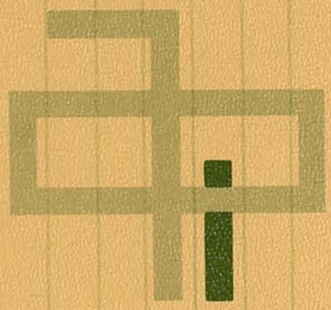

Policies Affecting Rural People

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COMMENT ON
AGRICULTURE--MIDWAY THE 1960's*

Rex F. Daly, Chairman
Outlook and Situation Board
Economic Research Service
United States Department of Agriculture

I

The authors have handled well a broad subject matter theme which might have been presented with any of a number of variations in emphasis. Bottum and Mayer briefly outline the "myriad of farm programs" growing out of the tendency for farm output to exceed demand at satisfactory price levels during much of the past 40 years. It is a little disturbing to be reminded agricultural problems have changed so little despite years of effort and expensive programs.

The authors conclude land retirement continues to be a basic approach to solution of the farm problem in the 1960's. However, in several places they note the long-run solution requires human resources be brought into balance with other agricultural resources. "Raising the educational levels, the skills, and the mobility of agricultural people is the fundamental solution to raising incomes of rural people." Are present farm programs moving in this direction? Will we be able to avoid the pitfalls of the past?

II

Bottum and Mayer tell the story of agricultural efficiency and growth by pointing out that farm output per man-hour has risen about twice as rapidly as productivity in the nonfarm sector. We should remind ourselves, though, that rapid substitution of capital inputs for labor and, in recent years, for land have greatly accelerated long-run advances in productivity. Part of the rise in total crop output per acre

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*Views expressed in these comments are those of the author and do not necessarily reflect those of the U. S. Department of Agriculture.

since the early 1950's can be attributed to acreage cutback. These shifts in resource use arose quite naturally from rapid technological developments, changes in the relative cost of inputs, and the impact of farm programs. Consider, too, in this connection the output increase could have resulted from a different combination of resource inputs with smaller increases in output per acre and in output per man-hour (Table 1).

III

The authors give us a glimpse of their analytical framework, but a more explicit statement of their views would have been helpful. For example, what was the impact of past land diversion on output? How important are changes in relative prices on resource inputs? What is the effect on output of long-run advance in technology? Probably a rather wide range of opinion exists among economists regarding answers to these questions and such questions are basic to the development and appraisal of agricultural policy.

Attempts to measure an aggregate supply response for crops for the post-World War II years show the first 40 to 50 million-acre diversion had a limited effect on output, perhaps no more than half the coefficient of output impact (coefficient of 0.5) implied by Bottum and Mayer. Thus the first 10 percent crop acreage cut may have reduced output no more than 2 or 3 percent at a given level of prices and technology. Although the impact seems small, other studies show similar results. Much of the land going into soil bank was marginal and probably had very little effect on output.[1] In recent years, acreage diversions under the grain programs undoubtedly have had a greater impact on output.[2] (Table 2)

Appraising the impact of price changes on output and demand has become very involved under the complexities of loan rates, direct payments, diversion payments, and certificates. In 1964-65, the loan rate for corn was $1.10 per bushel; cooperators received an additional 15 cents plus a diversion payment equivalent to possibly 50 cents per bushel on their estimated production. Similarly on the demand side, domestic food use of wheat responded to a price around $2 per bushel at the farm

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[1] See The Economic Demand for Irrigated Acreage by V. W. Ruttan, especially Appendix I, page 91ff. See also The Conservation Reserve in South Central Iowa by W. R. Butcher, E. O. Heady, and L. G. Rigler, Research Bul. No. 525, 1964, Ames, Iowa.

[2] An Economic Appraisal of the 1961 Feed Grain Program by James Vermeer, Ag. Econ. Report No. 38, USDA, ERS, 1963.

Table 1. Crop production and utilization: 1950, 1959-60, 1964 and 1965

Item	1950	1959-60		1964	1965 estimated		
		Total	Percent change from 1950		1965	Percent change from 1950	Percent change from 1959-60
	(million dollars in 1957-59 prices)						
Carryover stocks	14,295	20,214	41.4	21,422	20,581	44	2.0
Production	16,794	20,220	20.4	20,862	22,376	33	10.7
Imports	2,764	3,242	17.3	3,000	3,175	15	-2.1
Total supply	33,853	43,676	29.0	45,284	46,132	36	5.6
Domestic utilization	17,647	19,165	8.6	19,852	20,346	15	6.2
Food, total	7,126	7,972	11.9	8,352	8,409	18	5.5
Per capita	47.0	44.7	4.9	43.5	43.2	-8	-3.4
Other nonfood, total	2,927	2,836	-3.1	2,789	3,033	4	6.9
Per capita	19.3	15.9	-17.6	14.5	15.6	-19	-1.9
Seed	578	507	-12.3	515	518	-10	2.2
Feed	7,016	7,850	11.9	8,196	8,386	20	6.8
Exports	2,193	3,618	65.0	4,851	4,533	107	25.3
Percent of production	13.1	17.9		23.2	20.3		
Total utilization	19,840	22,783	14.8	24,703	24,879	25	9.2
Carryover stock	14,013	20,893	49.1	20,581	21,253	52	1.7
Estimated surplus, percent of output[a]	---	9.1	---	2.2	8.7	---	---
Population[b]	151.7	178.5	17.7	192.1	194.6	28	9.0
Per capita real income[c]	1,576	1,878	19.2	2,099	2,173	38	15.7

[a]Assume surplus equal to net increase in inventories plus 32 percent of exports in 1959-60 and 27 percent for 1964 and 28 percent of estimated exports for 1965--the percent of program exports.

[b]Population as of July 1, including 48 states in 1950 and 50 states for later periods.

[c]Per capita disposable income deflated by the consumer price index.

Table 2. Cropland use, selected periods 1949 to 1965

Item	1949	Average 1959-60	1965 estimated		
			1965	Percent change from	
				1950	1959-60
	(million acres)				
Cropland harvested	352	316	294	-16	-7
Fallow and failure	35	40	40	14	0
Cropland used for crops	387	356	335	-13	-6
Pasture (estimated)	(69)	(65)	(55)	-20	-15
Idle	((22))	(11)	(10)	(66)	---
Program		26			127
Total cropland inventory	478	458	458	-4	0

made up of a loan rate of $1.25 per bushel plus a certificate of 70 cents. The export price included a certificate of 25 cents per bushel. To what, in this complex of prices and payments, do producers respond in planning their production? These questions are pertinent to farm program appraisals such as those developed by the authors.

IV

In these times of computers and sophisticated analytical frameworks, one is hesitant to present a simple framework even for illustrative purposes. Recognizing the risks of oversimplification, we might explore with the authors some of the pertinent interrelationships in policy appraisals. The illustration assumes crop output in a given year depends on prices the previous spring, acreage used for crops, the trend in technology, and the previous year's output (0_{t-1}). The last factor, a measure of plant size, is obviously much less important for crops than it would be in determining livestock production. Demand relationships assume food use of crops is affected very little by price changes (very inelastic). However, price changes have a much greater influence on feed use of crops and on exports. The major demand force is population growth; the major supply shifter is technology.

Major variables expressed:

O_c = index of crop output (1957-59 = 100)

P_c = index of crop prices (Jan., Feb., Mar.) (1910-14 = 100) adjusted by parity index for same months

A = index of acreage of cropland used for crops (1957-59 = 100)

q_v = per capita food use of crops (1957-59 dollars)

q_n = per capita nonfood use of crops (excluding feed and seed) (1957-59 dollars)

q_c = per capita total utilization of crops for domestic use and net exports--crop output less inventory change (1957-59 dollars)

P_v = index of prices of food crops including imported foods (1957-59 = 100)

P_n = index of prices of nonfood commodities, excluding feed and seed (mainly cotton, oils, and grains) (1957-59 = 100)

F_m = a measure of competitive product use (per capita use of man-made fibers)

I = index of per capita disposable income deflated by the consumer price index (1957-59 = 100)

T = index of output per unit of input (1957-59 = 100)

Output functions (elasticities):

1. Short-run: $O_{ct} = +.20\ P_{ct} + .25\ A_t + .85\ O_{ct-1}$
2. Long-run: $O^*_{ct} = +.267\ P_{ct} + .333\ A_t + 1.133\ T_t$
3. Yield per acre: $\frac{O_c}{A} = +.267\ P_c - .667\ A + 1.133\ T$

Demand functions (elasticities):

1. Per capita demand for food and nonfood[3]

   (a) Food: $q_v = -.05\ P_v + .05\ I$

   (b) Nonfood: $q_n = -.14\ P_n + .42\ I + 1.22\ \Delta I - .387\ F_m$

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[3]The implied composite demand includes net export demand (determined largely from trends) and the demand for feed.

(c) Implied composite: $q_c = -.35 P_c + .15 I$

2. Demand for feed concentrates as function of livestock production units and the ratio of livestock prices to feed prices:

(a) $F_c = -68.0 + .878 L_u + .233 \frac{P_a}{P_f}$

The above framework assumed for the crop sector shows that prices affect output (higher prices tend to increase output), but the short-run effect is very small.[4] The appraisal also suggests in the range of post-war acreage reductions, a 10 percent acreage cut reduces output by possibly a third. Similarly, the yield-per-acre function suggests part of the accelerated rise in crop output per acre in the past 10 to 15 years was due to reduction in land used for crops. These relationships do not imply further acreage diversion would have the same small impact on output. Surely deeper acreage cuts would tend to result in a proportionately larger cut in output. Moreover, the impact on output probably would be relatively larger if diverted acreage were brought back into production at a higher level of technology and resource inputs.

The uptrend in technology (partly a proxy for increased resource use) has increased output at a rate in excess of population growth. Accordingly, prospective expansion in domestic markets and a continued uptrend in long-run growth in exports can be supplied with about the acreage now used for crops.

The accompanying diagram illustrates projections to 1980 based on the assumed framework and projected growth in population, consumer income, and technology in agriculture. Basic assumptions as well as the expansion in export markets were based primarily on trends of the past 10 to 15 years. The diagram is intended only as an illustration to show major functional relationships. It also provides a rough basis for approximating relative differences in program costs. Suppose we assume price supports, including payments, at a level that would result in average crop prices around 235 (1910-14 = 100) and a market price of 214.[5] With cropland use at 340 million acres, overall cost ($P_s O_s$) — ($P_c O_c$) would approximate a sixth of cash receipts from marketings ($P_c O_c$).

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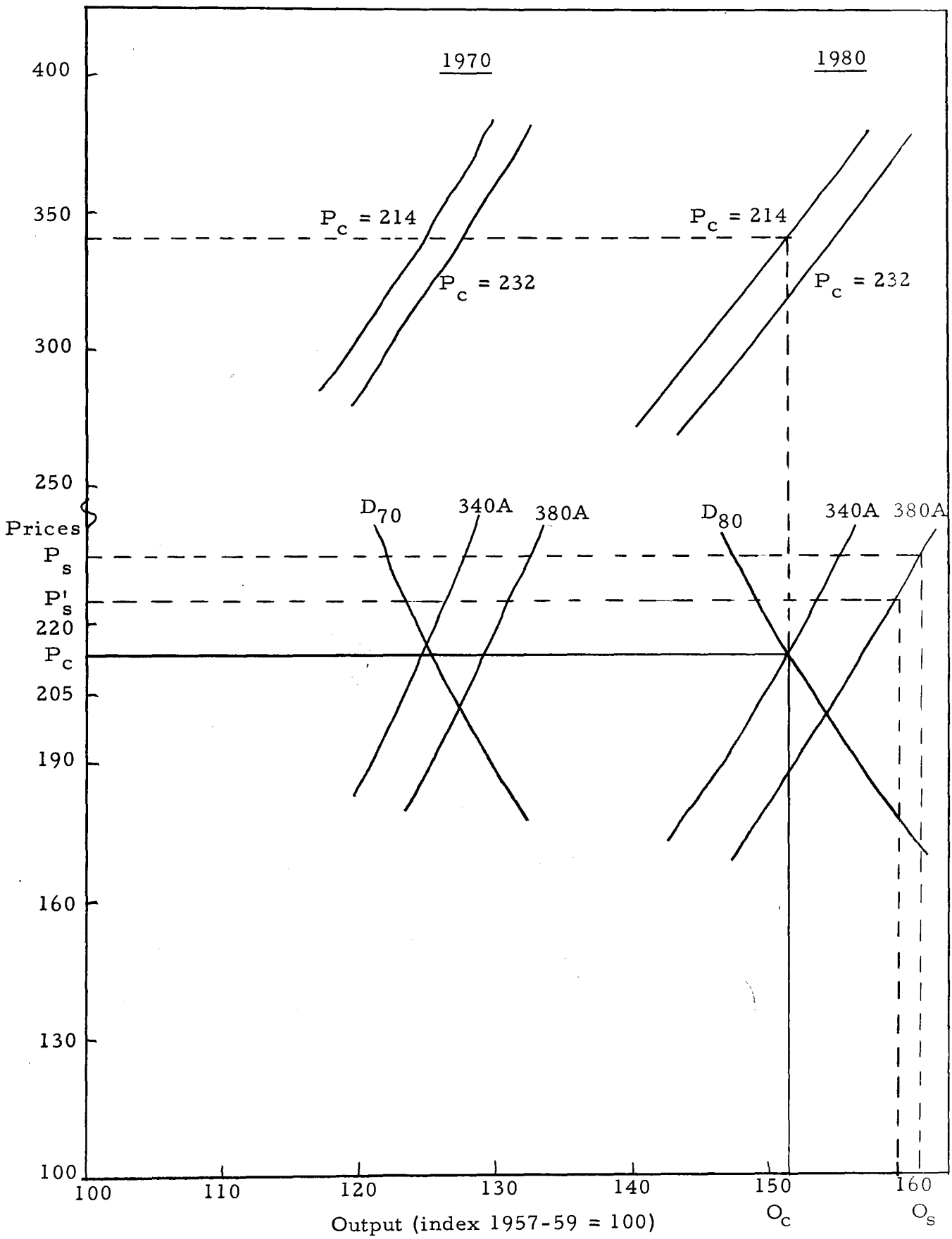
[4] Resource Demand and Structure of the Agricultural Industry by E. O. Heady and L. G. Tweeten, Iowa State Univ. Press, 1963, pp. 440-443.

[5] These compare with a market price around 220 in the closing months of 1965--the beginning of the 1965-66 crop marketing year. Crop prices around 235 could imply average prices around $1.80 per bushel for wheat, $1.30 for corn (and equivalent for feed grains), $2.30 for soybeans, and 29 cents per pound for cotton.

Crop sector demand, supply, price and acreage used;
illustrative projections for 1980



Of this total, possibly 60 percent would represent price support payments, $O_c(P_s - P_c)$, and 40 percent land diversion payments, $P_s(O_s - O_c)$. A similar calculation at a price support level of 225 (1910-14 = 100) with 340 million acres indicates total costs around a tenth of market receipts. Price support payments would represent a little less than half of the total and land diversion payments more than half.

Even though price changes have little effect on output, small output changes have significant price effects in the market. In this simple framework, the effect on output of bringing the marginal 40 to 50 million acres back into production, though relatively small compared to total output, would suggest market prices of possibly 1/4 to 1/3 below the 235 support level. Implied price declines would be even larger for some major support crops. Needless to say, program costs needed to maintain income under this assumption would rise sharply.

V

Bottum and Mayer give us some of their views on the 1965 Food and Agriculture Act and raise questions regarding the impact of land diversion on land values and grower participation in the program. Although a thorough appraisal of new legislation must await program detail, the authors might have pointed out new directions and emphasis. The new legislation, which apparently represents a rather broad consensus, shifts program emphasis toward flexible market-price supports around world price levels. Farm incomes will be strengthened through provisions for direct payments to cooperators. Such programs encourage domestic use and exports; they also virtually eliminate the need for government subsidies on exports. In addition to basic policy changes for commercial agriculture, new legislation recognizes the essentially different problems of the small farmer with inadequate resources. But is the new legislation on the right track? What is implied for the size and resource structure of American farms during the next 10 to 15 years? Are we moving toward a solution of the problems of agriculture?

I feel optimistic, possibly more optimistic than the authors, about a satisfactory long-run solution to the farm problem. We now have around 3 million farms, according to preliminary census data. Less than half produce more than 90 percent of all farm products. Larger commercial family farms are increasing in number: They have become more specialized, and their managers are more highly trained. In 1964, one-third of the farmers with sales above $40,000 had attended college.

The adjustment of people to resources, which Bottum and Mayer spoke of, is going on at a rapid clip, almost too rapid. The human adjustment is a difficult but very important part of the overall problem.

One of the major objectives of current legislation is to move toward a "parity of opportunity for all rural people . . ." A number of new programs are designed to provide greater access to education, training, and health services for rural people.

With resource adjustments in agriculture moving toward larger, more efficient family farms, more farmers will receive returns on their resources comparable to those earned in nonfarm industry. And this parity of income may be possible at gradually declining prices, particularly if the pace of technological advance continues. Adjustment possibilities in agriculture, with most farms organized as are today's efficient commercial units, suggest that the bulk of farm output needs could be supplied by possibly 1/2 to 3/4 million commercial family farms. These farms probably could do the job with less total land, less labor, and possibly less total capital than presently used in agriculture. Such trends, of course, would depend to a considerable extent on U. S. policy with respect to meeting world food needs.