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Shifting Direct Government Payments from Agriculture to Poor People: Impacts on Food Consumption and Farm Income

By Alvin C. Egbert and Stephen J. Hiemstra

Some people currently assert or imply that if we had a national jobs-for-all program and minimum guaranteed incomes so that no one fell below the poverty line, the increased demand for food and fiber products would absorb our full cropland capacity to produce, and farmers would get parity of income through satisfactory prices.

It follows from this proposition, they go on to say, that the \$3 billion or so annually paid farmers "not to grow anything"¹ ought to be transferred to the poor as buying power for food and fiber products, and if this amount is not sufficient it should be supplemented by enough more public money to achieve freedom from hunger, which would certainly result in absorbing cropland capacity with good farm prices and income.

These propositions raise the following questions: (1) If the \$3 billion now paid to farmers were spent for food by the poor: (a) how far would it go toward raising their nutritional intakes to acceptable standards, (b) how far would it go toward absorbing cropland capacity, and (c) how would it affect gross and net farm incomes; and (2) how much new buying power at the retail markets would be needed to put \$3 billion back into net farm income.

This paper summarizes an analysis of these questions.

¹ In reality, this total includes price support, conservation, sugar, and wool payments as well as cropland diversion payments.

Basic Assumptions and Procedures

(1) Payments now made to farmers to divert cropland and otherwise support or supplement agricultural prices would be discontinued. These funds would be transferred to people living in poverty, together with any additional funds needed to achieve program goals.

(2) Programs would be directed toward the people living below the poverty line, which included 30 million people in 1967 when poverty was defined as a nonfarm family of four receiving an income of less than \$3,335.

(3) The 1965 Household Food Consumption Survey provided data for estimating increases in demand for food at different income levels. The estimated income elasticity of demand for food is 0.1 for households with incomes below \$3,000 and 0.35 for those with incomes above \$3,000.

(4) Both income supplement and food stamp programs were evaluated as means for improving the diets of poor people and expanding the demand for farm products.

(5) The following food consumption alternatives were analyzed: Food consumption patterns of low-income households were assumed changed to food consumption patterns of average households with (a) incomes between \$3,000 and \$5,000, (b) incomes above \$3,000, and (c) incomes between \$7,000 and \$10,000. These groups, of course, are not mutually exclusive but fit a range of policy alternatives.

Expenditures Required for Target Food Consumption Patterns

INCOME SUPPLEMENT PROGRAMS

The analysis showed that large increases in income would result in only small increases in total consumption of food if there were no restrictions on how the additional income could be spent by low-income families (table 1). An increase in income of \$14 billion would be required to raise their food expenditures by \$1.4 billion. This amount of increase in food expenditures would raise food consumption patterns of the low-income group to that of the \$3,000-\$5,000 group.

An income increase of about \$19 billion would be needed to raise the consumption pattern of the low-income families to that of all families with incomes above \$3,000. With this income supplement, food expenditures are estimated to increase around \$3.3 billion. This estimate as-

sumes that when food consumption of the low-income families is raised beyond the consumption level of the \$3,000-\$5,000 families the income elasticity of demand increases from 0.1 to 0.35.²

² Analysis of data from the 1965 Household Food Consumption Survey shows that income elasticities of demand vary significantly by level of money income. Households with annual incomes below \$4,000 yielded income elasticities of 0.08 to 0.13, per capita expenditure basis, depending on the aggregation of food expenditures used. Households with incomes between \$4,000 and \$8,000 yielded elasticities of 0.3 to 0.5, and those with incomes above \$8,000, 0.2 to 0.4. These estimates are based on group averages and means of income ranges with no adjustment for changes in composition of family over income levels. Despite the small increase in food expenditures to incremental changes in levels of income for the low-income group, this group spent a larger share of its income for food than the other two groups. The lowest of the three income groups spent 42 percent of its income (money income plus the value of food not bought) for food compared with 25 percent for the middle-income group and 14 percent for the highest income group.

Table 1.--Estimated income supplements and food expenditure increases required to raise food consumption patterns of low-income families to three levels

Item	Food consumption levels ¹		
	(1) Families with \$3,000 to \$5,000 incomes	(2) Families with incomes over \$3,000	(3) Families with \$7,000 to \$10,000 incomes
Total income supplement.....	<i>Billion dollars</i>		
Increase in food expenditures.....	14.0 1.4	19.4 3.3	21.7 4.1
Percentage increase in food expenditures.....	<i>Percent</i>		
	8	15	17

¹ Based on food consumption patterns as measured by the 1965 Household Food Consumption Survey and an assumed income elasticity of demand for food (per capita expenditure basis) of about 0.1 when households with incomes below \$3,000 adjust their consumption pattern to that of the \$3,000-\$5,000 income group and an elasticity of 0.35 when the low-income group increases its expenditures beyond the level of consumption of the \$3,000-\$5,000 group. For example, the package of foods consumed by the families in the \$3,000-\$5,000 income group was valued at \$1.4 billion more than the food consumed by the under-\$3,000 group when multiplied by the number of low-income families involved. The elasticity of 0.1 implies expenditures of 10 times this amount or \$14 billion in adjusting the consumption pattern. This pattern represented an increase of 8 percent in expenditures by the low-income group.

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An income supplement of about \$22 billion would be required to raise low-income family consumption patterns to those of the \$7,000-\$10,000 group.

These income supplements, most will agree, are large and even the minimum income supplement of \$14 billion does not appear to be a reasonable alternative at the present time.

FOOD STAMP PROGRAM

One possible method of improving food consumption patterns appears to be a greatly expanded Food Stamp Program. In other words, all income supplements would be made in the form of food stamps. Even a Food Stamp Program expanded by \$3.3 billion may not be feasible because it assumes some 30 million people would be enrolled. Many of the people currently eligible are not now participating in the Food Stamp Program. But many of the persons classified by the Office of Economic Opportunity as below the poverty index are not now eligible for the program because the Food Stamp Act requires income standards to be consistent with those now used by each State in administering its public assistance program. Of course, eligibility criteria could be changed. Nevertheless, the analyses in the remainder of this paper are based on an assumed food stamp type of program.

Under such a program, the income supplement can be assumed to be about the same as the required increase in food expenditures (line 2, table 1). Under the existing program, participating families are required to contribute an amount approximately equal to their previous food expenditures. Thus, program costs represent additional spending for food. Nevertheless, some "slippage" can be expected because of the necessity to induce participation in the program.

Food Consumption Patterns

The changes in food consumption patterns underlying changes in food expenditures shown in table 1 are presented in table 2 in terms of values of farm products. The consumption of

beef would increase most. The consumption of all other livestock products, except for eggs, would also increase. Of the crops, consumption of food grains, feed grains as food, and dry peas and beans would decline.

Nutritional Levels

Standards of good nutrition are only loosely associated with levels of household income. According to the 1965 Household Food Consumption Survey, 36 percent of the households with incomes below \$3,000 had diets that fell below two-thirds of the National Research Council's recommended allowances for one or more nutrients (considered a critical level by some nutritionists). The percentage declined to 24 percent for the \$3,000-\$5,000 income group and to 12 percent for the \$7,000-\$10,000 income group.

If the low-income households adjust their consumption patterns to those of higher income groups when their incomes are raised, as assumed above, nutritional levels would be raised accordingly. Certainly hunger (the prolonged shortage of calories) would be alleviated at all higher income levels. However, a significant proportion of diets would continue to fall below the full NRC recommendations for nutritional adequacy because of personal choice, lack of complete information, and variation in personal needs not adequately reflected in the recommended nutritional standards.

LIMITATIONS OF CONSUMPTION ESTIMATES

The preceding consumption estimates, based on cross-section data, assume that the low-income households would adjust their consumption patterns in line with existing households currently with higher incomes. Because of the makeup of the population of low-income households, such an assumption may be tenuous. At a minimum, it assumes a process of long-run adjustment of tastes and habits. The low-income families have a much larger proportion of one-person households, older people, and nonwhites than the U.S. average. In the 1965 survey, the average size of household for the below-\$3,000

Table 2.--Estimated changes in food consumption required to raise food consumption patterns of low-income families to three levels

[1957-59 farm prices]

Item	Food consumption levels ¹		
	(1) Families with \$3,000 to \$5,000 incomes	(2) Families with incomes over \$3,000	(3) Families with \$7,000 to \$10,000 incomes
	----- Million dollars -----		
Cattle and calves.....	193	378	464
Hogs.....	39	36	32
Chicken.....	12	5	-3
Turkey.....	4	2	-1
Eggs.....	-8	-17	-30
Milk.....	65	135	170
Total livestock.....	305	539	632
Food grains.....	-13	-28	-32
Feed grains.....	-3	-7	-8
Fruit.....	11	39	48
Tree nuts.....	5	7	8
Potatoes, sweetpotatoes.....	12	13	16
Dry beans and peas.....	-4	-11	-14
Other vegetables.....	13	39	47
Soybeans.....	3	5	6
Peanuts.....	8	12	14
Other major oils.....	1	1	1
Sugar.....	3	2	1
Total crops.....	36	72	87
Total, all commodities.....	341	611	719
----- Percent -----			
Increase in consumption of: ²			
Total food.....	1.2	2.1	2.5
Livestock and products.....	1.5	2.7	3.2
Crop products.....	.4	.8	1.0

¹Direct use only.

²Supply and utilization index basis, see Stephen J. Hiemstra, Food Consumption, Prices and Expenditures, Agricultural Economics Report No. 138, p. 160-162.

income group was 2.6 persons and 37 percent of the group were over 55 years old--compared with 3.3 persons and 17 percent over 55, for the U.S. average.

Finally, these changes in consumption were based on the assumption that changes in prices

would not accompany the change in quantities consumed. This assumption certainly would not hold for most of the commodities in the short run, nor would it hold for all commodities in the long run. In the long run, prices depend on the response of food supplies to both the

changes in prices and commodity programs. These factors are analyzed in a following section.

Estimated Effects of Food Programs at the Farm

DEMAND FOR FOOD AT THE FARM

The estimated changes in food consumption would have only small effects on the total demand for farm output. The increase in demand at the farm would be a little over 1 percent for the lowest consumption alternative and about 2.5 percent for the highest (table 2). The comparable figures on a net farm output basis (total production less feed and seed used) are fractionally less.

FARM OUTPUT AND PRICES

The effects of consumption changes on farm output and prices depend on the supply response relative to the shift in demand or consumption change.

Currently farmers are diverting 50 to 60 million acres of cropland for which they receive direct payments of about \$3 billion. If these payments were discontinued, as assumed, most of this land would be returned to production, even without price supports. The question then is: What impact would this increase in crop output have on livestock output and how would these increases relate to the estimated increases in demand resulting from an expanded food program?

To examine the possible impacts of food programs on farm supplies, prices, and incomes, we first look at the feed-livestock sector and consider only the second food program alternative (table 2).

The "effective demand" for livestock products is estimated to increase by approximately 2.7 percent. In the very short run, production of livestock products cannot be increased much. Thus, the increase in demand would be largely offset by higher prices. In other words, prices

would "absorb" the increase in demand. People receiving income supplements would be consuming more, but others would be consuming less. Assuming a price elasticity of demand for livestock at the farm of 0.35,³ the 2.7 percent increase in demand would result in a 7 to 8 percent increase in livestock prices.

Higher livestock prices would stimulate livestock production over the longer run. Moreover, with no acreage diversion programs, total feed grain production is estimated to increase about 30 percent. This increase in total production is equal to about 38 percent of current domestic feed grain consumption. In the short run, a 4 percent decline in feed grain prices is required to increase domestic feed consumption about one percent. On the basis of this relationship, the additional feed grains would not be fed at any price. However, at very low prices the elasticity is probably higher. Also, much of the increased output probably would be held as stocks. Nevertheless, prices would be extremely low.

Over the long run, lower feed prices and expanded feed supplies would result in a significant expansion in livestock output and, consequently, livestock prices would fall. Livestock production would need to expand by about 25 percent above the 1967 level to use the additional production of feed grains and other feed crops from diverted cropland. Of this 25 percent increase in livestock production, a market would have to be found for 22 percent--food programs would absorb about 3 percent. Assuming a price flexibility of demand of 3.0, this increase implies that livestock prices would fall by over 60 percent.

These conclusions are largely hypothetical. In reality, at the low prices cited, part of the increases in feed and livestock would not occur. The conclusions, however, highlight the magnitude of the potential output in U.S. agriculture.

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fall about 34 percent.⁴ Lower domestic feed grain prices, the study reasonably assumed, would have resulted in larger exports, which would have taken some pressure off domestic feed prices. But even this feed price decline would have resulted in a 6 to 7 percent increase in livestock supplies and a 20 percent decline in livestock prices. However, if demand were expanded by food programs as assumed here, livestock prices probably would decline less--perhaps around 15 percent.

Effective demand for food crops is estimated to increase only 0.8 percent under food program (2) in table 2. However, the demands for dry beans and peas and grains for food all decline. These are crops for which excess capacity and production control programs exist. Thus, expanded food programs would have a detrimental rather than helpful effect on producers of these crops. Although the decrease in demand represents only 1 percent of food grain production, it represents about 7 percent of dry bean and pea production. Demand for fruits and vegetables would increase, however. These crops usually have not been plagued by chronic over-production.

In the short run, output of some crops, especially fruits, would not respond to the stronger demand and only prices would increase. The poor people would be consuming more of these crops but not as much as indicated in table 2. Other people not receiving any income supplement would be consuming less.

Over the longer run, output of these crops likely would expand as much as demand. Prices probably would not change much and consumption would be up around the full amount given in table 2.

This analysis, although piecemeal, leads us to the clear conclusion, which is certainly not new, that the most optimistic food consumption expansion programs would not go very far in absorbing the total productive capacity of U.S.

⁴ Estimates of Farm Production, Prices and Income, 1961-67, in the Absence of Farm Programs. U.S. Dept. Agr., Econ. Res. Serv., April 23, 1968, 4 p.

agriculture and in maintaining reasonable prices and incomes of farmers.

FARM INCOME CHANGES

The estimated effects of increased food expenditures of \$3.3 billion on farm prices and income were determined by employing the following assumptions: (1) Livestock production increases as much as the estimated increase in demand (table 2); (2) feed grain programs are structured so that feed prices fall only to a level needed to encourage livestock production increases equal to the estimated increases in demand; (3) the feed grain price elasticity of supply with respect to livestock output is -0.2; and (4) supplies of other products will adjust to the changes in demand and, on balance, prices will be unchanged.

To achieve a 2.7 percent increase in livestock output, feed grain prices would have to decrease by about 13.5 percent. For this livestock increase, feed grain acreage would need to be expanded only 4 million acres. Consequently, about 31 million acres would still need to be diverted (diversion was about 35 million acres in 1968) and substantial program payments to farmers would continue to be needed to support feed prices, even at the lower level.

Under the above assumptions, only small changes in cash receipts and income result from the assumed increase in the consumption of food (tables 3 and 4). Total cash receipts decline slightly. Larger cash receipts for all livestock products except eggs, and for fruits, vegetables, vegetable oils, and a few minor crops, are more than offset by smaller cash receipts for feed crops. Cash receipts from feed crops decline because prices decline relatively more than marketings increase.

Operators' realized net income is estimated to improve a little, even though cash receipts would be down slightly. This occurs because direct payments to farmers would be down only \$150 million and more than compensated by lower production expenses--due to lower feed prices.

Table 3.--Actual and estimated cash receipts, with \$3.3 billion increase in food program, 1967

Item	Cash receipts 1967	Percentage change in production--new programs	Assumed percentage change in price at farm	Estimated cash receipts 1967 ¹
Cattle and calves.....	10,539	4.91	0	11,056
Hogs.....	3,776	.99	0	3,813
Sheep and lamb.....	299	.00	0	299
Chicken.....	1,314	.28	0	1,317
Turkey.....	459	.36	0	460
Eggs.....	1,777	-.83	0	1,762
Milk.....	5,756	2.79	0	5,917
Other livestock.....	445	.00	0	455
Total.....	24,365	--	--	25,069
Food grains.....	2,531	-.86	0	2,509
Feed grains.....	3,727	1.92	-13.5	3,286
Fruit)	1,700	2.84	0	1,748
Tree nuts)				
Potatoes, etc.)	2,627	1.50	0	2,666
Dry beans and peas)				
Other vegetables)	2,432	1.56	-13.5	2,136
Soybeans.....	279	.47	0	280
Peanuts.....	63	.51	0	63
Other oils.....	386	.08	0	386
Sugar.....	578	2.76	-13.5	513
Hay.....	1,392	.00	0	1,392
Tobacco.....	1,107	.00	0	1,107
Seed.....	99	.00	0	99
All other crops.....	1,299	.00	0	1,299
Total.....	18,220	--	--	17,484
Total, all commodities.....	42,585	--	--	42,553

¹Actual receipts adjusted for production and price changes.

Food Consumption to Maintain Farm Income

The question, "How much new buying power at retail markets would be needed to get \$3 billion back in net farm income?", remains to be analyzed. We approach this question by assuming first that prices received by farmers do not change.

Using 1967 as a base, total farm output and marketings would have to increase over 20 percent to hold net farm income at the \$14.2 billion received in 1967 (table 5). An increase of this amount is needed because additional inputs and expenses are required to bring forth the additional output. This increase in output would have to be absorbed by a comparable increase in demand for food at retail.

Table 4.--Actual net income and estimated net income with \$3.3 billion increase in food program, 1967

[48 States]

Item	1967 actual	1967 estimated
<i>Cash receipts:</i>	<i>Million dollars</i>	<i>Million dollars</i>
Crops.....	18,220	17,484
Livestock.....	24,365	25,069
Total.....	42,585	42,553
Value of home consumption	744	744
Rental value.....	2,441	2,441
Government payments.....	3,070	2,920
Realized gross.....	48,840	48,658
Expenses.....	34,682	34,330
Operators' realized net..	14,158	14,328

On the basis of historical relationships, a 20 percent increase in farm output implies that domestic food consumption would need to increase 26 percent. Although consumer expen-

ditures for food historically have risen faster than food consumption, we assumed that a 1 percent increase in food expenditures at retail in constant prices would accompany a 1 percent increase in demand for farm food products. This increase in terms of consumer food expenditures would amount to about \$25 billion above that spent in 1967 and about \$21 billion in addition to the highest expenditure increase considered in the above analysis of food programs.

This route to higher farm incomes appears quite unreasonable. It would cost too much. It is worth noting, however, that the \$25 billion increase in food consumption at retail would be required to use up potential feed supplies. These feed supplies, as noted, would provide for about a 25 percent increase in livestock output.

It does not appear to be feasible to eliminate direct payments to farmers and to maintain farm income through the market unless prices are raised. But prices cannot be raised by expanding demand alone. Production would still need to be constrained, even with optimistic and large increases in food consumption.

Table 5.--Estimated changes in food expenditures and farm output needed to replace Government payments to farmers

Item	1967	Percentage change ¹	Estimated 1967
Food expenditures ²	Bil. dol.	Percent	Bil. dol.
	94.9	26.0	119.6
Total food consumption ³	28.8	26.0	36.3
Food from domestic sources ³	25.3	26.0	31.9
Gross farm output ³	43.4	20.6	52.3
Cash receipts.....	42.8	20.6	51.6
Expenses.....	34.8	16.5	40.5
Net income from receipts.....	8.0	39.2	11.1
Rental value of dwelling and home consumption....	3.1	---	3.1
Net income.....	11.1	27.9	14.2
Government payments.....	3.1	-100.0	---
Realized net income.....	14.2	---	14.2

¹ Assumes no changes in prices. ² Consumer expenditures, U.S. Department of Commerce.
³ Valued using 1957-59 prices received by farmers, Supply and Utilization Index.

Summary and Conclusion

Again and again someone proposes income supplements to poor people in the United States as a way of solving the farm problem. At first glance, this proposal sounds reasonable and, of course, it is humanitarian. But invariably the conclusion is the same: The unsatisfied demand for food in the United States is much less than agriculture's capacity to produce.

The analysis supporting the results presented in this paper is admittedly crude. However, in a qualitative sense, we believe the following conclusions are valid.

An income supplement of approximately \$20 billion would be needed to increase food expenditures of the poor by \$3.3 billion (roughly the amount of direct Government payments received by farmers in 1967) if the income recipients were allowed to spend their income at will. On the other hand, if the Food Stamp Program funds were increased by \$3.3 billion, most of this presumably would result in increased expenditures for food as the program is now operated.

An increase of \$3.3 billion in food expenditures represents less than 2 percent in food consumption and total farm output as of 1967. This 2 percent increase in farm output would still leave a large part of agriculture's productive capacity unused. Potential feed concentrate supplies could support, if forages and other inputs were available, a 25 percent increase in livestock products. Food grain supplies, too, could readily be expanded about 15 percent. But the demand for food grains decreases when low-income people obtain more food purchasing power. Thus, the excess ca-

pacity problem for food grains would be aggravated rather than ameliorated.

The changes in food consumption patterns that would result from an increase of \$3.3 billion in food expenditures by the poor would do much to improve the adequacy of their diets as measured by nutritional standards. The result would remain far from the standards, however. The consumption patterns of the affluent miss the mark by quite a bit too. As long as people have a choice in selecting the foods they eat, discrepancies will likely persist. A vigorous educational program would help to close nutritional gaps. But nutritional standards may never be met because they incorporate safety factors to insure that virtually all segments of the population would receive sufficient food. At these levels, many people would be getting more food than they wanted or needed.

An increase in food consumption of at least 25 percent would be needed to maintain farm prices and incomes if farm productive capacity were turned loose. It is unlikely that people would eat this much additional, regardless of the incentives. Food expenditures would have to increase about \$25 billion to expand demand for farm output sufficiently to replace, through the market, the \$3 billion farmers now receive in direct payments.

If present cropland diversion programs and direct payments were discontinued, the only practical way of maintaining farm income would be to raise farm prices. And, aside from an expensive price support program, prices could only be raised by mandatory restriction of supplies. Such controls, except for a few crops, seem to be out of the question at the present time. Moreover, should farm prices increase, food programs would become more costly.