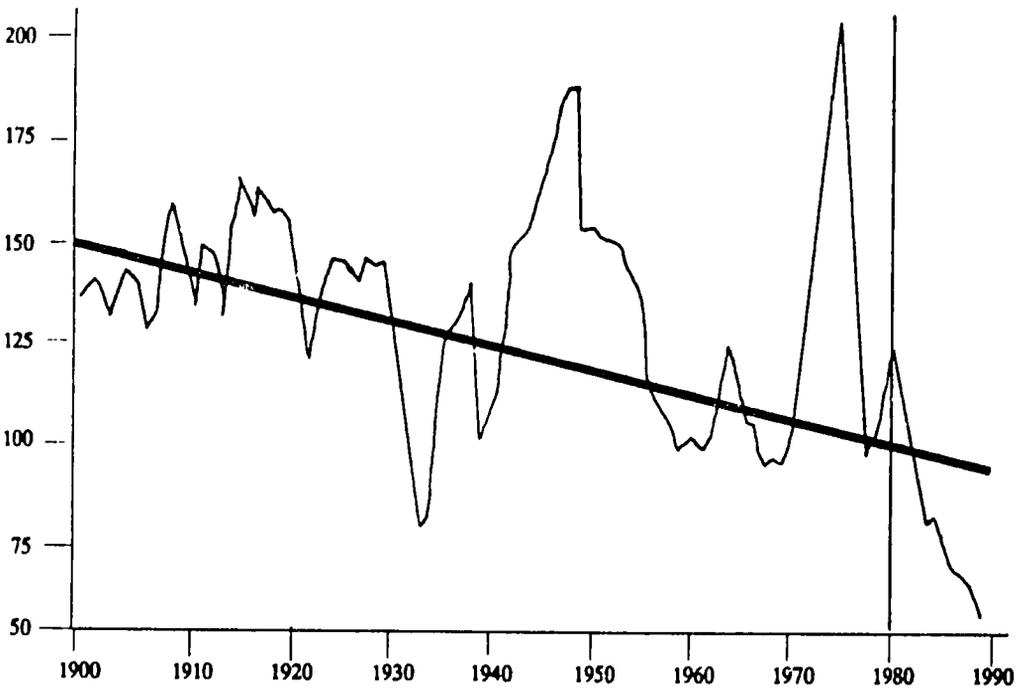
In an open economy, domestic prices equal border prices plus tariffs. In a closed economy, where domestic prices are higher than world prices due to quantitative restrictions on imports, an increase in food production leads to a fall in domestic prices. With price elasticity of food demand in developing countries less than unity, a fall in food prices also reduces the gross income of food producers. But since a fall in the value of output is matched by a fall in unit costs, there is neither net loss nor excess profit in a competitive market. Where there are differences in efficiency or costs among individual products, more efficient farmers earn extra profits. Frequently, however, technological progress does not take place in a vacuum; at the same time, population and income growth lead to an expanded demand, which keeps food prices from falling to the full extent of their reduced costs. In many instances, the government intervenes through a price-support program to prevent a short-run decline in prices to the full extent of the reduced cost and to also prevent the corresponding fall in the income of food producers. However, to the extent that a country imports food and sells it domestically below the world market price, technological progress, which increases production at lower per unit costs, enables it to reduce food imports and distribute the benefits of cost reduction via lower prices and lower subsidies.

Technological progress does not uniformly extend to all food producers in all regions simultaneously. Those producers who do not enjoy the benefits of cost-reducing

technological innovations will be confronted with a lower market price without having the simultaneous advantage of higher productivity and lower cost. They lose from technological progress in which they do not share. If the losers happen to be poor farmers with no secure access to new technology, and the gainers are a few large producers, then rural income inequality and poverty are aggravated. Therefore, the need for wide diffusion of technological progress to maximize its beneficial impact on the producers can hardly be overemphasized.

On an international level, when many countries enjoy the benefits of cost-reducing technological innovations, the world price is likely to fall, thus benefiting the food-importing countries. Historically, technological progress resulted in a downward trend in world cereal prices, which benefits both producers and consumers (Figure 1). As unit costs in the exporting countries fell, rising populations and per capita income in both exporting and importing countries partly offset the downward pressure on prices.

Figure 1: Long-Run Trend in Food Prices



Based on Anderson and Tyers (1987).

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The impact of technological innovations on cost and price depends on the extent to which the marketable surpluses in a country increase in relation to demand. Only a portion of the increase in output is marketed. Medium-sized and large farmers have a higher ratio of marketable surplus in relation to output compared to smaller farmers. If an increase in output is concentrated among smaller farmers, they will consume most of it because of their low consumption levels and high demand elasticity. The downward pressure on market prices will be correspondingly less. On the other hand, if the largest part of the increase is concentrated on a few very large producers with large marketable surpluses, without any corresponding increase in income and demand from poorer farmers, then the downward pressure on prices is likely to be large. If the fall in prices exceeds the fall in costs, the income of the surplus-producing farmers would be adversely affected. Their incentive to continue increasing food production will suffer, unless there is an offsetting increase in demand by consumers.

Low food prices which follow cost-reducing innovations directly improve the real income of the poor, who are the net purchasers of food. Technological progress in food production, which enlarges the supply of the principal wage good – food – at a stable and low price, facilitates the adoption of an employment-based development strategy, especially in the nonfarm sector.

Furthermore, a fall in food prices improves the terms of trade of the industrial sector and lowers the real wage income in terms of the output of the nonfarm sector. This encourages labor-intensive industrialization, as well as a substitution of labor for capital, in the various processes and products in the nonfarm sector. However, the relative decline in the ratio of labor cost to capital cost in the nonfarm sector depends not only on the relative fall in the food prices, but also on a range of macro-economic policies which affect the relative prices of labor and capital.

The extent to which reduced food production costs and a relative fall in price improve the terms of trade in the industrial sector partly depends on the extent and the magnitude of marketing, distribution, and other transaction costs in the movement of food from rural producers to urban consumers. An increase in these costs would offset the impact of the relative decline in food prices.

Low wages, facilitated by cheap food, help expand labor-intensive exports, both agricultural and industrial. This is because relatively cheap food strengthens the comparative advantage of labor-intensive activities in the world market.

Agricultural growth stimulates expansion in the nonagricultural sector through consumption linkages, as well as forward and backward linkages in the production process. The consumption linkage is stronger than the production linkages. This is partly because in developing countries the ratio of purchased inputs in agriculture is

low, and therefore the expansionary impact on the demand for agricultural inputs is limited. The magnitude of backward linkages increases rapidly as industrial structure becomes more complex and agriculture becomes more modernized and uses more purchased inputs. The relative importance of purchased inputs in gross agricultural output in various developing regions is shown in Table 4.

Table 4. Ratio of purchased inputs over gross outputs in selected developing countries

<i>Country</i>	<i>Ratio</i>	<i>Country</i>	<i>Ratio</i>
Argentina	26.98	Pakistan	12.22
Benin	8.65	Peru	18.07
Colombia	18.22	Philippines	28.00
Ecuador	17.23	Sri Lanka	17.17
India	24.43	Sudan	27.42
Indonesia	9.66	Tanzania	13.13
Korea	22.06	Thailand	6.38
Mexico	29.41	Turkey	32.48

SOURCE: FAO (1986).

In developing countries in general, the forward linkages from agriculture through processing and distributing agricultural output appear to be far larger than those from the originating side of inputs. The distribution of agricultural products undoubtedly generates the largest nonfarm production links for agriculture. If retailing agricultural produce is approximately proportional to its share in production and in total rural consumers' expenditures, then about 45% of rural retailing can be assumed to be forward distribution links with agriculture (World Bank, 1987: 97).

Consumption Linkages and Overall Growth

Increased purchases of nonfarm goods made with increased income in the agricultural sector potentially serve as an important stimulant to the nonfarm sector. The stimulus to growth is not confined necessarily to the rural nonfarm economy, but is also extended to the urban sector, depending on the extent to which the latter is integrated with the rural sector through transportation, communication, marketing, and distribution channels. Frequently the nonfarm goods and services on which increased income of rural agricultural households is spent are labor-intensive and produced in rural regions. The output of the nonfarm sector includes not only manufactured goods but also trade and other services. The role of trade and services in the rural areas as a source of employment and income has not been sufficiently emphasized. Much greater

attention has been paid to manufacturing in areas such as handicrafts, cottage industries, and other small-scale rural industries. The rural services on which increased rural income is spent include, among other things, housing, education, health, transportation, and personal services (Hazell and Roell, 1983).

As increased farm productivity raises farmer incomes, not only is a higher proportion of income spent on nonfarm goods and services, but also farm household income begins to diversify. At the level of marginal or very small farmers with land holdings too small to provide a minimum income, nonfarm employment is not only a supplementary source of income, but is often a high proportion of total income. As farm size increases, self-employment or employment of hired labor on the farmer's own land increases. At the same time, agricultural income as a proportion of total income of the farming household increases. However, as farm size increases beyond a certain level, or as the farmer's income exceeds a certain threshold, the share of nonagricultural income in total income rises again. As the very large farmers increase the productivity of their land and labor, they invest the savings generated by their higher income in nonagricultural activities and derive higher nonagricultural income.

Nonfarm income constitutes an important proportion of the total income of rural households in both India and Bangladesh (Tables 5 and 6). In villages in Bangladesh with well-developed infrastructures, and in India, the percentage of nonfarm income is highest among the smallest farmers or farmers in the lowest income groups – 44% in Bangladesh and 60% in India. With the increase in income among Indian farming families, the share of nonagricultural income in their total income first goes down and then goes up again for those in the highest income bracket (National Council of Applied Economic Research, 1980). In Bangladesh, the change takes place at a slower pace. Although the share of nonagricultural income is higher for the large farmers than for the medium-sized farmers, it is only by a small margin. This may be because large farmers in Bangladesh are not as large nor do they earn as high an income as those in India because the average level of poverty is higher in Bangladesh.

A study in Pakistan found that 40% to 50% of all marginal farmers had a nonagricultural occupation which substantially added to their incomes or significantly reduced their poverty. Furthermore, the productivity of marginal farmers increased because some members of farming households had nonagricultural income sources. Farmers invested their nonagricultural income in their farms. Thus, nonagricultural income was a source of capital for investment in the agricultural sector to purchase agricultural inputs, as well as for livestock development (Klennert, 1986).

Intersectoral consumption linkages depend partly upon income distribution in rural areas, especially the distribution of the incremental income that accrues in the

Table 5. Nonagricultural income as a percent of total income in rural households by technology and land ownership groups, Bangladesh, 1982

Land ownership group	Technology group ¹	
	Underdeveloped	Developed
Landless and marginal (0.5 ha)	61.9	43.9
Small (0.5-2.5 ha)	42.5	38.6
Medium (2.5-5.0 ha)	33.3	26.9
Large (5.0 ha)	24.1	30.0

SOURCE: Ahmed and Hossain (1988).

1. In developed villages high-yielding rice varieties have been sown on 80% of the total planted area.

Table 6. Composition of income by income ranges in rural India, 1975-76

Income range	Total income		
	Agriculture	Nonagriculture	Share of wage income
(Indian rupees)	(%)	(%)	(%)
<3,600	40.1	59.9	45.0
3,601-7,500	58.5	41.5	16.2
7,501-15,000	64.5	35.5	2.1
15,001-30,000	74.5	25.5	0.2
>30,000	40.5	59.5	-

SOURCE: National Council of Applied Economic Research (1980).

agricultural sector to different sizes of farming families. It is the medium-sized farmers who tend to have the expenditure patterns that have a greater potential to stimulate demand for mainly labor-intensive, nonfood goods and services. They spend a higher proportion of their incremental income on nonfarm goods and services than do small and very small farmers. Because of their low income, the small farmers spend a much higher proportion of incremental income on food rather than on nonfood items. The direct stimulating effect of their consumption expenditures on the rest of the economy

is therefore limited. However, the increased demand for food by poor farmers and landless laborers stimulates expanded food production, including production by medium-sized and large farmers. The increased production and income of these two groups in turn stimulates the demand for nonfarm goods.

In many instances, the medium-sized farmers are numerous and their absolute aggregate expenditure on nonfood items is often as great as, if not greater than, the aggregate expenditures of a larger number of small farmers. Expenditure of a higher percentage of an incremental income on nonfood items by the medium-sized farmers, starting with a large base, strongly stimulates nonfarm-sector employment and income.

In a number of studies in India, Malaysia, and Nigeria (Tables 7 through 10), it was found that if increased production is concentrated on very rich households, and not on the medium-sized and small farmers, expenditure patterns are most likely to be skewed towards goods and services that are imported or are frequently capital intensive. In Malaysia, 63% to 66% of the incremental income of the medium-sized farmers, between the fourth and seventh decile in farm size, was spent on nonfarm goods and services in 1972-73. This went up to 74% for the highest income deciles. The percentage of locally produced nonfarm goods in incremental aggregate expenditure was 38% to 40%, whereas the expenditure on imports from outside the region was about 26%. It is noteworthy that the average size of middle-income farmers in this context was quite small because the largest farm size in this study was no more than 15 ha to 20 ha.

Table 7. Food expenditure elasticities for low-income families

Country or region	Urban	Rural
Bangladesh	1.06	1.06
Brazil	0.83	0.83
Egypt	0.71	0.68
Indonesia	0.88	0.98
Malaysia		
Muda	—	0.88
Nigeria		
Funtua	—	0.89
Gusau	—	1.04
Sri Lanka	0.72	0.86
Sudan	0.74	0.84
Thailand	0.62	0.65

SOURCE: Alderman and Braun (1984).

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Table 8. Rural household expenditure behavior in selected countries

	Average budget share					Marginal budget share				
	Gusau N. Nigeria	Rural Sierra Leone	Zaira Province N. Nigeria	Muda Malaysia	North Arcot S. India	Gusau N. Nigeria	Rural Sierra Leone	Zaira Province N. Nigeria	Muda Malaysia	North Arcot S. India
Commodity group										
Food, alcohol, and tobacco	80.7	73.7	56.5	66.7	78.2	76.1	67.9		37.7	63.0
Clothing and footwear	7.2	7.0	11.4	5.8	4.2	8.9	7.4		8.1	7.7
Consumer expendables	4.3	—	—	3.4	3.1	4.4			3.7	2.4
Housing	0.3	—	2.6	4.1	n.a.	0.4			12.4	n.a
Transport	1.9	2.2	1.3	1.8	2.8	2.7	3.0		3.1	3.4
Durables	1.1	—	2.1	0.6	1.4	.1	1.9		1.25	
Education and health	1.1	1.4	—	2.9	1.9	1.6	0.8		5.2	2.4
Services and social and religious obligations	3.3	4.3	13.5	13.1	9.1	4.4	8.1		22.7	19.3
Locational group										
Locally produced										
<i>Foods</i>	75.3	69.0	—	46.4	65.0	70.3	66.1		24.6	48.5
<i>Nonfoods</i>	8.4	8.8	—	18.1	17.4	11.3	12.3		36.9	30.8
Regional imports										
<i>Foods</i>	5.4	—	—	20.3	12.3	5.8	—		13.1	12.0
	22.2	21.6								
<i>Nonfoods</i>	10.9	—	—	15.3	7.4	12.6	—		25.4	8.6
<i>Nontradables</i>	24.7	—	—	23.5	17.6	32.0	—		40.6	24.1

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Table 8. (continued)

		Expenditure elasticities				
		Gusau N. Nigeria	Rural Sierra Leone	Zaira Province N. Nigeria	Muda Malaysia	North Arcot S. India
Commodity group						
	Food, alcohol, and tobacco		0.94	0.92	0.57	0.81
	Clothing and footwear		1.24	1.06	1.39	1.85
	Consumer expendables		1.02	—	1.09	0.77
	Housing		1.40	—	3.02	n.a.
	Transport	—	1.41	1.36	1.67	1.22
	Durables		3.35	3.43	—	
	Education and health		1.42	0.57	1.79	1.26
	Services and social and religious obligations		1.33	1.88	1.73	2.12
Locational group						
	Locally produced					
	<i>Foods</i>	0.93	0.96	0.53	0.77	
	<i>Nonfoods</i>		1.34	1.40	2.05	1.77
	Regional imports					
	<i>Foods</i>	1.07	—	0.65 0.97	0.98	
	<i>Nonfoods</i>		1.16	—	1.66	1.17
	<i>Nontradables</i>		1.30	0.87-1.62	1.73	1.37

Table 9. Marginal budget share by per capita expenditure decile in Muda, Malaysia, 1972-73 (percent)

Group	Per capita expenditure decile ¹									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Commodity Group										
Food, alcohol, and tobacco	67.39	57.94	51.98	49.61	45.57	41.88	37.63	35.27	27.71	13.89
Cereals and cereal products	21.88	18.42	15.64	15.34	13.41	12.27	10.39	9.43	6.22	10.53
Fruits, vegetables, and nuts	9.85	8.75	8.30	8.02	7.60	6.98	6.79	6.49	5.94	4.42
Meat and fish	12.19	10.54	9.52	9.11	8.52	8.17	7.24	7.16	5.73	3.46
Eggs and dairy products	2.61	2.38	2.14	2.01	1.85	1.76	1.57	1.52	1.42	0.96
Clothing and footwear	7.92	8.20	8.33	8.38	8.14	8.07	7.94	7.70	7.87	7.44
Consumer expendables	4.58	4.25	4.10	4.13	3.95	3.79	3.67	3.59	3.52	3.10
Housing	2.51	5.50	7.88	7.64	10.06	10.55	12.35	13.76	15.47	20.29
Transport	2.33	2.53	2.77	2.82	2.84	2.96	3.09	3.01	3.26	3.58
Durables	-1.01	1.70	2.83	4.05	4.95	5.94	6.85	8.00	9.82	13.22
Education and health	2.22	3.16	3.31	4.12	4.05	4.89	5.17	5.45	6.53	7.71
Personal services and entertainment	1.65	1.99	2.33	2.12	2.39	2.40	2.36	2.39	2.63	2.89
Social obligations	12.41	14.73	16.45	17.12	18.06	19.53	20.94	20.82	23.18	27.89
Locational Group										
Food										
<i>Home-produced</i>	22.47	18.36	15.44	15.54	13.52	12.54	10.22	9.71	5.34	-1.17
<i>Locally produced</i>	21.40	19.47	18.11	16.99	16.05	15.07	14.29	13.55	12.75	9.88
<i>Imported</i>	23.53	20.11	18.43	17.08	16.00	14.27	13.12	12.02	9.62	5.18
Nonfood										
<i>Locally produced</i>	17.87	23.50	27.70	28.74	32.06	34.21	37.36	38.91	43.06	47.79
<i>Imported</i>	14.74	18.56	20.31	21.64	22.37	23.90	25.01	25.82	29.23	33.32
Nontradables	23.72	28.64	32.42	33.35	36.30	38.12	41.07	42.47	46.18	54.92
Average farm size (acres)	2.14	2.33	3.02	3.12	3.33	4.14	4.08	4.00	4.50	5.64
Average family size	7.07	6.64	6.42	5.90	5.45	5.43	5.27	4.66	4.65	3.89
Per capita expenditure (M\$)	150.00	197.00	225.00	255.00	289.00	327.00	369.00	419.00	514.00	820.00

SOURCE: Hazell and Roell (1983).

1. All household characteristic variables are evaluated at decile means.

2. Farm area is the operated paddy area.

Table 10. Marginal budget share by per capita expenditure decile in Gusau, northern Nigeria, 1976-77 (percent)

Group	Per capita expenditure decile ¹									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Commodity Group										
Food, alcohol, and tobacco	77.88	76.74	76.75	76.89	76.45	76.26	76.18	75.78	76.15	75.89
Cereals and cereal products	50.99	44.40	42.07	39.89	37.86	35.40	34.56	31.49	30.45	26.48
Fruits, vegetables, and nuts	4.57	5.94	6.71	7.61	8.18	8.59	9.56	9.68	10.41	11.72
Meat and fish	7.22	9.44	11.44	11.03	11.32	11.44	12.70	12.72	12.80	13.58
Eggs and dairy products	7.32	8.50	7.57	8.77	9.28	10.73	8.35	11.00	11.39	12.28
Clothing and footwear	8.87	9.08	9.31	8.94	8.98	8.96	8.85	8.92	8.56	8.31
Consumer expendables	4.23	4.33	4.44	4.45	4.47	4.39	4.72	4.49	4.57	4.66
Housing	0.45	0.48	0.45	0.41	0.43	0.46	0.34	0.42	0.37	0.32
Transport	1.49	1.98	2.04	2.27	2.52	2.77	2.62	2.88	2.95	3.16
Durables	0.77	1.21	1.36	1.33	1.33	1.37	1.54	1.65	1.71	1.91
Education and health	1.41	1.57	1.57	1.53	1.57	1.59	1.57	1.64	1.64	1.68
Personal services and entertainment	1.34	1.21	1.09	1.08	1.04	0.99	1.13	1.07	0.99	1.00
Social obligations	3.57	3.39	2.99	3.09	3.20	3.22	3.06	3.15	3.06	3.06
Locational group										
Food										
Home-produced	59.15	53.55	50.05	50.82	50.00	50.08	46.16	46.60	46.18	43.82
Locally produced	14.49	18.62	21.73	20.63	20.92	20.47	23.62	23.01	23.59	25.22
Imported	4.23	4.57	4.97	5.44	5.53	5.70	6.39	6.18	6.39	6.85
Nonfood										
Locally produced	10.95	11.05	10.56	10.73	11.02	11.21	10.93	11.24	10.94	10.96
Imported	11.17	12.21	12.69	12.38	12.53	12.53	12.90	12.98	12.91	13.14
Nontradables	26.96	29.22	27.61	29.29	30.49	32.06	30.11	33.09	33.75	35.61
Average farm size (acres) ²	8.52	10.98	9.03	7.94	10.08	8.21	7.63	9.02	10.23	9.82
Average family size	12.52	10.48	7.66	7.31	7.66	7.69	5.62	6.24	5.45	4.61
Per capita expenditure (M\$)	42.00	62.00	73.00	84.00	96.00	107.00	120.00	140.00	163.00	221.00

SOURCE: Hazell and Roell (1983).

1. All household characteristic variables are evaluated at decile means.

2. Farm area is the operated paddy area.

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In Africa, on the other hand, marginal budget shares – the expenditures out of incremental income that are spent on nonfarm goods and services – were lower than in Asia. Twenty-four percent of the incremental income was spent on nonfarm goods and services in 1976-77 and 11% on locally produced goods and services. Moreover, the variations between different-sized groups in Africa were not high. This is because of the low absolute level of income in the African example compared with that in Asia. A much higher percentage of incremental income was spent on cereals, and marginal budget shares of incremental income spent on noncereal foods such as livestock and horticultural production were as high as 30%. They were also highly labor intensive or locally produced. The expenditure patterns of different-sized farming households in a sample of developing countries are shown in Table 8.

The stimulating effect on the rest of the economy by the consumption expenditures of medium-sized farmers on labor-intensive nonfarm goods and services, and therefore on the income and employment of the poor, is subject to three sets of leakages. First, larger farmers may have a higher propensity to save. The savings by large farmers, even though they constitute in the first instance a leakage from the consumption linkage, can serve an essential role as a source of investment to expand the productive capacity in the nonfarm sector and thus to increase the output of nonfarm goods and services in response to increased demand. Second, the increased output may lead to a fall in prices and a fall in income due to demand inelasticity. Third, the medium-sized farmers may follow capital-intensive techniques, and therefore may not provide much employment either for the small farmers seeking employment or for the landless laborers.

The demand pull provided by agricultural growth needs to be matched by an elastic supply response from the nonfarm sector. In order for the rural nonfarm sector to respond strongly and positively to the stimulus provided by the increased expenditure of the farm sector, a few preconditions need to be met. Among them are infrastructures such as roads, transportation, communication systems, and electricity; rural credit to finance both current and investment costs of nonfarm activities; and education. The role of government policy in providing infrastructure, credit facilities, education, extension, and training to those engaged in the nonfarm sector cannot be overemphasized. Infrastructure reduces marketing costs, creates competition in the marketing structure by facilitating easy access, and encourages specialization within regions of a country in accordance with cost advantages (Ahmed and Hossain, 1988). Infrastructure development maximizes intersectoral linkages by enabling a decentralization of industrial and other nonfarm activities through a country. The development of market towns and small industrial cities is a very cost-effective way not only to prevent the growth of large industrial concentrations with their high social and economic costs, but also to decentralize industrial activities and bring them nearer to the source of demand and supply of raw materials and food.

An infrastructure that is highly dispersed throughout the country is needed. But this does not imply building roads or providing electricity in areas where either population densities or agroecological circumstances do not warrant profitable investment in either agricultural or nonagricultural activities. Agricultural research and research to design appropriate technology for labor-intensive, nonagricultural activities deserve high priority. The development of entrepreneurship is closely linked with the growth of institutions that are able to mobilize rural savings as well as provide credit to finance a wide variety of nonfarm activities. Education, both primary and secondary, also stimulates nonfarm entrepreneurial activities.

The critical role of infrastructure and rural institutions in strengthening intersectoral linkages is emphasized by the example of Africa, where the incremental share of nonfarm goods and services in country expenditures is low. The poor transportation and communication links between villages and towns have an important impact on the intersectoral linkages. These impede access to nonfarm goods and services and increase their cost relative to food prices. The role of infrastructure in the development of nonfarm sources of income and employment is illustrated with an example from Bangladesh (Table 11).

Table 11. Percentage increase in average income per household of developed villages over underdeveloped villages by income source

Income source	Increase (%)
Business and industries	20
Business	10
Industries	53
Wage income per capita	88
From agriculture	55
Not from agriculture	108

SOURCE: Ahmed and Hossain (1988).

Attempts have been made to quantify the impact on overall growth of a certain percentage increase in agricultural output. For example, it is estimated that an increase of \$1 in agricultural value added would lead to an overall increase in GNP of \$1.8 in Asia and \$1.5 in Africa.

In a recent study of 34 developing countries in which agriculture was 20% or more of the GDP for the period 1961-84, it was found that a 10% increase in agricultural value added led to a 13% increase in nonagricultural value added. For the period 1973-84, the increase in nonagricultural value added was 14%. In a number of Asian countries, the increase in nonagricultural value added in response to a 10% increase in value added in agriculture varied from 2% in South Korea to 16% in Malaysia (Bautista, 1988).

The variations are due to differences in the relative importance of agriculture in national economies, and in the state of infrastructure and other factors that facilitate investment in the nonfarm sector. In a small country that depends predominantly on the export market for its nonfarm sector, in the way South Korea depends on its industrial exports, agricultural growth would be less of a stimulus to the development of the nonfarm sector than would be the case in other countries.

Similarly, in countries that depend on enclaves or exclusive export zones where agricultural exports are concentrated, and where at the same time technical progress is encouraged, the linkages of the export sector with the domestic industrial or nonfarm sector would be limited. This happened in colonial times, especially when production of a large-scale export crop was capital intensive and often owned by foreign investors, whose income was spent on imported goods and whose savings were transferred abroad.

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