

THE AGRIBUSINESS SECTOR—AN IMPORTANT LINK
 IN ECONOMIC GROWTH MODELS

A major difficulty with the application of existing two- and three-sector growth models is that they do not identify clearly enough the main sectors that interact in the process of economic transformation. In two-sector models, economic activity is divided into *agriculture* and *industry*. Three-sector models add *services* as a sector. With these models emphasis is upon the relationship between agriculture and industry in the process of economic development. But in that process a part of agriculture moves, unnoticed, into the nonagriculture sector as agribusiness.

This note discusses the usefulness of a growth model that would include agribusiness as a sector. Attention is given to the importance of agribusiness as a growth sector in developing countries; the relationships between farming and agribusiness; and some of the data problems involved in constructing a model.

The proposed model would identify on-farm production and processing activities as a *farming sector*; off-farm activities related to farm inputs, processing, storing, and handling farm products as an *agribusiness sector*; and *non-agriculture* as a third sector. The model would be used to reveal the interactions between technological change in farming and the growth of off-farm activities essential to modern agriculture, in order to identify areas in an economy where intervention or assistance could be applied to promote economic development.

**Agribusiness Growth and
 Economic Development**

Industries for processing and handling farm products usually are among the first important industrial activities to emerge in the modern or semimodern sector of a developing economy. The importance of these activities at early and later development stages in selected countries is shown in Table 1 as reported in [5, pp. 91 ff.]. Even though the relative importance of the agriculture-based industries declines with development, they continue to be important.

Agriculture-based industries have strong linkages with other sectors of the economy. An ECAFE study [4] reported that the total demand effect resulting from increased demands

for agricultural processing and textile products was greater than for any other manufacturing sector. These intersector linkages add to the value of separate identification of the agribusiness sector.

An indication of the growing importance of post-farm agribusiness activity with economic development is provided by changes in the margin between farmers' receipts and consumer spending for food. In the United States the farmers' share of retail value of food has declined from 50 percent in 1947-49 to 39 percent in 1970 [12, pp. 6, 10, and 471]. A study of Indian market areas reported that in 1949-50, producers received 80 to 90 percent of the retail price of maize [7, p. 333]. The ratio between the cost of purchased inputs and the value of farm production also tends to rise during development. In the United States, the value of major purchased inputs was 17 percent of farm income in 1948 and 28 percent in 1970 [10, pp. 489-491]. In India the value of major purchased inputs was reported to be only 2.5 percent of the value of farm production in 1964 [6, p. 20].

The relationship between economic development and changes in the farming and agribusiness sectors has been explored for several countries by Simantov [8], who states the following three principles:

1. Among countries, the value added by farm production as a share of Gross Domestic Product is inversely correlated with the level of GDP per capita. Over time, the share going to farmers tends to decline for all countries.

Table 1. Share of manufacturing output from agriculture-related industries at early and later stages of development, selected countries and areas

Country or area	Early Period		Late Period	
	Date	Share of all mfg.	Date	Share of all mfg.
United States	1879	57 percent	1960's	30 percent
Canada	1925	61	1961	46
Italy	late 1800's	75	1961-1964	30
Sweden	1896-1900	58	1959-1960	30
Australia	1934-1935	55	1961-1962	31
E. & S. E. Asia	1948	74	1958	67

Source: Adapted from [5, pp. 91 ff.].

2. Off-farm inputs as a proportion of all farm production inputs rise as economic development proceeds. But off-farm inputs tend to remain a stable percentage of GDP. For the countries studied, this ratio centered around 2.5 to 3.5 percent of GDP.

3. The trend in margin of consumer expenditures for farm products over farmers' costs (including purchased inputs) also tends to be similar among countries at the same stage of development and to remain a constant percentage of GDP. For the countries studied, this margin was clustered around 8 or 9 percent of GDP.

A study by Doving suggests that the Simantov percentages apply reasonably well to growth of the agribusiness sector in many countries except at high income levels [2, p. 3].

A few studies have been made of the magnitude of the agribusiness sector in the United States in terms of labor requirements. In an early study Davis and Goldberg [1] examined the whole process of producing, handling, and distributing agricultural products, including the production of inputs and the marketing of farm products. They also made allowance for secondary and tertiary labor requirements, including, for example, the labor that went into mining of iron and coal that went into the production of farm tractors. As derived by Davis and Goldberg, workers on farms were only 17 percent of the U. S. labor force in 1947, but about 40 percent of the labor force was employed directly or indirectly, in total or in part, in agriculture and agribusiness.

Other studies of employment in agribusiness in the United States give lower figures for off-farm employment. Doving and Gossling [3, p. 12] estimated the full-time man-equivalent labor required for off-farm production and servicing of farm inputs was about two million man-years in 1965. With respect to labor used in marketing, the U. S. Department of Agriculture estimates that the number of persons on a full-time equivalent basis who were engaged in marketing farm foods for U. S.-civilian consumers was 5.3 million in 1970 including 1.3 million in manufacturing, 0.6 million in wholesaling and assembling, 1.5 million in retail stores, and 1.9 million in restaurants and other eating places [11]. Workers on nonfood products and on production for export are not included. The Doving and USDA estimates indicate that total number of United States workers employed in agribusiness is considerably more

than twice the approximately 2.7 million man-equivalent workers on farms, assuming 2,400 hours per worker [10, p. 492].

The Proposed Three-Sector Model

The proposed model includes sectors of Farming, Agribusiness, and All Others.

The Farming Sector would include:

1. Farm-related activities of farmers including work on other farms.
2. Inputs of family and hired labor.

The principal components of Agribusiness would be:

1. Production, distribution and application of inputs of nonfarm origin, including those made by landlords, and the nonfarm portion of feed and seed inputs. Construction of farm structures and land improvements when not done by farmers.
2. Credit services to farmers.
3. Marketing and processing of farm products.
4. Off-farm storage.
5. Transportation of farm products.
6. Advisory, grading, and regulatory services.

The third sector would include all other economic activities. It would probably be necessary to include here some inputs related to farm production, such as general education, road building, and communications, because of the problem of allocating a share to agriculture. The third sector might also contain activities remotely related to farm and agribusiness production. For example, farm equipment manufacture would be part of agribusiness, but production of the coal used in the manufacture of farm equipment might be considered nonagriculture. Inclusion in agribusiness of such derived demands for production resources could add to the problems of estimation without contributing much to the value of the model. The main need is to identify the manpower, investment, and managerial requirements, and the outputs of the various specific agribusiness industries.

The proposed model would not serve all purposes and would not replace present two- and three-sector models. But it would be especially useful for study of the agricultural development process, permitting examination of interactions between the farm and off-farm sectors of the food and fiber industry and the relations of these two sectors to the rest of the economy.

Data Problems of an Agribusiness Sector

Preparation of estimates for an agribusiness sector would pose substantial, but not insuperable definitional and data problems. For countries that have income or production data on the basis of the International Standard Industrial Classification, several agribusiness industries can be identified directly. Others would require estimation of the fraction related to agriculture.

The United Nations Department of Economic and Social Affairs publishes data on employment and value of output on an industry basis for 69 countries [9, Vol. I]. Information is available for each year since 1957 and for some countries since 1953, according to ISIC codes for 20 industry groups that would permit identification of the following important agribusiness related activities: food products (meats, dairy, and preserved fruits and vegetables); beverages; tobacco; textiles; footwear, wearing apparel, etc.; and leather and leather and fur products.

The United Nations also publishes quantitative production data for 315 industrial commodities for 67 countries [9, Vol. II]. There are separate categories, according to ISIC codes, for most of the important processed agricultural commodities, fats and oils, animal feeds, fertilizers, specified farm implements, and specified processing equipment. United Nations statistics cover only industries, not services.

Countries that have good input-output data offer the best opportunities to develop the proposed three-sector model and to analyze the linkages and complementarities among sectors and sub-sectors. Some work along this line has been done for India by Hendrix and Giri, using the 62-sector input-output tables for 1964-65 [6, Chs. 4 & 5]. The work of Davis and Goldberg [1] is still worth consulting for examples of the procedures involved in estimating the fractions

of various industries and services related to agriculture.

Summary and Conclusions

Models of rural-urban transformation for developing countries are inadequate to explain and quantify processes by which food and fiber production and distribution are transmuted from primitive and largely self-sufficing activities into a purchased input-farm production-commercial distribution complex. Oversimplified models obscure the process by identifying agriculture only with on-farm activities. If misinterpreted, they can exaggerate the labor displacement effects of farm mechanization, understate agriculture and agribusiness's share of national income and employment, and obscure the dynamic and rapidly growing farm input, processing, and distribution activities. These models are of limited help to planners in identifying and assigning priorities to sector needs for resources, investment, and training.

The proposed model would include sectors for (a) farming, (b) agribusiness, and (c) all other. Inclusion of agribusiness as a sector would shed light on the growth of the system of services and inputs associated with farm technological advance, and the linkages, complementarities, and substitutions among the various components. The model would furnish an improved basis for the application of systems analysis to development planning and would also be helpful in showing the importance of agribusiness as a creator of jobs and income in early stages of economic growth. Data requirements for separate identification of an agribusiness sector would be difficult, but much data are available or can be derived from United Nations statistics, augmented in a few countries by input-output tables.

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