A PROSPECTUS FOR RESEARCH ON THE AGRICULTURAL POTENTIAL OF THE SOUTH*

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The South[1] plays an important role in American agriculture in that it is a major supplier of several commodities. However, due to relatively low yields, the region is a marginal producer of some important farm commodities grown in the United States. Given this constraint, the South still offers the greatest potential for expansion of agricultural output of any region in the country. The purpose of this paper is to evaluate this assertion. A rather broad perspective with implications for future research is provided.

THE RELATIVE POSITION OF THE SOUTH IN UNITED STATES AGRICULTURE

Relative Position of the South in Major Farm Products

The South contributes more than half of the nation's output of rice, sorghum, peanuts, cotton, tobacco and chickens (Table 1). The region accounts for 25 to 50 percent of the output of soybeans, sugar, vegetables, fruit and tree nuts, beef, turkeys and eggs. However, it contributes less than 25 percent of the nation's output of wheat, corn, barley, oats, pork and milk. The South accounts for about 40 percent of the cows but only 20 percent of the fed cattle marketed, with Texas and Oklahoma alone accounting for most of that 20 percent.

Relative Importance of Farm Products in the South[2]

In terms of relative importance, beef is the South's dominant commodity with an average annual value of $4.4 billion during 1970-74—accounting for about 22 percent of the total value of agricultural production. Most of this value is attributed to forage produced in the region. Other commodities accounting for more than five percent of the total include corn, soybeans, cotton, tobacco, milk, chickens and eggs. (Chicken and egg production in the South is highly dependent on shipped-in grain.) Although the South produces nearly all the nation's peanuts, this commodity accounts for only 2.5 percent of the region's agricultural output. Corn and soybeans—and animal-poultry sectors dependent on these crops—are highly important to the South as well as to the nation's agriculture.

Although the South contributes about 30 percent of the nation's gross value of farm products, there are some prominent differences in relative values. Corn accounts for 15 percent of the total value of farm products in the nation but only 5.5 percent in the South. Wheat is more than twice as important in the nation's as in the South's agriculture. In contrast, rice, peanuts, cotton and tobacco are much more important to the South's than to the nation's agriculture.

Beef is important in U.S. agriculture—to about the same degree as in the South. Pork and milk are more important to the U.S. than to the South. In contrast, chickens are much more important to the South than to U.S. agriculture.

Corn, soybeans and wheat, with a combined annual value (1970-74) of $20 billion, dominate U.S.

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[1] The South is defined to include Texas, Oklahoma, Arkansas, Kentucky, West Virginia, Maryland, Delaware and the states to the south and east of these states.

[2] The total value of farm commodities includes some double counting in that part of the value of crops is used in livestock-poultry production. A more accurate accounting would be in terms of value added, but this also presents problems in terms of cattle and forage.

TABLE 1. THE RELATIVE POSITION OF THE SOUTH IN THE PRODUCTION OF MAJOR CROP AND ANIMAL PRODUCTS AND THE RELATIVE IMPORTANCE OF THESE PRODUCTS TO SOUTHERN AGRICULTURE, 1970-74

Product	Annual Average Farm Value 1970-74[a]				
	United States	South	South relative to U.S.	Relative to total U.S.	Relative to total South
	- - $ million - -		- - - - - - - - - percent - - - - - - - - -		
Food grain					
Wheat	4,180	564	13.5	6.3	2.8
Rice	802	618	77.1	1.2	3.1
Feed grain					
Corn	10,006	1,113	11.1	15.0	5.5
Sorghum	1,341	675	50.3	2.0	3.3
Barley	622	39	6.3	0.9	0.2
Oats	678	46	6.8	1.0	0.2
Oilseeds					
Soybeans	6,131	1,732	28.2	9.2	8.6
Peanuts	497	494	99.4	0.7	2.5
Cotton	2,321	1,690	72.8	3.5	8.4
Tobacco	1,577	1,488	94.4	2.4	7.4
Sugar	1,010	360	35.6	1.5	1.8
Vegetables	2,152	568	26.4	3.2	2.8
Fruits & tree nuts	2,689	777	28.9	4.0	3.9
Beef (cattle & calves)[bc]	13,932	4,417	31.7	20.9	21.9
Pork[c]	5,766	988	17.1	8.7	4.9
Milk[bc]	7,829	1,599	20.4	11.8	7.9
Chickens	2,060	1,725	83.7	3.1	8.6
Turkeys	631	204	32.3	0.9	1.0
Eggs	2,341	1,064	45.5	3.5	5.3

SOURCE: U.S. Dept. of Agr. Selected Statistical Data.

[a]Annual production × annual farm price 1970-74/5.

[b]Forages crops are assumed to be utilized locally for beef and dairy cattle.

[c]Value of production.

crops. Cattle (beef and dairy) dominate U.S. animal agriculture with a combined value of nearly $22 billion. Sugar, fruit and vegetables have a combined average annual value of nearly $6 billion. Cotton and tobacco (the two major non-food crops) had a combined average value of nearly $4 billion during 1970-74. Timber is also a major competitor for land in the South, but comparable value data are not available.

POTENTIAL FOR SOUTHERN AGRICULTURE AND AGRIBUSINESS IN DOMESTIC AND EXPORT MARKETS

Changing Economic Environment for Agriculture

The United States experienced two decades (1952-71) of chronic agricultural surpluses under existing programs and policies. Prior to 1972, most farm commodities (particularly grains and soybeans) moved largely in domestic markets. But export markets expanded markedly during 1972-75 [7 and 12]. The changing demand-supply balance was manifested in rapidly rising prices for basic commodities during the 1972-74 period.

Several factors that contributed to the changing demand-supply balance in domestic and export markets included: (1) reduction in yields of basic crops over much of the world during 1972-74, (2) increasing affluence in industrialized countries contributing to an increased demand for animal products and subsequently feed grain and soybeans, (3) the U.S. deficit in world industrial and raw materials trade increased dollar exchange available to foreign buyers and (4) devaluation of the dollar made U.S. farm products more attractive to foreign buyers [13 and 14]. Schuh (1974) provided an analytical framework for the impact of devaluation of the dollar on farm commodity exports and domestic food prices [13].

These developments provide the impetus for expansion of agriculture in the South. Agricultural output expands or contracts at the margin—that is, marginal or less productive land and associated livestock activities move in or out of production as

the demand-supply balance changes—but with time lags.

Future economic potential for expansion of agriculture in the South depends both on level and stability of product prices, domestic and world agricultural and food policy, and the cost structure of expanding output in the South and competing areas. Cost at the margin—through expanding land area, irrigation, drainage and increased levels of applied plant nutrients—are particularly relevant. Multidisciplinary research is needed to estimate physical input-output relationships, and associated costs and returns for the wide array of climate, soils and terrain in the South.

Market Growth Potential for Farm Products

Market growth potential is a complex research area. Continuing research is needed to update parameters and monitor both domestic and international markets. Price-quantity relationships must be analyzed to accurately gauge market growth. Production is governed by marginal costs relative to effective market demand (or marginal revenue). Market equilibrium is difficult to estimate—and seldom achieved in agriculture—due to the lag in production response, advancing technology, changing costs of farm inputs and shifting market demand.

Estimates of the rate of growth in domestic and export markets for major farm products are shown in Table 2. Tentative market growth rates in the domestic market appear to be most favorable for rice, sorghum (associated with cattle feeding), tobacco, frozen fruit, processed vegetables, beef and poultry based on the rate of increase in domestic utilization

TABLE 2. DOMESTIC AND EXPORT GROWTH RATES FOR MAJOR AGRICULTURAL COMMODITIES PRODUCED IN THE UNITED STATES, 1970-74

		Domestic Utilization[b]			Net exports[c]		
Commodity	Unit	1970	1974	Annual growth[d] rate	1970	1974	Annual growth[d] rate
				%			%
Food Grain							
Wheat	Mil. bu.	763	644	-3.9	712	976	9.3
Rice	Mil. cwt.	35	41	4.0	57	50	-3.2
Feed Grain							
Corn	Mil. bu.	4,187	4,316	0.8	579	1,194	26.6
Sorghum	Mil. bu.	647	714	2.6	126	234	21.4
Barley	Mil. bu.	419	358	-3.7	43	42	-0.6
Oats	Mil. bu.	877	717	-4.6	18	30	16.7
Oilseeds							
Soybeans[e]	Mil. bu.	824	804	-0.6	434	465	1.8
Peanuts	Mil. lbs.	1,947	1,877	-0.9	217	555	39.0
Cotton[f]	Mil. lbs.	3,899	2,766	-7.3	1,853	1,862	0.1
Tobacco[a]	Mil. lbs.	1,289	1,398	2.1	243	253	1.0
Fruit							
Fresh[c]	Mil. lbs.	16,543	16,943	0.6	-2,301	-2,008	3.2
Canned[c]	Mil. lbs.	4,774	4,123	-3.4	43	-17	-34.9
Frozen[c]	Mil. lbs.	2,011	2,513	6.3	-25	40	0
Vegetables							
Fresh[g]	Mil. lbs.	22,045	22,719	0.8	-342	-211	9.6
Canned[g]	Mil. lbs.	10,784	11,454	1.6	-209	-41	20.1
Dry[g]	Mil. lbs.	1,353	1,628	5.1	778	692	-2.8
Potatoes[g]	Mil. lbs.	324	319	-0.4	4	7	21.6
Sugar	(000) tons	11,507	11,308	-0.4	-5,583	-5,887	-1.4
Livestock Products							
Beef and veal	Mil. lbs.	24,001	25,055	1.1	-1,712	-1,515	2.9
Pork	Mil. lbs.	13,585	14,014	0.8	-272	-273	-0.1
Milk (NFS)[h]	Mil. lbs.	108,676	109,022	0.1	4,542	-1,094	-31.0
Poultry Products							
Chicken	Mil. lbs.	8,430	8,793	1.1	187	240	7.1
Turkey	Mil. lbs.	1,700	1,934	3.5	35	40	3.6
Eggs	Mil. doz.	5,688	5,427	-1.2	18	49	43.1

SOURCE: U.S. Dept. of Agr. Selected Statistical Data.

[a] 1974 data not available—1973 data.

[b] Food, feed and other uses.

[c] Exports minus imports (negative means net imports).

[d] 1974/1970-1(100)/4.

[e] Raw bean & bean equiv. of meal.

[f] Lint basis.

[g] Product weight.

[h] Nonfat solids (11.160).

from 1970 to 1974. In contrast, domestic utilization of wheat, barley, oats, cotton, canned fruit and eggs decreased more than 1.0 percent annually during 1970-74.

Exports were much more volatile and showed much larger growth rates than domestic utilization between 1970 and 1974. Relatively large increases occurred in exports for wheat, feedgrains, peanuts and poultry. In 1974, the United States was a net importer of fresh and canned fruit, fresh and canned vegetables, sugar, beef and veal, pork and dairy products. Net imports as well as exports represent potential markets.

The South's Resource Base

The primary local natural resource base for agriculture is land and water. Agricultural potential is further subject to terrain, climate, fertility and physical properties of soils. Availability and cost of irrigation water are also pertinent factors. Other agricultural inputs such as fertilizer, pesticides, machinery, equipment and labor-management are fairly mobile. Location and costs of inputs are important factors in the expansion of the agriculture base. Sources and costs of feedstuffs are important in the location of the livestock-poultry industries.

Table 3 shows the potential (based on approximate maximum) cropland and land used for crops in 1972 and 1974. The South had about 57 million acres of potential cropland not used for crops in 1974—about 51 percent of the U.S. total. Actual available cropland is slightly less, due to diversion to urban, transportantion and other uses. Removal of some constraints on crop acreage between 1972 and 1974 resulted in an expansion of only four million acres planted to crops in the South compared with 23 million acres expansion in the North Central Region and eight million acres expansion in the West.

The South has an almost unlimited water supply and the potential for multiplecropping within a season. Availability and cost of irrigation water are major constraints on expansion of cropland in the West. The North Central Region is currently using about 90 percent of its potentially available cropland based on the historical maximum. Although the Northeast has ample water, only about 10 million acres of potential additional cropland is available. Thus, the South, with 50 million or more acres of additional potential cropland and large reserves of

TABLE 3. AREA IN CROPLAND, MAXIMUM YEAR COMPARED WITH 1972 AND 1974, FOUR MAJOR REGIONS OF THE UNITED STATES

Region	Cropland[a]			Change in Cropland			
	Max[b]	1972[c]	1974[c]	Max to 1974		1972 to 1974	
	Mil. Acres			Mil. Acres	Percent	Mil. Acres	Percent
South[d]	131[h]	70	74	-57	-43.5	4	5.7
West[e]	60[i]	35	43	-17	-28.3	8	22.9
North Central[f]	218[j]	169	192	-26	-11.9	23	13.6
Northeast[g]	21[k]	10	10	-11	-52.4	0	0

SOURCE: U.S. Dept. of Agr. Selected Statistical Data.

[a]Includes all cropland planted and intended for harvest including hay and silage.

[b]All cropland.

[c]Harvested acreage of principal crops.

[d]Includes Tex., Okla., Ark., Ky., W. Va., Md., Del., and states to the east and south.

[e]Includes N. Mex., Col., Wyo., Mont., and to the West (excl. Alaska and Hawaii).

[f]Includes N.D., S.D., Nebr., Kan., Mo., Ill., Ind., Ohio, Minn., Iowa, Wis., and Mich.

[g]Includes Penn., N.J., N.Y., and New England.

[h]Maximum occurred in 1934 (Ag. Census Year).

[i]Maximum occurred in 1964 (Ag. Census Year).

[j]Maximum occurred in 1949 (Ag. Census Year).

[k]Maximum occurred in 1934 (Ag. Census Year).

water, has the greatest potential for expanding its agricultural land base.

Much of the South's potential cropland is in pasture or woodland. Relatively favorable product prices (relative to costs) are necessary to activate this potential. Also, there is a trade-off in activating potential cropland in terms of loss of revenue from cattle and timber. The potential cropland in the South may require drainage, terracing or other alterations to be used efficiently with modern machinery and technology. The real potential for the Southern expansion of agricultural base can be determined only through comprehensive multi-disciplinary research embracing economics, engineering and the biological sciences.

Competitive Position of the South in Domestic and Export Markets

Considerable research [3, 4, 5, 6, 8, and 11] has been addressed to the South's competitive position for several commodities. Examples include the region's competitive position in cattle feeding [5], given location of feeder calves and feedstuffs; competitive position in processing vegetables, [6] and that in swine [11], given feed supplies.

Animal and poultry production is dependent upon forages, grain and soybeans; it is desirable, then, to consider production and movement of feed inputs simultaneously with animal and poultry production. For example, it might be postulated that the South is competitive in soybean production (small comparative disadvantage) but not in feed grain (large comparative disadvantage). The final solution will have a bearing on the optimum location of animal and poultry industries.

Another important area of investigation is an assessment of expansion of output at the margin. Given the market potential (domestic and export); where and how should expansion occur, including that of land area, added plant nutrients, irrigation, drainage, multiplecropping, etc.?

In that animal and poultry production is closely related to feed crops, the South's major disadvantage lies in low yields for corn and other feed grain, soybeans and hay [8]. However, most of the region has considerable potential for increasing yields above current levels for feed grain, wheat and soybeans through added plant nutrients [8]. This potential depends on costs and returns at the margin under increasing costs of fertilizer and highly variable product prices.

Optimum livestock-poultry mix for the South and its various subregions is another area of potentially productive research. Although the area is highly deficient in feed grain, poultry and swine (with high grain requirements) are still relatively important enterprises. In contrast, the South is highly deficit in dairy products and beef (good grade or better)—both of which can be produced with much lower grain/forage ratios than poultry and swine.

The South may have considerable potential in the processed vegetable subsector. This potential lies in a long growing-harvesting-processing season. Research directed to the total industry (production-processing-distribution) on a near-complete vegetable mix is needed to adequately evaluate the South's potential in processing vegetables. Due to the limited land area required, and relatively intensive use of labor in the vegetable processing industry, attention should be directed to fairly small subregions. Both technical and economic—especially vertical organization—aspects of the processing vegetable industry are potentially productive areas of research.

The South's competitive position appears to be secure in peanuts, tobacco, rice, citrus fruits and sugar cane. Potential exists for expansion of rice and sugar can production—especially in the Atlantic coastal areas. However, potential for rice is highly dependent on export markets while that for sugar cane depends on the region's competitive position with respect to off-shore sources of sugar and U.S. sugar beets. The production potential for peanuts depends on expanding export markets under current programs, as the domestic market is generally oversupplied.

SUMMARY AND IMPLICATIONS

The South plays an important role in United States agriculture, but the region's full potential has not yet materialized. Market constraints, and relatively low yields for key crops with associated high costs, have been the major limiting factors. This disadvantage carries over to the animal-poultry subsectors.

A marked expansion occurred in both domestic and export markets for farm products during the 1970-75 period. The South's agriculture stands to benefit from this. There is potential for continued expansion in the market. Agricultural production necessarily expands or contracts at the margin—that is, where the soils, climate, management or other factors are least productive.

An accurate evaluation of domestic and foreign market growth potential is necessary to undergird a sound expansion in agriculture. Given reasonable assurance of market growth, a comprehensive analysis of costs at margin is needed to determine the optimum location of added increments of output. This also requires full costing, through assembly of

inputs (particularly in the case of livestock and poultry) and production-processing-distribution. Complex interrelationships exist with respect to grain, forage and protein supplements and associated livestock-poultry production.

To a large degree, the South's economic potential for expanding its agricultural output depends on domestic and international food and agricultural policy. Following nearly four decades of constraints on production, the United States adopted a free market agricultural policy in 1973, for most commodities undergirded by target prices. Under this program, commodities move in domestic and international markets at prices established by supply and demand. The government provides a direct payment for differences, if any, by which market price falls below target price. The market does not guarantee a price above the target price. However, the latter is adjusted for changes in costs of production over time.

Although a competitive market is reasonably effective in locating production, allocating resources and distributing output, sound planning should minimize trial and error and help maintain economic momentum. The South has the resources in terms of land, water and labor to expand agricultural output to meet domestic and export market demand. However, it is a real challenge to the research-educational complex to determine where, when, and how this expansion in agricultural output should occur.

Important implications for the South are that the region's competitive position in international markets may be superior to its position in the domestic market for several important commodities. Particularly in the case of feed grains and soybeans, and associated livestock activities, the South is a marginal producing area in the United States. However, the region may have a competitive advantage over much of the world outside the United States. Rice, peanuts, citrus and wheat also offer considerable potential for the South in international markets.

A research program in marketing and competition, in terms of priorities for the Southern Region, was outlined in the Task Force report in 1974 [14]. The Task Force suggestions for research are, however, subject to modification as economic conditions change over time.

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