IMPACTS OF ASSET FIXITY ON AGGREGATE PEANUT SUPPLY RESPONSE

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ABSTRACT

IMPACTS OF ASSET FIXITY ON
AGGREGATE PEANUT SUPPLY RESPONSE

by Daniel D. Badger

The objective of this study is to analyze those factors primarily associated with the partial irreversibility of the peanut supply response, and to determine the interrelationships among those factors. Both non-normative and normative approaches are followed. The interrelationship between these two approaches allows a more thorough analysis of the peanut industry, and provides the bases for making recommendations and for suggesting alternative actions by the industry to direct the supply and demand of peanuts toward equilibrium. Such right actions may also be used to modify some of the rigidities that exist in the peanut industry. Any explanation of the irreversibility of the supply response for peanuts must consider the relevant government programs.

Asset fixity theory plays an important role in explaining the partially irreversible supply response for peanuts. Major emphasis is given to modification and further development of asset fixity theory in the analysis of the impact of fixed resources on the peanut supply response. Diagrams are used to illustrate theoretical concepts.

The effect of the peanut price support program on land values indicates that a substantial capital gain (the capitalized value of the

acreage allotment varying by production areas from $500 to $1,000 per acre) has accrued to allotment owners. Change in support price levels, or a major change in the price support program would cause an associated capital gain or loss to the allotment owners. The Acreage Allotment and Soil Bank programs have not been fully effective in controlling the aggregate supply of peanuts.

Labor is a declining input in peanut production. Shortages of labor and increasing wage rates have encouraged the adoption of combines and other types of equipment as labor substitutes. Labor reduction has not had a significant impact on the peanut supply response. Labor for harvesting peanuts is reduced by approximately 22 hours per acre through the use of combines. The benefits are evident in larger peanut acreages per farm and by the trend toward consolidation of acreage allotments resulting in more efficient production.

Machinery is an important capital asset in the peanut enterprise, which must be fully utilized to attain maximum efficiency and to reduce capital losses when peanut price decreases. After mechanization producers tend to continue a given level of production resulting in little or no response to product price decreases or input price increases, at least within a specified range.

Two sets of equilibrium prices are considered. One of these prices equates MVP and MFC when MFC is based on acquisition cost for all resources. The second equilibrium price is that which equates MVP and MFC only when MFC is based on a price between acquisition cost

(P_{acq}) and salvage value (P_{salv}) for the resources. Production is maintained at high levels despite product price decreases under the second situation, because, although capital losses are sustained, it is less unprofitable to continue utilizing these resources than it is to sell them at P_{salv}.

Recommendations for new legislation which would aid in alleviating some of the present problems in the peanut enterprise are either: (1) to revise the present government program so that allotments can be reduced below 1,610,000 acres and the level of price support can be decreased below 75 percent of parity, or (2) to allow the acreage allotments to become negotiable and establish a system whereby the government can buy and sell allotments. Capital losses would still be incurred even under these programs. An expanded research and extension program to improve knowledge would reduce some of the erroneous overcommitments of durable resources in peanut production.

IMPACTS OF ASSET FIXITY ON
AGGREGATE PEANUT SUPPLY RESPONSE

by

Daniel D. Badger

A THESIS

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DOCTOR OF PHILOSOPHY

Department of Agricultural Economics

1963

DEDICATED

IN

MEMORY

OF

MY

GRANDMOTHER

BETTY BOOLE DOWNING

I Have Fought a Good Fight,
I Have Finished my Course,
I Have Kept the Faith.

II Timothy 4:7

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Any errors in this thesis are the full responsibility of the author.

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CHAPTER I

INTRODUCTION

Statement of the Problem

Peanut producers have produced an annual "surplus"[1] of peanuts in every year except one[2] since the acreage allotment program was reinstated in 1949. This has occurred despite mandatory reductions in acreage allotments, i.e., the land input, by almost 40 percent from 1949 to 1962.

The general problem is the annual surplus of peanuts which the Commodity Credit Corporation (hereafter referred to as the CCC) has had to purchase at the minimum support price. The supply of peanuts exceeds edible requirements at current support price levels. Thus, some quantities of unneeded resources are being used in the peanut industry. The specific problem which will be investigated in this thesis is why peanut producers have not reduced the aggregate supply of peanuts in response to product price decreases and/or reductions in acreage allotments during the 1949-62 period.

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[1]Surplus is defined as an excess of supply over demand at the support price established by USDA for any given marketing year. The USDA establishes a minimum support price based on a parity level of support, which in turn is determined by the supply percentage. These terms will be further discussed in Chapter IV.

[2]1954 was an extremely poor crop year for peanuts, due to unfavorable weather conditions during the planting and growing season, particularly in the Southeastern and Southwestern production areas.

It is hypothesized that the aggregate supply response for peanuts is more elastic upward, in response to product price increases and input price decreases, than it is downward, in response to product price decreases and input price increases.

The conventional economic analysis is based on the assumption that producers respond to product price decreases by reducing output, assuming no change in input costs and no changes in the general price level via either deflation or inflation. It further assumes that the supply function is reversible, i.e., that a given decrease in product price will reduce output as much as it increased as a result of a previous equal price increase. This conclusion is based on the assumption that the acquisition cost or purchase price is the same as the salvage value or sale price for each input used,[3] if the owner desires to sell the input.

Acquisition cost for both conventional and fixed asset analyses can be defined as the price of a purchased stock or input, or the marginal factor cost of the stock if produced by the firm. The salvage value is the sale value of the input or resource. This is usually considered to be the "opportunity cost" or what the stock is worth to someone else, i.e., its marginal value product (MVP) to another firm. Though ordinarily positive, salvage value can be negative, as in the case of a fence which has deteriorated, or the remains of a building which has burned or collapsed and must be removed before a new asset

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[3]A short-cut notation for this situation is that $P_{acq} = P_{salv}$, i.e., the acquisition price or cost equals the salvage price or value.

can be added in the same location. Marginal value product (MVP) is the present value of the expected change in total value product from using either the flow of services of the durable input, or it is the lifetime value in use of the durable stock itself. More simply, the MVP of a unit of stock is the present capitalized value of its future stream of net MVPs.[4]

A specific objective of this study is to investigate those factors which cause the supply response for peanuts to be irreversible. Irreversible as used in this thesis means that for both individual producers and the peanut industry the production response to product price decreases and/or input price increases is not the same as the production response to product price increases and/or input price decreases. Data and diagrams will be presented to show that the aggregate supply response[5] for the peanut industry has not followed the classical reversible supply concept, but has been partially irreversible during the period 1949 to 1962.

A relatively new theoretical concept has been proposed which allows a more realistic interpretation or explanation for the irreversible

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[4]The net MVP is computed on the average number of units of flow that are utilized with a deduction being made for the cost of the additional units of flow of service of the stock.

[5]The use of the term "supply response" in this study has a different connotation than that found in its strict usage in economic theory. The conventional supply function or supply response shows the quantities of a commodity that will be offered per unit of time at various alternative prices for the commodity. As used in the fixed asset theory, and in this thesis, supply response means the effect of price and related institutional factors, i.e., minimum price support, parity price, etc., on the supply in subsequent time periods.

supply response existing in the peanut industry. This new concept or theory is called fixed asset theory. The term, asset fixity, as used in the title of this dissertation, was rephrased from the original term. An asset can also be defined as an input, factor, or resource.

Asset Fixity Theory

What is a fixed asset? In neoclassical economic theory, the reasons for a fixed asset are not clearly specified. In that theory fixity is sometimes related to the expected useful life of an asset. Thus, in a short production period, there are some resources or assets which are considered fixed. In the long run, sufficient time elapses so that all assets or resources can be considered variable, and thus there are no fixed costs in the long run.[6]

Observation of production in almost any industry reveals that regardless of the expected useful life of the asset, there have been many instances where it has been profitable to change the quantity of supposedly long-run durable resources. It is also quite obvious that for many durable resources, acquisition price is not equal to salvage value, not only between two different time periods, but not even within the same time period. Interest charges, attorney's fees, transportation costs, etc., in the purchase and sale of resources cause a spread between net acquisition cost and net salvage value.

In an economic sense, a fixed asset is defined as a durable input which is fixed in production because the expected future stream

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[6]Marshall, Alfred, Principles of Economics, Eighth Edition Macmillan & Co., London, 1956, p. 313.

of marginal value products[7] in its present use neither justifies acquisition of more units of the input nor disposal of any units presently in use. Thus, a fixed asset is one for which its $P_{acq} \geq MVP \geq P_{salv}$.

The conventional factor-factor analysis in production economics indicates only one expansion path or line of least cost combination (LCC), based on the tangency of the various isoquants (isoproduct contours) and the isocosts, where the isocost line is derived from P_{acq} for both factors. There would also be only one high profit point (HPP), and at this point, $\frac{MVP}{MFC} = 1$ for both inputs.

However, when differences between P_{acq} and P_{salv} are recognized, there are four relevant isocost lines for each level of cost outlay involved. In Figure 1, the isoquants, or isovalue product contours if measured in dollar terms, are shown for two durable inputs, X_1 and X_2, used in producing Y. For this analysis and all other diagrams and discussions in this thesis, it is assumed that $P_{acq} > P_{salv}$ for all inputs. Thus, for a given cost outlay, the amount or value of product produced will be greater when the assets are priced at their salvage value than when they are priced at their acquisition costs.

As indicated in Figure 1, the point at which the isovalue product lines or isoquants will be tangent to the isocosts depends on which price is used for each input. With these four isocost lines,

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[7]Marginal value product will hereafter be referred to as MVP.

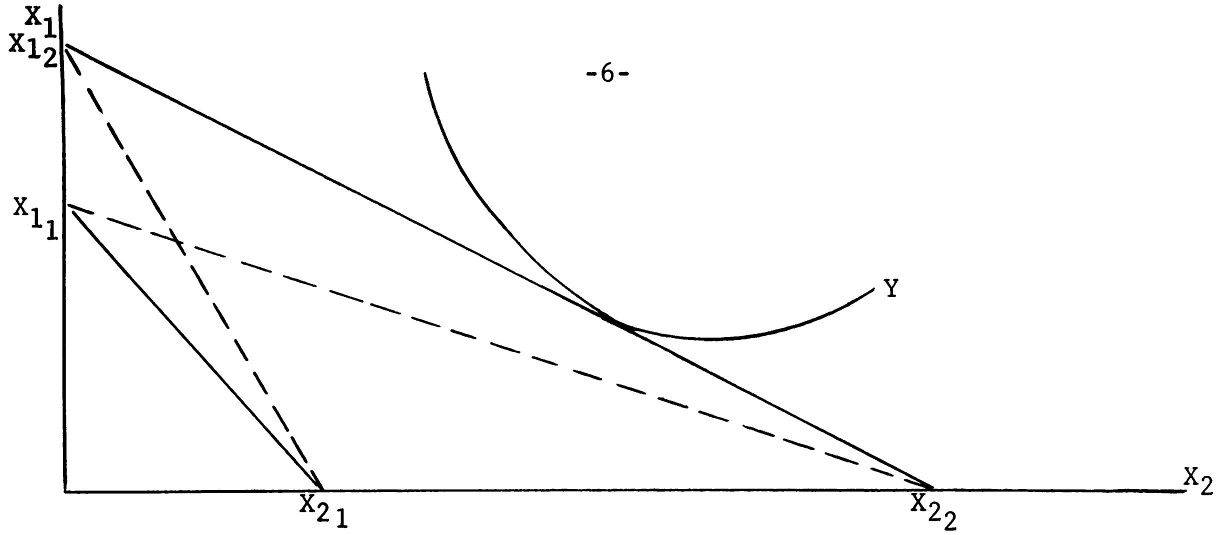

Figure 1: Derivation of Four Isocost Lines, Based on Differences in Acquisition Cost and Salvage Value for Each Input

four different expansion or contraction paths[8] are developed. The X_{1_1} and X_2 quantities of each input are based on the acquisition prices of the respective inputs. Similarly, the X_{1_2} and X_{2_2} quantities of each input are based on a salvage value which is lower than the acquisition cost. Total outlay cost is the same in locating these four isocost lines. Consequently, <u>four</u> high profit points (HPP) are derived, as illustrated in Figure 2.

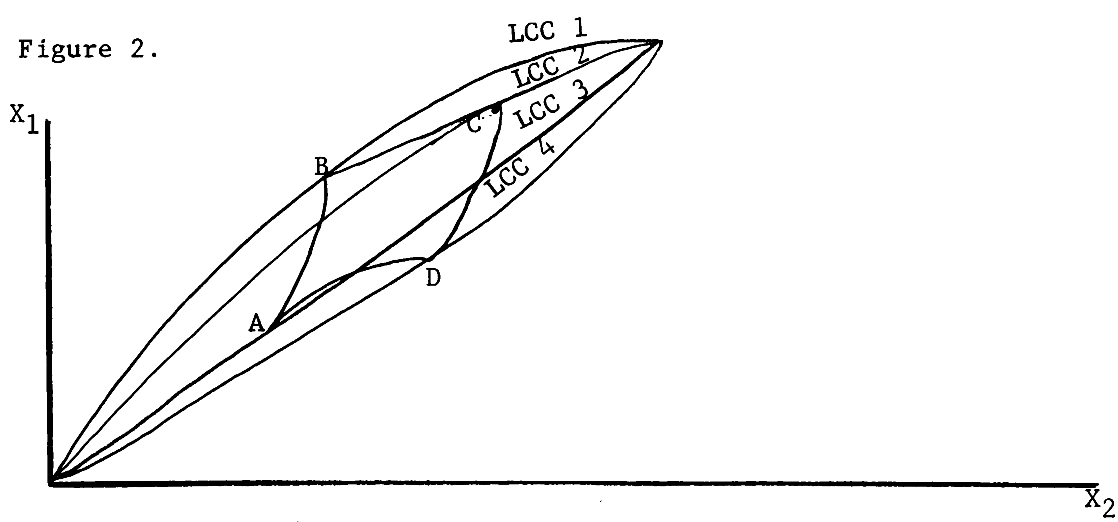

Figure 2: Derivation of Four Lines of Least Cost Combination and Four High Profit Points, Based on Difference in P_{acq} and P_{salv} for Two Inputs

The line represented by LCC 1 is the LCC line when X_1 is priced at P_{salv} and X_2 is priced at P_{acq}. Similarly, LCC 2 represents

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[8]Perhaps it is more correct to refer to these four lines as lines of least cost combination (LCC). This nomenclature holds whether the assets are priced at P_{acq} or P_{salv}.

X_1 at P_{acq} and X_2 at P_{acq}. LCC 3 represents X_1 at P_{salv} and X_2 at P_{salv}, and LCC 4 represents X_1 at P_{acq} and X_2 at P_{salv}.

In Figure 2, HPP A is located on the acquisition cost line for both inputs and identifies that level of production where both inputs are priced at P_{acq}. As such, it represents a lower level of production than any of the other HPP's. HPP C represents the level of production where both inputs are priced at P_{salv}. Since the assets are priced at their salvage value, more of each input would be used in producing Y. Hence the HPP would be located at a higher level of output than any other of the points. Point B represents the HPP where X_1 is priced at P_{salv} and X_2 at P_{acq}. Point D represents the HPP where X_1 is priced at P_{acq} and X_2 at P_{salv}. Figures 1 and 2 provide a graphical illustration of how much of each of the two durable inputs should be used under various prices of the inputs.

The above concepts can be integrated into a third diagram to illustrate the profitable levels of use for each input. Four isomarginal value product lines,[9] two for each input, are necessary in this analysis. In Figure 3, these lines are indicated by the solid lines running vertically and horizontally in the diagram.

Line AB represents the locus of all points for X_2, where the MVP = P_{acq}. Line DC represents the locus of all points for X_2, where MVP = P_{salv}. Similarly the line AD represents the locus of all points for X_1 where MVP = P_{acq}, and line BC represents the locus of all points for X_1 where MVP = P_{salv}.

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[9]An isomarginal value product line is the locus of all points of a production function having equal marginal value products.

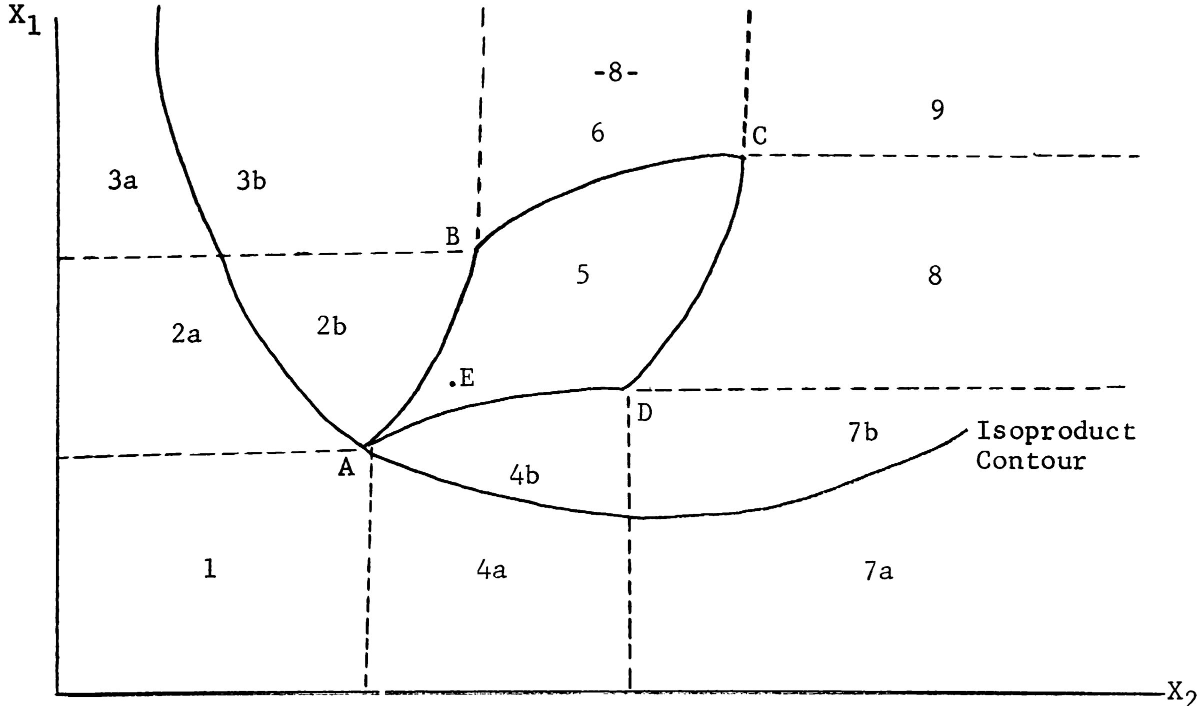

Figure 3: Key Areas of Adjustments Indicated by MVP's, Acquisition Costs, and Salvage Values for Two Durable Assets[10]

As shown in Figure 3, these four lines will intersect at four points on the production function for the two inputs used in producing one product. HPP A is indicated where lines AB and AD intersect. Thus, at HPP A, for both factors MVP = P_{acq}. Similarly, HPP C is indicated where MVP = P_{salv} for both factors. HPP B is at the intersection of AB and BC and indicates that for X_1, MVP = P_{salv}, but for X_2, MVP = P_{acq}. HPP D is at the intersection of AD and DC and indicates that for X_1, MVP = P_{acq}, but for X_2, MVP = P_{salv}.

It should be noted that these four lines trace out an irregular quadrilateral area on the production surface and that the four lettered points in Figure 3 correspond to the same four lettered points in Figure 2. In areas 4 and 6 of Figure 3, the X_2 asset is fixed (its $P_{acq} \geqq MVP \geqq P_{salv}$) and only X_1 can be adjusted; <u>i.e.</u>,

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[10]Glenn Johnson first developed this diagram, without the subdivisions in Areas 2, 3, 4, and 7. The diagram was originally presented in Johnson, Glenn; and Hardin, Lowell, <u>Economics of Forage Valuation</u>, Station Bulletin 623, Purdue University, Lafayetter, Indiana, April 1955.

expanded in area 4 and decreased in area 6 to reorganize production of the enterprise to the edge of area 5. Similarly, X_1 is fixed in areas 2 and 8, and X_2 can be adjusted only to the boundary line of area 5.

Areas 2 and 4 actually should be separated into two sub-areas, as shown by 2a and 2b, 4a and 4b in Figure 3. If the enterprise is organized in area 2a, the use of input X_2 can be increased, since for X_2 MVP $> P_{acq}$, and production can be increased to the same level as that obtained at HPP A, indicated by the isoproduct contour, which includes point A. However, the optimum organization indicated by HPP A cannot be reached. Similarly, in area 4 a, the use of X_1 can be increased, since for X_1 MVP $> P_{acq}$. Production can be increased to the level indicated by the isoproduct contour, or the same level of production as obtained by the optimum organization at HPP A.

In areas 2b and 4b, the enterprise is organized such that overproduction with respect to HPP A is occurring. Any adjustments in these areas will be towards the boundaries of area 5, <u>i.e.</u>, use of X_2 in area 2b and use of X_1 in area 4b will be increased to the level at which MVP = P_{acq}. Thus, even though overproduction was previously occurring, more production is forthcoming, even at lower product prices as producers attempt to reorganize production by using some factors of production until MVP = P_{acq}, while the other factor, $P_{acq} \geq$ MVP $\geq P_{salv}$, and its use cannot be adjusted.

In area 9, the salvage values of both "fixed assets" are greater than their respective MVP's. It pays to sell or salvage some of each asset until point C at the extreme corner of area 5 is reached. Production may be <u>decreased</u> some in areas 6, 8, and 9. However, depending on the location in areas 3 and 7 with respect to the isoquant, the producer may either increase or decrease production as he makes adjustments in his assets to the edge of area 5. This explanation is similar to that for areas 2 and 4. In area 1, the MVP of each asset is greater than its respective acquisition cost; hence, it is profitable to expand production by increasing the use of both X_1 and X_2 until HPP A is reached.

However, the most rigid fixity arises within area 5. In this area, both X_1 and X_2, e.g., land and machinery investments in the peanut industry, are fixed, since, for both assets in this range, $P_{acq} \geq MVP \geq P_{salv}$. If each individual farm is producing just a few more peanuts than it would be producing at point A, e.g., if each peanut farm is located at point E in area 5, then the aggregate effect of all such producers results in an annual production that is greater than consumption at the supported price.

For any producer trapped in area 5, if the inputs are durable, the marginal value productivities of the inputs are not sufficient to maintain their capital value equal to the acquisition prices paid for the durables. As a result, farmers suffer capital losses since it is impossible for the individual farmers to contract production from some point in area 5, e.g., point E, to HPP A without suffering greater losses than if they continued to produce at point E. As a matter of fact, purchase or acquisition of assets, i.e., reorganization adjustments, in all the other areas except area 1 result in overproduction and capital losses for the peanut enterprise. For example, the resource owner suffers capital losses on X_1 if production is located in areas 2, 3, 5, 6, 8, or 9. He suffers capital losses on X_2 if production is located in areas 4, 5, 6, 7, 8, or 9.

Under conditions of perfect knowledge, some adjustments can be made in area 5 by changing the rate of flow of service from the fixed assets. However, even under perfect knowledge, resource adjustments are not economically feasible when $P_{acq} \geq MVP \geq P_{salv}$.

The geometrical presentation and the discussion of fixed assets in this thesis are in three dimensional terms, using only two durable resources or fixed assets and one product. However, this in no way implies that only two fixed assets are of concern in the analyses developed in this thesis. Obviously, the producer may have a production function $Y = f(X_1, X_2 \ldots X_n)$ where for each X_i, $P_{acq} \geq MVP \geq P_{salv}$. Edwards made use of this n-dimensional concept in a recent journal article, as well as presenting the algebraic formulations in his Ph.D. dissertation.[11]

Viewing the peanut industry in the aggregate, annual production of peanuts tends to remain relatively stable, except for variations caused by weather, despite price fluctuations and decreases in the government support price. This production has been stabilized by (1) the large investment in fixed resources, and (2) the desire and efforts on the part of individual producers to maintain income at a constant level, *i.e.*, they strive to increase production in periods of lower prices.

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[11]Edwards, Clark, "Resource Fixity in Farm Organization", *Journal of Farm Economics*, Vol. 41., November 1959, pp. 747-759, and *Resource Fixity, Credit Availability, and Agricultural Organization*, unpublished Ph.D. dissertation, Michigan State University, 1958.

However, the mere graphing of two separate supply responses[12] for price increases and decreases is only a reflection of the underlying causes for this phenomena and not the explanation. To seek the explanation, one must delve into the structure of the farm organization and into institutional and economic factors affecting the resources, and the resulting decisions, of the peanut farmer. The theory of asset fixity can be applied to the peanut industry to acquire an understanding of the basic underlying causes of the supply-demand disequilibrium existing in the peanut industry at the present time. Study of the basic factors underlying the partial irreversibility of the peanut industry supply curve will be given major emphasis in this thesis.

A study to determine what are the major causes of the irreversibility of the supply curve has relevance for farm policy considerations for two reasons:

(1) In periods when production is greater than present consumption needs, the ability to delineate those factors causing increased output per unit of input, and to suggest methods of controlling the use of these factors in agriculture would be very useful knowledge for policy makers. Pricing and/or institutional restrictions could be used to prohibit use of these factors during periods of excess supply;

(2) During periods when consumption needs are greater than production, knowledge of factors causing greater efficiency in production, _i.e._, greater output per unit of input, would

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[12]Instead of two separate supply responses, one for a product price increase and the other for a product price decrease, it is possible that a kinked supply curve would better represent the situation that exists in the peanut industry.

allow the use of economic or patriotic[13] incentives to be applied to these factors to increase production. With a steadily increasing population and stable or slowly rising per capita consumption, the need for increased production may arise sooner than the present situation would seem to indicate.

In this study, existing empirical data and facts relative to the peanut industry will be used to attack the problem of overproduction. Also, to develop a basis for future actions, a discussion of normative considerations for government programs will help establish a basepoint for recommendations for alternative peanut programs. In this latter connection, it must be realized that value concepts differ (1) among action groups in the peanut industry, i.e., government officials enforcing price support-acreage allotment programs and the peanut growers, (2) among individuals within a given segment of the peanut industry, i.e., among peanut growers or between Republican and Democratic administration officials in Washington, and (3) among research workers in USDA and at the various state Agricultural Experiment Stations.

Summary

This thesis will consider both theoretical and empirical aspects, and normative as well as non-normative considerations affecting the irreversibility of the aggregate peanut supply response. Such a study in the area of aggregate supply response, with emphasis on the fixed assets in peanut production, will make a contribution to the

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[13]This was used to some extent in World War II to encourage producers to meet certain production goals to fill the wartime needs for oil.

analysis of an inherent, basic problem facing agriculture, i.e., the partial irreversibility of supply responses. Such an analysis permits a more valid appraisal of the current status of the peanut industry and points towards "right actions" to eliminate some of the present problems.

The overall problem is the apparent inability of peanut producers to adjust quickly to decreases in product prices. Since current supply exceeds demand at the government support price, a "surplus" of the commodity exists.

Given the existing situation of overproduction and over-commitment of resources in producing peanuts, this thesis has as its objectives (1) the analysis of some of the more important factors affecting peanut production, (2) their effect on the aggregate supply response, and (3) gaining some insight into the partial irreversibility of supply responses.

CHAPTER II

PROCEDURE AND REVIEW OF LITERATURE

Procedure

The general procedure for developing this thesis will be as follows:

(1) A review of the literature on fixed asset theory and work in related areas which will be helpful in analyzing partially irreversible supply responses will be presented in this Chapter (Chapter II).

(2) Additional fixed assets concepts will be presented in Chapter III. Use of diagrams will relate these concepts to those resources of likely importance in causing overproduction of peanuts. Some possible reasons for the inability of farmers to make resource adjustments will also be presented.

(3) Programs affecting the peanut industry will be reviewed in Chapter IV.

(4) Factual information on three resources will be presented, namely, Chapter V on land and land substitutes, Chapter VI on machinery, and Chapter VII on labor. Effects of government policies and programs will be related to land. The effects of World War II developments will be considered in various sections.

(5) The effect of the three selected factors and some related resources on the aggregate peanut supply response will be treated in Chapter VIII. Normative considerations will also be used in the aggregate analyses since non-normative considerations do not reflect farmers' value systems or explain fully why farmers react as they do in given situations. An explanation of what has happened, and a discussion of what is likely to happen in the future, in the production of peanuts also will be developed in that Chapter.

(6) Additional normative considerations will be presented in Chapter IX. Finally these normative considerations will be integrated with the preceding theoretical and empirical analyses to provide the bases for recommended right actions in Chapter X.

Review of Literature

Johnson has tried to explain the partial irreversibility of supply responses with asset fixity theory.[1] He argued that separate supply functions are necessary for rising and falling prices. In some agricultural commodities, the supply responses to price decreases differ from those for increases.[2] Farm production reacts quickly to product

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[1]Johnson, Glenn L., "Supply Function--Some Facts and Notions," Agricultural Adjustment Problems in a Growing Economy, Iowa State College Press, 1958, pp. 74-93.

[2]Halvorson, Harlow W., "The Response of Milk Production to Price," Journal of Farm Economics, Vol. 40, Dec. 1958, pp. 1101-14. Halvorson dealt with this problem in a recent study of milk supply responses to price. He found that rising prices resulted in higher supply elasticities than did falling prices.

price increases or input price decreases, but sluggishly, or in some different manner to reductions in price received for the product or to an increase in input price.

Evidence of this "atypical" supply response[3] is found in the moderate reduction in peanut production resulting from the 10 percent reduction in the price support level for peanuts in 1959. The slight reduction occurring in acreage planted, yield per harvested acre, and acreage harvested in the 1959 crop year can be attributed to unfavorable weather conditions at planting and at harvest time.[4] There is little evidence of intentions of farmers to reduce supply in response to the almost certain decrease in the product price. The Conservation Reserve Program also enticed some growers in some states (primarily Georgia, Alabama, Oklahoma, and Texas) to sign up peanut acreage in the program in 1959. Thus some of the decreased acreage planted to peanuts was, causally, more related to this new Conservation Reserve Program than to the decrease in the peanut price.

In recent years, other writers have touched on this problem of irreversible supply responses for various agricultural commodities. For example, Cochrane and Butz[5] indicate that multiple enterprise firms

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[3]This is "atypical" only in the sense that it does not correspond to the concept of a reversible supply curve.

[4]Extremely wet weather at harvest time reduced yields considerably in both the Virginia-Carolina area and the Southeast area. Crop Production, 1959 Annual Summary, AMS, USDA, Dec. 16, 1959, p. 24.

[5]Cochrane, Willard W., and Butz, William P., "Output Response of Farm Firms," Journal of Farm Economics, Vol. 32, Nov. 1951, p. 445.

and the agricultural industry in general do not expand supply along the same marginal cost curve as do individual enterprises. They argue that the output of such multiple enterprise agricultural firms and industries approaches perfect inelasticity, other things remaining constant. They place great emphasis on classical opportunity cost principles in explaining supply responses for individual commodities. More recently, Cochrane has tended to explain away any changes in aggregate farm output over time by blaming, or giving credit to, technology.[6] Still more recently, he has conceded that other factors as well as technology might have a hand in explaining the aggregate supply response,[7] and why it has reacted sluggishly, or even contrary to the conventional explanation for price-supply responses.

A previous study by this writer attempted to measure empirically the major factors affecting peanut production in the Southwest peanut producing area.[8] However, due to the failure to separate periods of price increases from periods of price decreases, the resulting parameter estimates are not applicable for any given production period. Upton Livermore also had difficulty in obtaining valid supply estimates; he worked on the assumption that the supply response would be the same for

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[6]Cochrane, Willard W., Farm Prices, Myth or Reality, University of Minnesota Press, 1958.

[7]Cochrane, Willard W., "Farm Technology, Foreign Surplus Disposal and Domestic Supply Control," Journal of Farm Economics, Vol. 41 Dec. 1959, p. 885ff.

[8]Badger, Daniel D., and Plaxico, James S., Selected Supply and Demand Relationships in the Peanut Industry, Processed Series P-338, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma, Dec. 1959.

equal changes in product price, both upward and downward.[9] This writer is not familiar with any other efforts on the supply side although other researchers have made elasticity estimates for various demand parameters in the peanut industry.[10]

Related to the problem of overproduction is the annual surplus stocks of peanuts purchased by CCC. Estimates of peanut consumption and production in 1965 by Livermore,[11] based in part on a demand equation developed by this writer and Plaxico[12] at Oklahoma State, indicate that if the predicted 8.5 pounds per capita consumption of peanuts (farmers' stock basis) could be achieved by 1965, the American consumers would have "eaten their way out of the surplus", so as to speak, since CCC stocks would be eliminated. In that case, increased peanut production, through acreage increases, or perhaps via higher yields on the same acreage, might be in order to meet consumption needs of our increasing population.

On the other hand, predictions to 1965 based on a more stable consumption rate of approximately 6.5 pounds[13] per capita (farmers'

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[9]Livermore, D. Upton, The Response of Peanut Supplies to Technological Progress, Institutional Changes, and Economic Conditions, M.S. Thesis, Michigan State University, 1960.

[10]Examples of such studies are (1) Banna, Antoine; Armore, Sidney J.; Foote, Richard J., Peanuts and Their Uses for Food, Mktg. Res. Report No. 16, BAE, USDA, Washington, D.C.; (2) Reagan, Sidney, Peanut Price Support Programs, 1933-1952, and Their Effect on Farm Income, Unpublished Ph.D. dissertation, Harvard University, Nov. 1953.

[11]Livermore, D. Upton, op. cit.

[12]Badger and Plaxico, op. cit.

[13]This per capita consumption rate is for the 1958-59 marketing year when the equations were estimated by Livermore.

stock basis) indicate that we would slowly be approaching a balance between production and consumption, but that the CCC would still be handling some "surplus" stocks of peanuts. Thus, the problem of reducing this surplus through overcoming the sluggish supply response would still be relevant.

Adjustments in the aggregate supply structure for peanuts involve interregional competition, the present production pattern in the three areas, and the relative changes in the structure of supply between regions. Heady believes that the relative changes in the regional supply structures for any agricultural commodity are brought about by such things as technical change, insitutional innovations such as vertical integration, and changes in managerial skills of farm operators. These variables should be considered in addition to the more conventional observations on prices and other variables which economists have been able to measure and incorporate into their models.[14]

Heady also argues that the crucial supply information which will lead to improvement in agricultural policies and educational guidance must come in macro form, by important regional and national aggregates. He agrees on the need to study the relationships and decisions process underlying individual output choices if we are to understand fully supply phenomena, but that the individual quantities derived must be aggregated or must lead to improved procedures for estimating supply quantities from aggregate data.[15]

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[14]Heady, Earl O., "Uses and Concepts in Supply Analyses", Workshop, Estimating and Interpreting Farm Supply Functions, Chicago, Illinois, January 20-22, 1960, p. 3.

[15]Ibid., p. 11.

Resources vary in their physical characteristics. For example, the period over which services are given off, i.e., the length of life, varies as does the rate of flow within a given time period. Some resources are made up mostly of flow services, which, if not used in a given time period, are not available for use in a later period. A stock is defined as a physical unit of a durable resource. A flow is defined as the quantity of service being used from a stock during any given period of time. For nearly all resources used in peanut production, the $P_{acq} > P_{salv}$. Thus, the relevant question for reduced output is whether $MVP < P_{salv}$. If it is, then the flow of services of the fixed asset likely will be varied to provide the owner with the greatest net MVP for the resource. Discounting for uncertainty plays an important role in determining the rate of flow of services over the useful life of the fixed resource.

Within any given time period, market prices of the resources or their services have only a limiting relationship to the production response in that production period. Use of resources, such as services of buildings, some machinery, and labor with low mobility, may not be related to product prices of any one production period. On the other hand, other inputs are "one use" resources with the amount available in a later period depending on the amounts used and produced in a previous production period. Examples of these resources are seeds, feeds, fertilizers, chemical weed sprays, etc.

Inherent in the study of the impact of fixed assets on the aggregate supply response for peanuts is the problem of the flow and stock relationship for these fixed durable assets. If stocks have

different lengths of useful life, flows can be used as a common denominator, as long as the interval or time period under consideration is specified. The term service is sometimes used to describe the periodic contribution of a resource to production. The primary durable input in the peanut industry which is concerned with this stock versus flow concept is the peanut combine. A discussion of these two related concepts will be presented in the machinery chapter.

There appears to be considerable controversy as to whether the stock of fixed productive factors shall be included explicitly in the production function.[16] Smith,[17] however, takes the position that both stocks of capital goods and flows of current inputs should be included.

> "The direct objects of adjustment or action parameters of the firm are (1) the current inputs to current production, and (2) the physical stocks of the various kinds of capital goods employed. The distinguishing characteristic of capital goods is simply that their presence, in the form of physical stocks, is required in order for production to take place....the inclusion of all current inputs in the production function permits one to account for the economizing consequences of variations in equipment utilization through the latter's impact upon the consumption of current inputs."

Others argue that only flows of services should be included. Sune Carlson[18] is a proponent of this position. Nerlove treats both stocks and flows of the services of fixed factors as variables in the production function.[19]

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[16] Ibid., p. 25, Nerlove, Marc, "Time-Series Analysis of the Supply of Agricultural Products."

[17] Smith, Vernon L., "The Theory of Investment and Production," Quarterly Journal of Economics, Vol. 73, Feb. 1959, pp. 65-66.

[18] Carlson, Sune, A Study in the Pure Theory of Production, P.S. King and Sons, London, Ltd. 1939.

[19] Workshop, op. cit., pp. 33-38.

Heady[20] believes that the supply relationship for the individual firm is more elastic than statistical estimates have seemed to indicate. He has tried to identify variables which "generate shifts in supply". Some of these factors causing the aggregate supply function to be, or to appear to be, inelastic downward are: (1) the identification problem, (2) highly correlated movements of factor and product prices, (3) technical development, and (4) capital accumulation and redistribution of assets.

Plaxico[21] holds that complete reversibility of the supply function depends on (1) price expectations held with certainty, and (2) an equality of acquisition prices and salvage prices of productive assets. He also adds that in the real world neither of these conditions hold, and that the nature of the supply relationship should be investigated when there is a difference in the acquisition and salvage prices of one or more assets.

Boyne and Johnson[22] presented empirical evidence, based on a survey of 178 farmers, to substantiate partially the preceding argument.. There were 49 farmers in the suvery who did not adjust production when product prices decreased. This latter group acted in a manner apparently

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[20] Heady, Earl O., "The Supply of Farm Products Under Conditions of Full Employment," American Economic Review, Vol. 45, May 1955, p. 228.

[21] Plaxico, James S., "Aggregation of Supply Concepts and Farm Supply Functions," Farm Size and Output Research, Southern Cooperative Series Bulletin No. 56, Oklahoma State University, Stillwater, Oklahoma, June 1958, p. 81.

[22] Boyne, David and Johnson, Glenn L., "A Partial Evaluation of Static Theory from Results of the Interstate Managerial Survey," Journal of Farm Economics, Vol. 40, May 1958, pp. 464-465.

consistent with the hypothesis that marginal costs were still below or equal to the newly reduced prices, or else that fixed elements in their situation prevented adjustments.

Nine farmers indicated they increased production in response to product price decreases, as opposed to 36 who decreased production.[23] The nine farmers who increased production gave consistent reasons such as: (1) expansion of that crop was still the best alternative despite the product price decrease; (2) more than offsetting reductions in costs, i.e., costs of production had a greater relative decrease than the product price decrease; and (3) correction of previous maladjustments so that marginal cost equals the new (lower) price, i.e., it became profitable to utilize more fully these durable assets by increasing the use of complementary variable factors.

Boyne and Johnson also present some empirical substantiation that the supply curve may be more responsive upward, to product price increases, than downward, to product price decreases, giving increased significance to the use of the fixed asset theory to explain why and how this happens.[24]

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[23]It would also be interesting to probe deeper into farmers' actual behavior to determine what they did to decrease production (i.e., if they reduced resource use), and just what number of "decreased production" answers were actually the end result the farmer was reporting and that perhaps the decrease in production was caused by natural elements (temperature, rainfall, or lack thereof). Of course, the same analysis should be applied to those who indicated "production increases" (in response to product price decreases).

[24]Boyne and Johnson, op. cit., pp. 461-463. This difference between the two different product price responses may not be statistically significant, due to random error. It does indicate that at least in some situations, producers have good reasons for not responding to product price change.

The IMS data also provide some evidence of farmers' behavior to input price changes. Four farmers increased output in response to input price increases with the aid of (1) cost reducing practices or new technology and/or (2) a more than offsetting increase in product price. Apparently they felt that the new input price was still less than the returns from its use.

Analysis of these data also indicates that farmers are less responsive to input price increases than to input price decreases.[25] Conventional economic theory, based on equality of salvage values and acquisition costs would indicate that farmers are equally responsive to input price increases and decreases. However, fixed asset theory, based on a difference between acquisition costs and salvage values, provides an explanation for farmers being less responsive to input price increases than to input price decreases.[26] This in turn helps explain, with changes in product prices, the irreversible supply curve characteristic of the peanut industry.

Possible causes for the acquisition cost of a durable resource being greater than its salvage value are (1) farms are dispersed causing transportation costs from farm to farm to maintain a spread between the two values; (2) institutional costs for some inputs are "one-shot" propositions and increase the initial acquisition costs, *e.g.*, brokerage

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[25]Forty-two percent of those mentioning an increase in input price did not change production; only 18 percent of those mentioning input price declines did not change production.

[26]Johnson believes this holds particularly for stock inputs following periods of expanded production.

fees, federal excise taxes, or state sales taxes; (3) positive supply functions for credit cause costs of ownership to be greater than sale value of the stock, i.e., interest rates increase after a certain level of credit has been used by the producer; and (4) labor is born into farm firms, resulting in it being a durable on these farms. In industry, labor can be hired and fired, thus making the services of labor a variable factor.

Willard Cochrane[27] has stated that "output response is not reversible because technological advance is incorporated into the response relation." Edwards[28] adds that "non-reversibility of supply response means that reversal of fixed conditions to a former state need not be accompanied by a complete reversal of output to its former level." Changes in any one of several basic determinants of asset fixity such as interest rate, acquisition costs, or product price would be sufficient to cause certain heretofore variable resources to become fixed or vice versa. However, it would be difficult to determine which of the fixed conditions led to the resulting irreversibility. Hence, there are other factors besides technology which have an important effect on supply response. Additional factors might be education, specialization, risk and uncertainty and mitigation thereof, and non-monetary motivations of farms.

Changes in the list of fixed assets and advances in technology are closely related in the real world. Technology certainly plays an

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[27]Cochrane, Willard W., "Conceptualizing the Supply Relation in Agriculture," Journal of Farm Economics, Vol. 37, Dec. 1955, p. 1172.

[28]Edwards, Thesis, op. cit., p. 112.

important role in the aggregative supply response being irreversible. However, it is entirely possible that specialization (based on comparative advantage), institutional considerations, etc., could change the list of fixed assets while technology is held constant. Thus, the supply response can become irreversible due to resource "stickiness" with no help from improved or new technology.

Haver has stated that factor market imperfections and institutional rigidities arise from successful efforts to gain protection for loss of sunken costs. He argued that government programs such as the high level price supports and acreage allotments have caused some of these imperfections and rigidities and have resulted in sluggish supply responses. This is a little different manner of explaining the basic cause of an irreversible supply response. Haver believes that, in one sense, uncertainty causes inefficient production. In the absence of uncertainty the same product could be produced with fewer resources and an optimal distribution of the product could be achieved.[29] This is primarily the reason why the price and income certainty generated by the government program has resulted in a more efficient allocation of resources in producing peanuts. However, as Haver stated, the price support and production control programs also have impeded adjustments to achieve optimal resource allocation.

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[29]Haver, Cecil B., "Institutional Rigidities and Other Imperfections in the Factor Markets," Agricultural Adjustment Problems in a Growing Economy, op. cit., p. 131.

The typical (conventional) supply-demand equilibrium analysis has not been effective in explaining the maintenance of production in response to product price decreases. This is one reason for the current emphasis on fixed asset theory in the hopes that such modifications will be useful in explaining the irreversibility of the supply response.

Other authors recently have discussed further implications of fixed asset theory and have argued its merits or its usefulness in explaining irreversible supply responses. However, there has been no study using a fixed assets approach to analyze the major factors of production in a specific enterprise such as peanuts. Using the above review of literature and discussion as the basic kit of tools, this author will attempt such an analysis in Chapter III and the following Chapters. Then recommendations or alternative "right actions" will be proposed in Chapter X.

CHAPTER III

THEORETICAL IMPLICATIONS OF ASSET FIXITY THEORY FOR THE PEANUT SUPPLY RESPONSE

Modifications of Existing Fixed Asset Theory

After a discussion of some fixed asset theory modifications, this theory will be used in some diagrammatical illustrations showing the effect of various durable resources on the aggregate peanut supply responses. These diagrams indicate the effect of differences in P_{acq}, MVP, and P_{salv} on these supply responses.

Some of Edwards' assumptions in the basic fixed assets model will be relaxed in this thesis to allow a further analysis of machinery, particularly combines, as fixed assets. Edwards based his analysis on the conditions that (1) prices are independent of quality and (2) stocks are perfectly divisible.[1] Peanut combines are usually designed for a standard capacity. Thus, the problem of divisibility cannot be overcome, as it might be with grain combines, by selecting different widths of cutting and pick-up attachments. However, this indivisibility can be handled, *e.g.*, a peanut combine may be owned jointly by several farmers, if an acceptable harvest schedule can be worked out. French

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[1]Edwards, Thesis, *op. cit.*

also illustrated a method which allows discontinuous units of stock to be handled within the framework of present marginal analysis, assuming perfect knowledge.[2]

Risk and uncertainty are important considerations in an individual farmer's decisions as to the size of the investment he will make in stocks of durable assets. There are times when it might appear profitable to add another unit of stock but the farmer hesitates because he is not certain that future earnings will make the machine a profitable investment, due to possible product price decreases, obsolescence, etc. On the other hand, the decision to make a change may be based on wrong assumptions about the future. For example, the thinking of many of the Oklahoma peanut producers is that the price support program will continue in operation in the foreseeable future, and that a guaranteed price, approximately the same as the present support price, will be maintained. It is possible, but not probable, that peanut producers will disapprove acreage controls and price supports in the next referendum.

It is likely that some assets do become fixed in the farming enterprise. In risk and uncertainty situations, technical, institutional, and economic variables work singly or in combination to determine fixity of assets in a farm or industry. Technical variables include discontinuous and immobile stocks of resources. Social custom, personal preference, habit, government policy and market structure are examples of institutional

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[2]French, B.C.; Sammet, L.L., and Bressler, R.G., "Economic Efficiency in Plant Operations with Special Reference to the Marketing of California Pears," Hilgardia, Vol. 24, No. 19, University of California, Berkeley, July 1956, p. 708.

variables which help determine asset fixity. Finally, the economic variables include such things as debt commitments, capital gains, taxes, transportation costs, transfer costs, depreciation, physical productivities, and product and factor prices.[3]

Edwards based his fixed assets exposition on the flow model concept, which is that a list of fixed services implies a set of stocks from which the services flow. This in turn means that a change in the flow of services[4] results in a change in the stock. An operational definition for fixed flows is that if no feasible change in the existing quantity of a service generates a positive gain in net revenue, then the flow is fixed. The owner can make optimum utilization of the resource during any given period of time using Edwards' model since he assumes a one to one (1:1) relationship between the flow of service of the durable and the durable asset itself.

However, in reality, the optimum flow[5] from a stock will seldom equal the utilized flow.[6] Bird has made a contribution in this

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[3]Edwards, Thesis, op. cit., p. 14

[4]Services are measured as units of flow per production period.

[5]The optimum flow occurs when the MVP of that flow just equals the MFC of using another unit of that flow of service from a stock within a given production period.

[6]Edwards does indicate (p. 28 of his thesis) that analysis of discontinuous stocks requires models which distinguish between used and available flows. However, he fails to note whether this lumpiness of stock is physical or is caused by asset fixity as we have defined it.

area by developing the relationship between the optimum rate of flow and the useful life of the durable resource.[7]

Available flow for a peanut combine is theoretically 24 hours a day, 365 days a year, with a time allowance for maintenance and repair. However, production characteristics limit the harvest season to a two or three month period. Weather in any given year limits the days of harvest even more. Finally, the peanut acreage on the farm and the yield per acre affect the utilized flow in any given production period.

A combine can be operated at the rate of approximately one hour per acre when the yield of combined nuts is 1,000 pounds per acre or less. When the yield is a ton or more per acre, the combining rate may decrease slightly, but not proportionately on a per acre basis. Rankness of the vines, number of rows of peanuts in the windrow, and the number of windrows per acre cause tractor, combine, and labor time to vary accordingly. Thus, the flow of services may not be the same on a per acre basis among the three areas or even among farms within the same production area.

Utilized or actual flow of service of a combine is affected by the factors such as the above which are not generally thought of as the major determinants of asset fixity, i.e., acquisition cost, salvage value, and product price. Consequently, the utilized flow of services of a durable stock seldom approaches the maximum or available flow.

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[7]Bird, Alan Ross, Towards A Feasible Program to Alleviate the United State Agricultural Surplus and Income Problem, unpublished Ph.D. Thesis, Michigan State University, 1960, pp. 92-130.

If the fixed asset is in discrete units, the optimum rate from each unit may change with the varying economic, technical, or institutional changes mentioned previously. Thus, the utilized flow of services from the stock may be varied in a given time period without adding an additional unit of stock or selling a unit presently in use. The relationship among break-even points for a peanut combine, custom combining and useful life of the combine, as presented in Chapter VI, are based on the previous discussion, i.e., the 1:1 relationship between stocks and flows has been abandoned for the analysis in that Chapter.

Random Errors

Imperfect knowledge of factor and product prices, government programs and other institutional factors, and the weather in any given production period affect the individual producer's decision on optimum location of production.[8]

Due to random errors caused by imperfect knowledge of the above uncertain factors, individual producers may be located in any one of the nine areas of production discussion in Chapter I, rather than at the optimum HPP, where P_{acq} = MVP for all inputs. In the aggregate, there are likely to be some producers in each of these areas of under- or over-production.

As illustrated in Figure 4, there are four general classifications of random errors. The numbers in the circles in the diagram are for identification purposes only, and do not correspond identically with the same numbered areas in Figure 3.

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[8]Location of production involves the type and quantity of inputs used, and the quantity of peanuts produced. Two producers may be producing at the same level, but located in different areas of economic fixity.

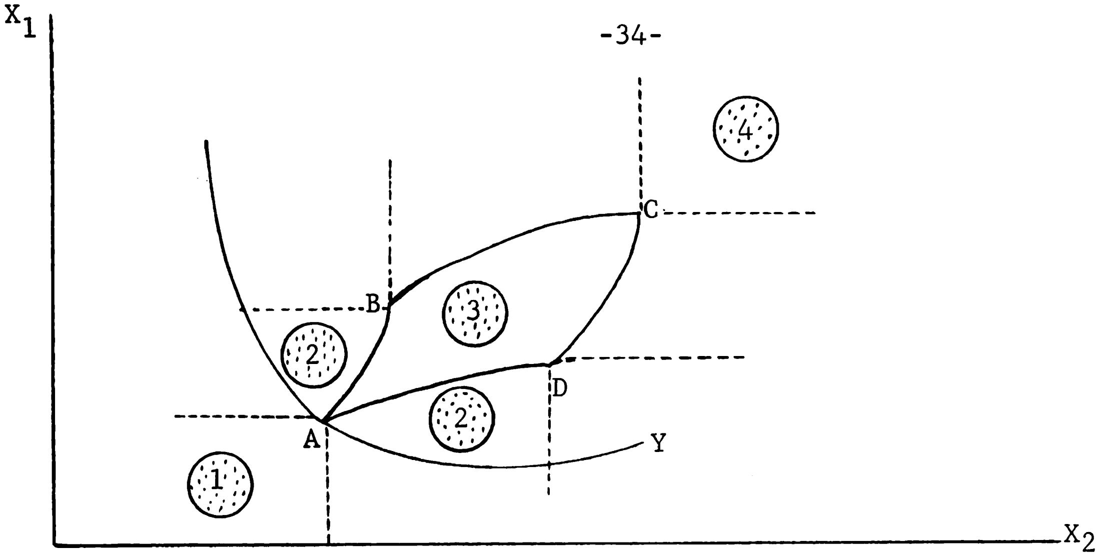

Figure 4: Four General Types of Production Errors in the Production of Peanuts

Assume there are two durable resources, X_1 and X_2, used in producing peanuts, Y. It is also assumed that some producers have organized and located in each of the general circles, numbered 1 to 4, through errors of organization and/or adjustments. If all producers had perfect knowledge and foresight, and organized their production to maximize profits, they would be located at HPP A.

In the general area 1, producers have made underproduction errors. These errors can be eliminated simply by increasing production. No capital losses are sustained on any assets in this situation. In the two circled areas designated by the number 2, overproduction errors have occurred. These errors can be partially eliminated, but this adjustment may increase production. Some capital losses are suffered on one asset or the other in these two areas.

In the circled area 3, overproduction is occurring and capital losses are being incurred on both durable factors. Furthermore, no adjustments can be made in this area to reduce production. In the circled area 4, where some farmers have been "stranded" through errors of

organization and subsequent product price decreases, reduction in production can take place as some units of the durable assets can be sold at salvage value, since in this area $P_{salv} > MVP$ for each durable resource. However, production will only be reduced to point C. Capital losses will be incurred on both inputs.

Several explanations of why producers make the "mistake" of organizing their farms so as to produce at some place other than the high profit point involve risk, uncertainty and the managerial process. Farmers are working with several inputs, not just the two indicated in Figure 4 and the other diagrams. It is very difficult to obtain expert knowledge about future <u>input prices</u> for all of these resources. Imperfect knowledge about future <u>product prices</u> and <u>technological relationships</u> is also likely, since no one can predict exactly consumer behavior or the rate of technological developments.

The producer may fail to foresee the aggregative effects of specialization, or of regional, sector, and enterprise adjustments on aggregate peanut production. He may also fail to see the aggregate impact of technical changes, or of adoption of new and improved technology due to economic changes. The effect of combines and irrigation in allowing the Southwest to become more competitive with the older established areas in peanut production is an example of this point.

The producer may not have foreseen the reduction in peanut acreage allotments. This could result in underutilized capacity for large capital investment factors of production. Similarly, the government and its agencies have not comprehended the aggregate impact of improvement in the human factor on aggregate peanut production. Farmers adopt new technology, increase use of fertilizer and irrigation, etc., to increase or maintain production when allotments are cut. Also today's farmers tend to have more education, and their adoption rate of research by public and private agencies is greater today than it was before World War II.

Most producers have imperfect knowledge in their ability to foresee wars, inflation, depressions, etc. They may also not understand the impact of these "cyclical" occurrences on their farm organization until it is too late and they are already trapped in the web of such happenings.

Once these errors of organization and location of production are made, the fact that $P_{acq} > MVP > P_{salv}$ for many of these resources results in inability to make adjustments to reduce production even if more adequate knowledge of the major variables is obtained.

Diagrammatical Presentation of Fixed Asset Theory Relevant in the Peanut Industry

The diagrams or illustrations which follow are based on the author's knowledge of production practices, trends, and expectations existing in the peanut enterprise. They are also based on the assumption that several durable resources used in producing peanuts are fixed assets, i.e., $P_{acq} \geq MVP \geq P_{salv}$. It is assumed that expendable items of production may be purchased and sold as needed, based on $P_{acq} = P_{salv}$.

Although these diagrams would necessarily reflect individual behavior, such behavior would be compounded by the number of farm managers producing peanuts. Consequently, although each individual would not be likely to consider the aggregate impact of his individual

actions on supply adjustment, such adjustments or lack of adjustments would combine to produce a problem of disequilibrium between supply and demand in an industry such as the peanut industry.

In Figure 5, the farmer is initially limited by the acreage allotment program with the land fixed at X_{2_1}. Assume that with perfect knowledge of everything except government program changes, due to periodic changes in the announced parity level of price support, the farmer has organized at HPP A, and is producing Y_a output.

Now assume that as a result of product price increases, the MVP of the other durable factor, e.g., a peanut combine, increases sufficiently such that MVP $> P_{acq}$. The reorganization and the increased use of the other factor results in an increase in output to Y_b with the "new HPP" at point B, based on the producer's imperfect price expectation.

Now assume that the resulting production at Y_b is greater than consumption at that price, and the price support is decreased. The price decrease will result in a decrease in the MVP of the other durable factor, such that $P_{acq} >$ MVP $> P_{salv}$. The resulting new optimum reorganization is that rectangular area with the HPP at point C, where P_{acq} = MVP for both land and the other durable factor. When the product price decreases, both the MVP and salvage value[9] of the other durable factor (X_1) decreases, resulting in a downward shift of the MVP = P_{X_1} salvage line in

[9]The salvage value decreases because the salvage value for a durable resource such as a peanut combine is its opportunity cost (MVP) on other peanut farms. Since the price support decrease is general, the salvage value would also fall.

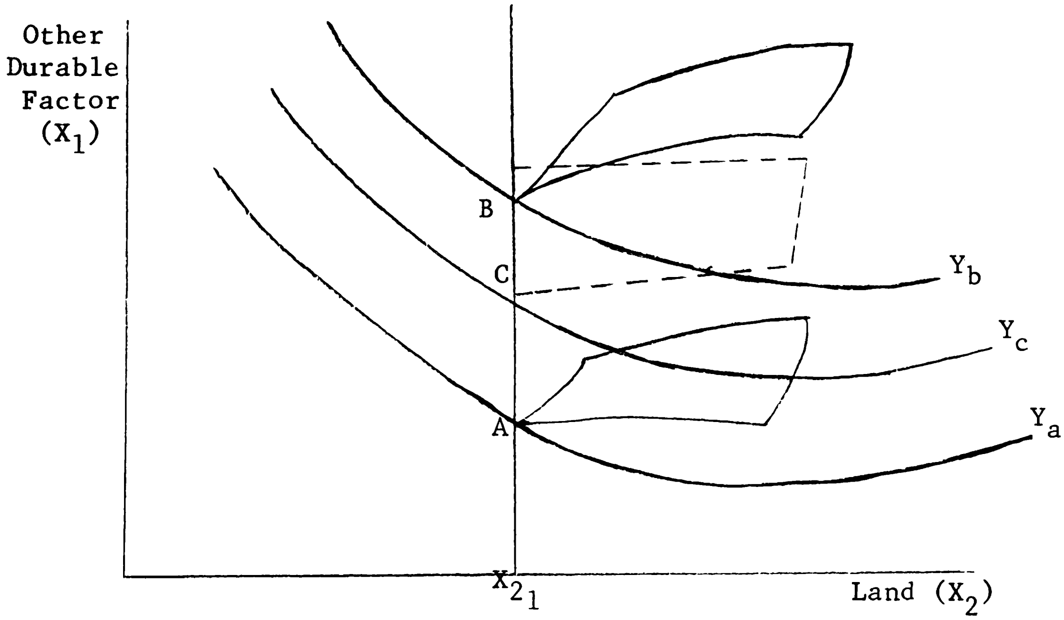

Figure 5: **Effect of Increases and Decreases in Peanut Price on Production, with Acreage Allotments Fixed, Under Perfect Knowledge of All Variables Except the Operation of the Government Program**

the rectangular area. Since the MVP for X_1 is in excess of its salvage value, the individual producer incurs a smaller capital loss by continuing to use X_1 at its present level than by selling it.

As the product price decreases, the MVP of land decreases so that it becomes an economically fixed asset at this new level (point B) also. Consequently, despite a price decrease for peanuts, the producer maintains output at Y_b level of production. More realistically, if the producers did have perfect knowledge of all input and product prices, then for those variable inputs for which $P_{acq} = P_{salv}$, the producer may decrease the use of some of these inputs as their MVP decreases due to a product price decrease. The new level of production may be slightly below Y_b in this situation. Obviously, in these diagrams where only the fixed assets as shown, such a decrease in the isoproduct contour cannot be illustrated.

In Figure 6, the farmer is assumed not to be initially limited by acreage allotments, although the government program is in existence, e.g., the 1943-48 crop years. He had perfect knowledge of all variables except the operation of the acreage allotment program, i.e., he does not know when or if acreage allotments will be decreased after he has made his initial upward adjustment.

Assume the peanut enterprise is organized such that it is at point A (the HPP) and Y_a output is being produced. Now, assume that product price increases. Both land (X_2) and the other durable factor (X_1) can be expanded, since MVP of these durables has increased such that MVP $> P_{acq}$. Consequently, the producer reorganizes at point B, the new HPP[10] and produces a greater quantity of peanuts, represented by Y_b[11].

Now assume that the product price decreases. Simultaneously, the acreage allotment is set at X_{2_2}. The farmer desires to continue taking advantage of the guaranteed price supports offered under the allotment program. Hence, he will reduce the acres of land planted to peanuts as required by the program. The value of the land increases due

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[10]The three parallelogram type areas represent area 5 at different levels of product prices. Note that at the new product price, area 5 shifts upward and the new HPP B is at the lower edge of the new "parallelogram-type" area, indicating that MVP = P_{acq} for all factors at that point.

[11]Although these diagrams represent the reaction of an individual producer, the decisions will be magnified by thousands of producers, resulting in aggregate production being greater than consumption needs.

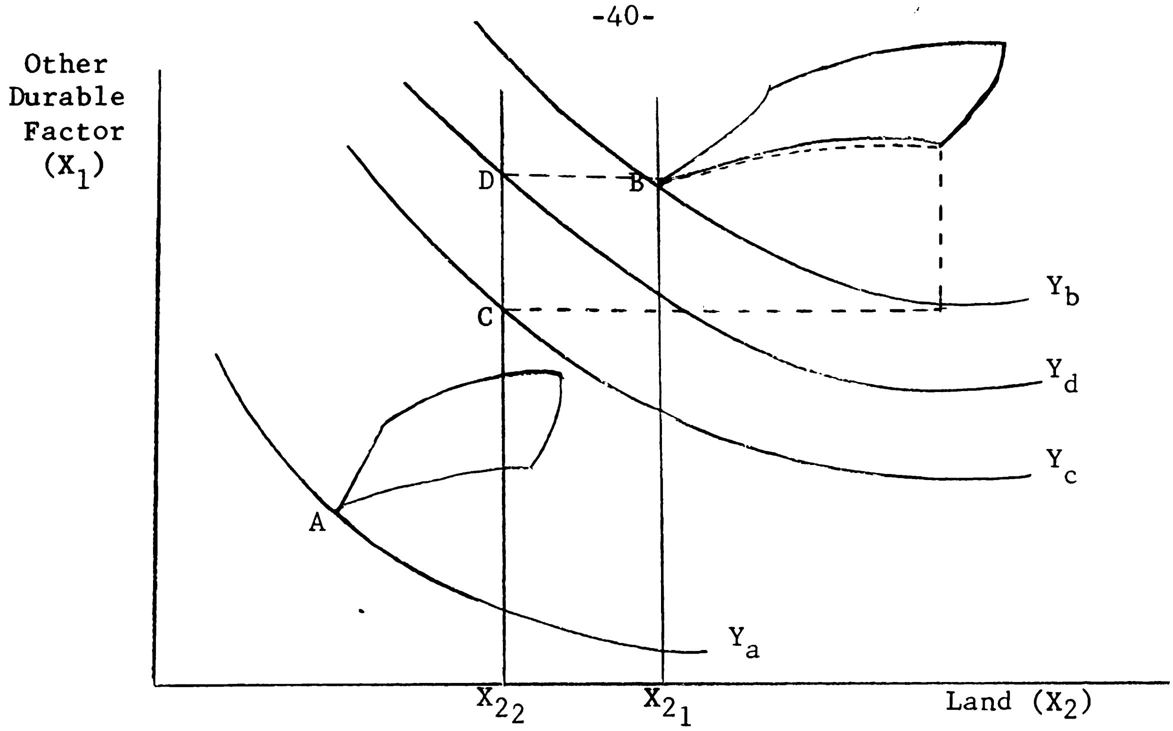

Figure 6: Effect of Increases and Decreases in Product Price on Production and Farm Organization, with Perfect Knowledge of all Variables Except the Government Program

to a reduction in acreage.[12] Since a smaller quantity of land is being used with the same quantity of other durable factors, this also increases the MVP for land. Thus, it is difficult to determine if the producer suffers a capital loss on his land (allotment). The MVP = P_{acq} line for land will now be bounded by the X_{2_2} land fixity line. Since the P_{salv} of land or MVP of the land in alternative uses is not affected, the MVP = P_{salv} line for land remains at its same location in the rectangle representing point B.

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[12]Under the government program the original value of an allotment, e.g., 10 acres, tends to be reassigned to the remaining acreage allotment when the government reduces the allotments by some stated amount, e.g., to 8 acres. This causes the price of the peanut allotment to be higher on a per acre basis. A discussion of this situation for tobacco is in Maier, Frank H.; Hedrick, James L.; and Gibson, W. L. Jr., The Sale Value of Flue-Cured Tobacco Allotments, Publication No. 35 of the Southeastern Land Tenure Committee, published by Virginia Polytechnic Institute, Blacksburg, Virginia, as Technical Bulletin No. 148, April 1960.

The other durable factor (X_1) is now a fixed asset as the product price decrease resulted in MVP $<$ P_{acq} but MVP $>$ P_{salv}. It is to the producer's advantage to continue producing with this resource rather than selling it at salvage prices. Thus, although the optimum reorganization would be at point C, the resulting production is Y_d and the farm is organized in area 5 of the new rectangle at point D. The producer suffers some capital losses on the other durable input (X_1) but these losses are not as great as they would have been had the producer shifted to the new HPP (point C).

As a result of this individual producer's actions, production is reduced slightly. If thousands of other producers take similar action, some reduction in supply of peanuts would take place, but not enough to increase the peanut price and the MVP of the other durable to cover its acquisition cost. Thus, the equilibrium price which clears the market in this situation would be where MVP = MFC of the durable resources based on a price below P_{acq}, but greater than P_{salv}.

In the example presented in Figure 7, assume the land is fixed by allotment although the level of fixity cannot be shown on the diagram. The producer has imperfect knowledge of the timing and magnitude of wage rate increases. Wage rates are increasing relative to the prices of other durable factors, e.g., machinery or land. However, with product support prices increasing, the producer will initially reorganize and expand production using some additional labor since this resource is easier to attain (in smaller units than is X_2). Thus, the enterprise organization shifts from HPP A to HPP B, producing Y_b level of output. This reflects a slightly increased use of labor and a greater use of the other factors. As the labor price continues to increase relative to the prices of the other factors, subsequent product support price increases will result in a substitution of other durable inputs[13] for labor and a shift in production to point C. This occurs because MVP $> P_{acq}$ for items such as machinery and it becomes profitable to purchase these other durable factors. In the case of labor, $P_{acq} >$ MVP but MVP $> P_{salv}$, i.e., P_{acq}, MVP, and P_{salv} all increase with the P_{acq} and P_{salv} increasing faster than the MVP. P_{salv} increases for labor since off farm wage rates are increasing and at a faster rate than farm wage rates. Only enough labor is "salvaged" to equate MVP with salvage value, i.e., the urban wage rate for unskilled immature or aged labor less the transportation cost to town.

The new level of peanut production is now being attained with less labor than previously, as the machinery is labor-saving; also, the MVP of some hours of labor has become less than the salvage price (MVP in alternative uses) for labor. It should be noted that point C is not at a HPP for acquisition costs, but occurs where MVP = P_{salv} for labor and where MVP = P_{acq} for other factors.

Aggregate production continues to surpass consumption at the high support prices, in which case the peanut support price would be decreased. With wage rates continuing to rise relative to the prices of other factors, use of labor would continue to decrease relative to the other durable factors. Some of these other factors now include capital investments in fixed assets since MVP is now less than P_{acq}.

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[13]The other durable inputs do not include land, as land planted to peanuts is fixed by the allotment.

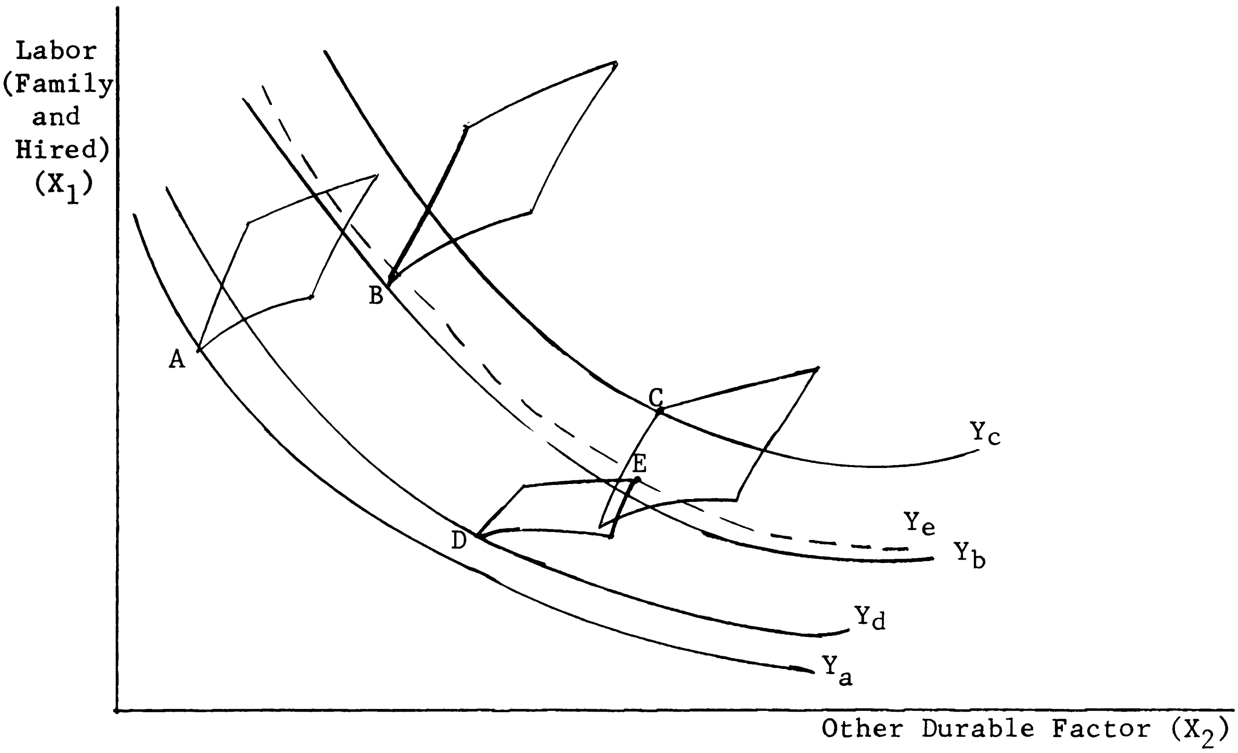

Figure 7: Impact on Peanut Production as Wage Rates Increase Relative to Price of Durable Factors, and as Product Price Increases and Decreases

It is to the producer's advantage or to his least disadvantage to continue using these assets even though some capital losses are suffered. The eventual optimum reorganization based on acquisition costs would be at HPP D and production at Y_d level of output. However, production is actually decreased only to Y_e level of output even though some adjustments are made in both groups of inputs. The producer becomes trapped at the edge of area 5 where the MVP's of all factors equal salvage values. Some decrease occurs in aggregate production but not nearly enough to equate MVP's with acquisition prices. Capital losses would be incurred on the other durables and the laborers would have "disappointing lifetime earnings".

In Figure 8, assume irrigation facilities are a new input which are adopted when peanut support price increases justify the acquisition

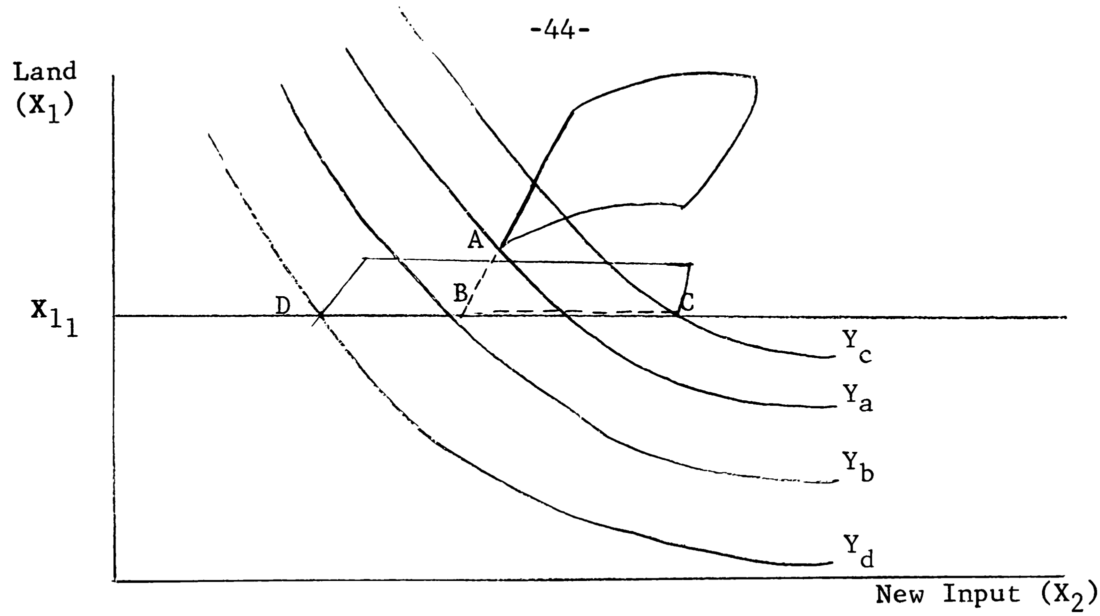

Figure 8: Effect of Increases in Product Price on Adoption of New Inputs and How Errors Cause Production Responses Greater than Expected

of the irrigation system.[15] Land in conjunction with irrigation and related production factors would combine to produce Y_a level of output if the optimum level of production were attained. However, this reorganization at HPP A could only be attained with perfect knowledge and with no allotment restrictions. This production response by all producers would be just sufficient to match consumption at support prices and to equate MVPs with MFCs.

The producer desires to increase production to Y_a to take advantage of the higher support price. Based on the certainty of a higher support price and experimental results of much higher yields through the use of irrigation, he is encouraged to invest in an irrigation system and to adopt those cultural practices which will give him.

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[15]In this example, irrigation is a new input which is associated with higher seeding rates, increased use of fertilization, chemicals for weed and disease control, etc.

higher yields per acre, and consequently, greater total production. However, the acreage allotment program is in effect and land used for peanut production is limited to X_{1_1}. Ideally, he would locate his farm organization at HPP B to produce output Y_b. The line for MVP = P_{acq} for land for the new area 5 coincides with the level of fixity of the allotment.

However, the producer often makes errors in his forecasting and analysis, and may purchase too many or too few other inputs to combine with his fixed land factor, depending on the direction of his error. In this example, it is assumed he makes an error of overproduction. Consequently, he may produce a greater amount than he would have at point B. He may or may not increase production to a higher level than would have been attained at HPP A. For purposes of this illustration, point C is shown to the right of A, indicating that the producer actually increased production to a higher level than would have been attained under the optimum organization without allotments at point A.

In this example, despite the CCC's intentions to hold production in line with demand at a higher support price through the use of acreage allotments, the individual producer, through errors in organizing his peanut enterprise, inadvertently defeats this purpose. If the CCC attempts to rectify this situation of over supply by reducing the price support the following year, this reduces the MVP of the new input and the new optimum organization could be at HPP D.

However, irrigation is still a profitable production practice for peanuts even at the lower support price. The irrigation system remains trapped in production, since the MVP $<$ P_{acq} but the MVP of irrigating peanuts is still greater than P_{salv} or the MVP of the irrigation system in alternative enterprises, e.g., irrigating other crops. Hence, even with a product price decrease, there is no downward adjustment in production due to reduced use of land and irrigation facilities in this particular illustration. The P_{salv} = MVP line for the new input (irrigation and related factors) does not shift because decreases in the support price for peanuts do not influence the MVP of the irrigation system in alternative enterprises. Thus the rectangular area 5 "cornered" by HPP D becomes elongated. In the aggregate, CCC would be required to purchase a considerable quantity of peanuts at the support price, as supply is greater than consumption at this price.

Peanut producers do not operate with perfect knowledge of all factors except wage rates, price support and changes in other government programs. Even with guaranteed price supports, there still exists crop yield uncertainty due to weather, diseases, etc., as well as the uncertainty of the continuance of the government program itself. Consequently, the actual conditions under which the producer must make his management decisions involve imperfect knowledge of many variables. The following examples illustrate the individual producer's supply response under these more realistic conditions.

In Figure 9, assume the producer's optimum organization is HPP A at the original product price with Y_a level of output. However, due to uncertainty, the producer is actually located at A' and is producing Y_a'.

Now assume that the product price is increased. The new HPP is at B with Y_b level of production. Again due to uncertainty, the

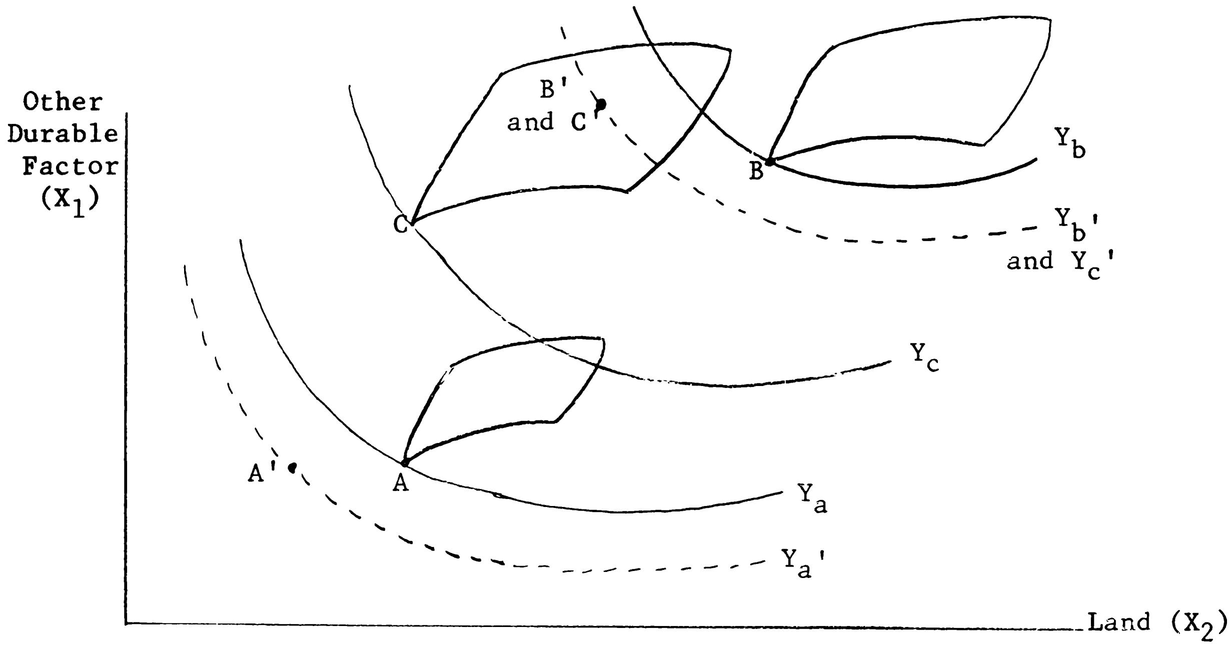

Figure 9: Effect of Peanut Price Changes on Production when Imperfect Knowledge Exists

producer actually locates at B' and produces Y_b' output. To make this move to B' requires some large capital investments. Now assume that the price support is decreased. The new optimum level of organization becomes HPP C. Due to uncertainty and since some assets are now fixed in production, the producer continues to produce at Y_b' since he is trapped in area 5 of the new quadrilateral area cornered by HPP C. In this illustration, Y_b' level of output is the same as Y_c' level of output. As indicated previously, the producer may be able to decrease production some by reducing the use of some variable resources for which $P_{acq} = P_{salv}$ since the MVP of these resources also decreases. Aggregate production would remain greater than consumption unless the lower support price results in consumption expanding sufficiently to offset the higher level of production brought forth by the initial peanut price increase.

In Figure 10, the initial optimum organization is at HPP A when the individual's allotment is fixed at X_{2_1}. However, due to

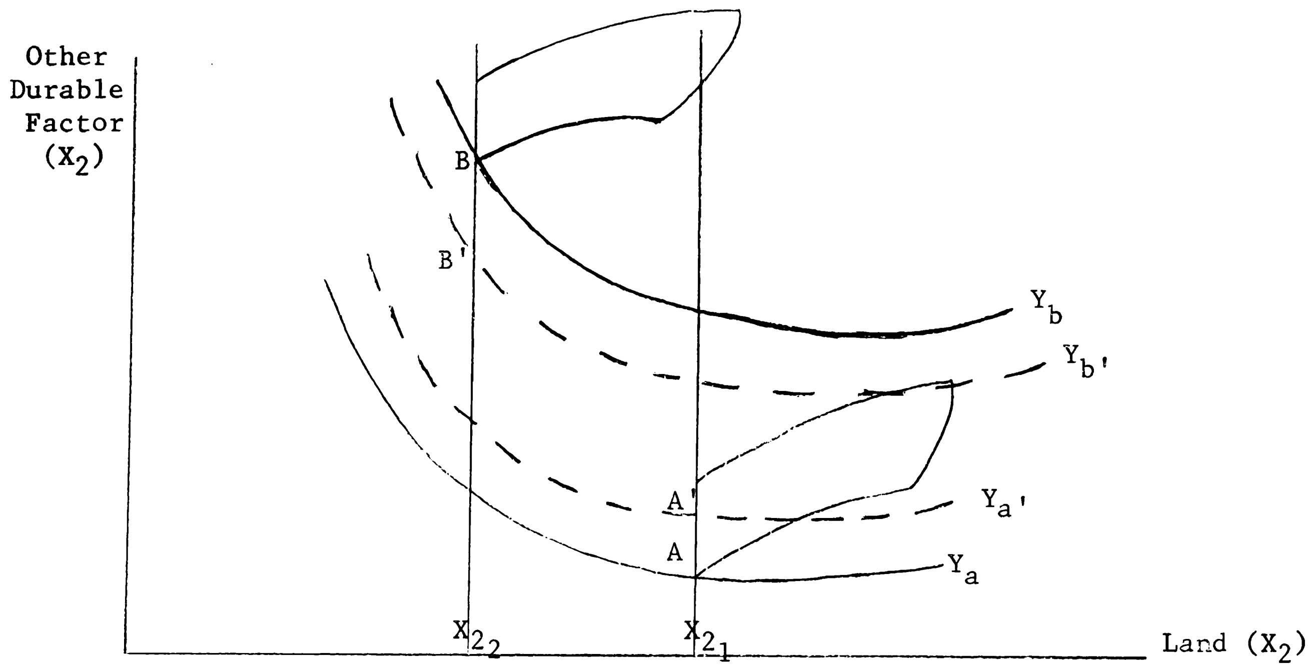

Figure 10: Effect of Increasing Product Price and Decreasing Allotments on Combinations of Inputs Used when Imperfect Knowledge Exists

uncertainty and errors in adjustment, the individual producer is assumed to have organized his peanut enterprise at A' and is producing Y_a' level of output.

Now, assume that acreage allotments are decreased to X_{2_2} but that peanut support prices are increased (this actually happened from 1949-55). Land values will increase since the value of the acreage allotment becomes capitalized into the price of land. As individual allotments are reduced, the remaining allotment becomes more valuable. The expected net MVP for land also increases. At the higher support price, the MVP of the other durable factors also increases, and for some of these durables, MVP becomes greater than P_{acq} and it is profitable to expand production. The new optimum organization would be at HPP B (assuming no uncertainty) with output at level Y_b.

Due to uncertainty, the producer shifts his organization to B' and expands production to Y_b'. However, this output is greater than that previously forthcoming with the larger allotted acreage (X_{2_1}). The aggregate supply response results in increases in the CCC purchases of peanuts.

At point A', the producer is suffering capital losses on his other durable factor X_2 because he is using a certain quantity of this other durable factor in the area where MVP $<$ P_{acq}. However, once the peanut producer reached this point through errors of adjustment, he incurs a smaller loss by continuing to use these durable factors since MVP $>$ P_{salv}. If he sold some of X_2 to move to the boundary of area 5, he would suffer additional capital losses.

At point B', even though he is not organized at the optimum, the producer suffers no capital losses on his other durable factor (X_2) since he is using X_2 at a level where MVP $>$ P_{acq}. It is difficult to appraise the capital gains or loss situation for his land factor at point B'. He has lost part of a monopoly patent (X_{2_1} - X_{2_2}). This loss may or may not have been offset by the increased land value. If the value per acre of allotment at X_{2_2} times the number of acres (X_{2_2}) is greater than the price of the original allotment at X_{2_1} times the number of acres (X_{2_1}) then he suffers no capital loss. If this new value at X_{2_2} is smaller, he suffers capital losses on his land (acreage allotment) factor.

In Figure 11, acreage allotments are assumed fixed at X_{2_1}. The resulting optimum organization for this level of land fixity is HPP A with level of output at Y_a. However, due to imperfect knowledge, the

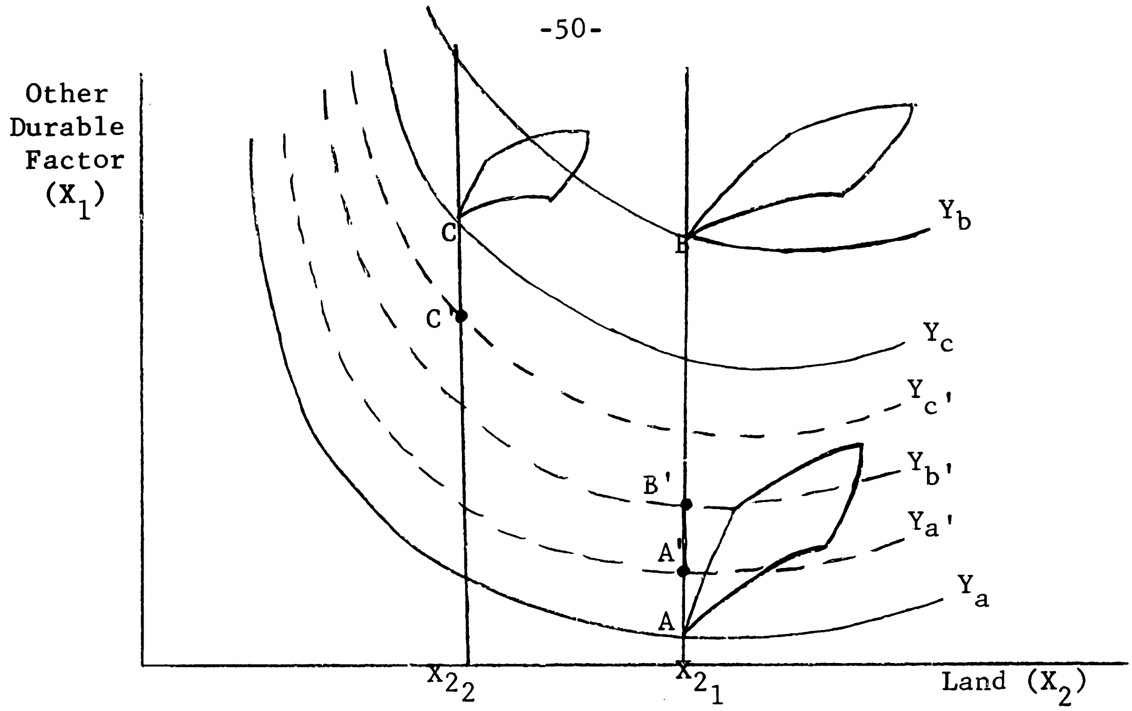

Figure 11: Producer Response to Product Price Increases and Decreases when Imperfect Knowledge Exists and Government Programs are in Effect

firm organizes at A' and produces Y_a' output. If the support price were increased, the resulting optimum organization would be at HPP B with land still limited by the allotment. However, due to uncertainty and resulting underproduction errors, actual organization takes place at point B', and the production is at Y_b', a smaller output than Y_b.

Now assume that both the peanut support price and the acreage allotment are reduced, the latter to X_{2_2}, because of aggregate over supply. Optimum reorganization would occur at HPP C assuming no uncertainty. In this situation, due to previous adjustments errors and with an accumulation of knowledge since the last adjustment[16], the lower support price would indicate expanded use of the other

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[16]The producer has been in a learning situation. Even though his knowledge of the future is still uncertain, he has narrowed the range of the uncertainty and can now make a more accurate production decision.

durable factors. Production would increase by $Y_c - Y_b'$. Again, due to uncertainty, actual reorganization occurs at C' and production is at Y_c', a higher level of output than Y_b'. Note that output Y_b' is based on a higher support price.

Thus, the government's attempt to keep peanut production in line with demand at the announced support prices would fail because only the land factor is manipulated. As shown, errors in adjustment to previous price changes due to uncertainty can result in a subsequent price support decrease being the incentive for a more accurate reorganization decision at a higher level of output. Such a situation could occur if producers made underproduction and overproduction adjustments based on imperfect knowledge and resulting random errors in their decision as to the optimum level of production.

Summary

Theoretically, when $P_{X_i acq} > P_{X_i salv}$, resources become trapped in production through random errors due to uncertainty and imperfect knowledge of changes in variables in forthcoming production periods. The producer would find it to his least disadvantage or to his greatest advantage (i.e., he suffers smaller capital losses) to continue to produce with these resources, even though aggregate production is already greater than demand at existing prices and even if MVPs $<$ MFCs based on acquisition prices.

The diagrammatical exposition on fixed asset theory has been developed to allow a more thorough analyses of the land, machinery, and labor factors as they are applicable to the peanut industry. This theory

will be used in analyzing the effect of these three factors on aggregate supply response in the three chapters on land, labor and machinery.
A rough aggregate analysis of the effect of these three factors and other related determinants on the aggregate supply response will be presented in Chapter VIII.

CHAPTER IV

PROGRAMS AFFECTING THE PEANUT INDUSTRY

Introduction

The government support program for peanuts must be considered in any analysis of the peanut supply response. Hence, a discussion of price support and other programs which have influenced the peanut industry in the past precedes the main empirical analysis in this thesis. These programs have a significant impact on producers' capital investment decisions, and ultimately have an effect on the type of supply response existing in the peanut industry.

Specific Characteristics of the Peanut Industry

Peanuts are an important cash crop in three major production areas of the United States and are classified as one of the five "basic commodities".[1] The annual value of production in recent years has been around 200 million dollars. Although this value represents only about .5 percent of the national value of production for all crops, peanuts are a major source of income for many peanut growers in the Southern States. For example, the value of peanut production to the approximately

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[1] A basic commodity is a crop for which an acreage control and price support program is compulsory so long as two-thirds of the producers, voting in a referendum every three years, approve the program.

5,000 peanut producers in Virginia was 28 million dollars in 1962. During the past twenty years, the total acreage planted to peanuts in these three areas has varied from a high of 5.15 million acres in 1943 to a low of 1.56 million acres in 1962.[2] The largest production of peanuts was the 2.4 billion pounds picked and threshed in 1948.

The Virginia-Carolina production area includes the two major peanut producing states of Virginia and North Carolina, and the small acreage planted in Tennessee.[3] The Southeastern area includes South Carolina, Georgia, Florida, Alabama, and Mississippi; Georgia and Alabama are the major peanut producing states in this area. The Southwestern area includes Oklahoma, Texas, plus a small acreage in New Mexico, and until 1961, included a small acreage in Arkansas. Louisana was also included in the Southwestern area until the early 1950's.

Planting dates for peanuts vary with geographical location. The planting season starts as early as March 1 in Southern Texas and may continue until July 10. In Oklahoma, the planting season runs from

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[2]Farmers planted 1,545,500 acres alone and approximately 28,000 acres of interplanted peanuts in 1962. One-half of the interplanted acreage (14,000) is added to the acreage planted alone to reflect the figure indicated above. (Source: Crop Production, AMS, USDA, Dec. 1962, p. 90). 1962 marked the third consecutive year that farmers have planted less than 1,610,000 acres since acreage controls were established at this level in 1956.

[3]USDA crop statistics included Tennessee in the Virginia-Carolina area through the 1960 season. Tennessee is not included in the crop statistics for 1961 and 1962.

May 15 to June 15. The usual planting period in the Southeast is from April 1 to April 15. Most of the planting in the Virginia-Carolina area occurs in early May.[4]

The growing season likewise varies by peanut varieties and by geographic location. The Spanish, Tennessee, and Valencia varieties require about 120 days, the Virginia Bunch varieties about 130 days, and the Virginia runner type varieties and the true runners about 140 days or more from planting to harvest.[5]

The crop year and marketing year for peanuts begins about November 1 in the Virginia-Carolina area, usually in early September in the Southeastern area, and in early August in the Southwestern area.[6]

The agriculture in most of the peanut producing areas is characterized by a cash-crop economy. In general, cotton has been the major competitive crop, although in a 3-year rotation peanuts following cotton supplement each other. Tobacco and soybeans, as well as peanuts and cotton, are also grown in the northeastern North Carolina area. In Virginia, cotton has declined in importance and it is no longer a competitive crop. A further point is that acreage allotments are in effect for both tobacco and cotton. Thus, these crops cannot be

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[4]Beattie, J. H., Poos, F. W., and Higgins, B. B., Growing Peanuts, Farmers' Bulletin No. 2063, USDA, Washington 25, D. C., May 1954, p. 22; and __________, A Handbook of Peanut Growing in the Southwest, Bulletin B-361, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma, November, 1950, p. 16.

[5]Beattie, et. al., Ibid., p. 40-41.

[6]__________, Peanut Price Summary, 1920-62 (Peanut Market News), AMS-234, USDA, AMS, Washington 25, D. C., Revised July, 1962, p. 13.

considered real alternatives unless the peanut allotment owner also owns or can purchase the tobacco and cotton allotments.[7]

In the Southeastern area, commercial production of peanuts has been concentrated in areas where cotton yields have been low because of climate, boll weevil, and other conditions. Corn is the most important feed crop in the Georgia-Alabama area. Until recently, a considerable acreage of peanuts was hogged-off in this area.

In the Texas-Oklahoma area, the basic cropping system centers around cotton and corn, supplemented in various sections by speciality horticulture crops. Almost every farmer who grows peanuts also has a substantial acreage of cotton, particularly in Texas. To some extent grain and forage sorghum are competitive enterprises in the irrigated peanut areas of Oklahoma, although peanuts have higher net returns than any other crop in this area, with cotton ranking second.[8]

Attempts to estimate an aggregate supply response for peanuts are complicated by fixed assets such as land, labor, and machinery, which are not responsive to product price changes once acquired for peanut production. Estimation of aggregative supply responses for the

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[7]For a more detailed discussion of cropping alternatives in the peanut areas, and a comparison of returns from cotton and peanuts, see Bachman, K. L.,; Crowe, G.B.; and Goodman, K.V., Peanuts in Southern Agriculture, FM 65, USDA, Washington 25, D. C., May 1947, pp. 39-79.

[8]Tweeten, Luther G., and Back, W. B., Costs, Returns, and Efficiency of Sorghum and Alternative Crop Production in Western Oklahoma, Bulletin B-525, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma, February 1959, p. 12.

peanut industry is further complicated by the widely different inherent characteristics of each of the three major areas of production. Different types of nuts going into different marketing channels are produced in the three different areas, and are subject to different end uses.

The Virginia-Carolina area, producing the larger type peanut, has a long time average yield approximately twice as high as the other two areas. On the other hand, probability of wet weather at harvest time and the high moisture content of these peanuts caused the Virginia-Carolina area to lag behind the other two areas in mechanized harvesting until recommended drying and curing procedures were adopted.

The support prices, and correspondingly, the prices received by farmers for peanuts also are different for the Virginia type nut, the runner type grown in both the Virginia-Carolina area and the Southeastern area, the Spanish variety grown in both the Southeastern and Southwestern area, and the Valencia grown primarily in New Mexico.

Background of the Support Price Program for Peanuts[9]

Some form of the government price support or acreage control program has been in effect for peanuts from 1933 to the present, except during the 1936-37 marketing season. Acreage allotment programs for peanuts were initiated in 1941. Although acreage allotments were announced

[9]For a more complete discussion of government support operations through 1951, the reader may refer to the publication by Banna, Antoine; Armore, Sidney J.; and Foote, Richard J.; Peanuts and Their Uses for Food, Marketing Research Report No. 16, USDA, BAE, 1952.

for the 1943 and 1948 crops, they were abandoned because of the shortage of oil in those years. Instead, the government encouraged farmers to plant additional acres during the 1943 to 1948 period. Acreage controls were reestablished in 1949 and have been in effect since then.

The Soil Bank Act of 1956 had some effect on reducing planted acreage in the peanut industry in recent years, although it had very little effect on total production. The Soil Bank Act had two parts: (1) the acreage reserve, and (2) the conservation reserve. The conservation reserve included both basic commodities and other crops. Under this program, contracts were negotiated for 3, 5, or 10 years. Farmers with peanut acreage allotments could participate in the main Soil Bank program beginning in 1956.[10] However, 1957 was the first year of major participation since most crops already had been planted in 1956 before the Act was passed. Facts concerning the Soil Bank and Conservation Reserve programs and their effect on aggregate peanut production are presented in Chapter V (Land).

Support prices at profitable levels have encouraged rapid adoption of improved varieties, better methods of planting and cultivation,

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[10] Henderson, Harry, Price Programs, Agricultural Information Bulletin No. 135, USDA, Revised April 1957, p. 30. The acreage reserve has since been discarded. Figures obtained from the Soil Bank Division, CSS, USDA, indicate that 44,000 acres of peanuts were placed in the Acreage Reserve in 1956. USDA paid $596,200 to take this acreage out of production (an average of $13.55 per acre). The estimated reduction in peanut production as a result of this participation was 12,500,000 pounds or approximately .8 percent of the 1956 production. The estimated yield per acre on the land taken out of production was approximately 280 pounds; thus the cost for the peanuts taken out of production (not produced) was $.05 per pound.

and mechanized harvesting operations. Every major producing state has shown an upward trend in per acre yields during the past several years. Thus, even with acreage allotments reduced to the legislative minimum of 1,610,000 acres, peanut growers have more than met annual consumption demands at support price levels ranging from 75 to 90 percent of parity.

Based on an estimated U. S. population of 188 million people in January 1963, and the present annual consumption rate of 7.0 pounds of farmers' stock equivalent peanuts per capita, the edible consumption requirements are 1,316 million pounds of nuts for the 1962-63 marketing season. This level is somewhat higher than previous years due to the population increase and the increase in per capita consumption. This requirement of 1,316 million pounds for 1962-63 has been exceeded by producers in every year since acreage controls were reinstated in 1949, with the single exception of 1954, a poor crop year.

A government price support and acreage allotment program which repeatedly leads to greater production than is taken by domestic consumers and normal export markets is not realistic. A continued large inventory of peanuts "owned" by the CCC as well as the costs of the buying and selling operations eventually result in damaging political repercussions.

A basic cause of the surplus of peanuts is the support price is established at a level different from the free market "equilibrium price", i.e., that price which would allow disposal of the supply of nuts in any given year. The "equilibrium price" as used here is that price which would clear the market while at the same time equalizing the MVP's and MFC's of inputs used by producers, where the MFC's are based on the P_{acq}'s for all inputs. The implication here is that the government established price is not the true equilibrium price that will clear the market without resorting to CCC purchases. In some years, e.g., 1959, the government established equilibrium price may be below that price at which MVP = MFC, where MFC is based on acquisition cost, even though production exceeds disappearance. In this latter situation, capital losses are incurred although producers maintain a high level of production.

Conversely, in some earlier periods, e.g., 1954-55, the government price support level was such that some producers had a positive margin between MVP and MFC, where MFC is based on P_{acq} for all inputs. Even though the support price level was gradually decreased in 1956-58, it still may have been profitable for some producers to maintain the same level of production, based on more accurate appraisals of their current situation. This writer has no empirical evidence to substantiate this point concerning MVP being above MFC, based on P_{acq} in 1954-55. However, based on unit cost of production estimated from various Experiment Stations, it appears that there was at least a positive gap between average revenue[11] and average cost of production per unit of output during some years of high government price supports. Likewise, it is also highly probable that when support prices were lowered, MVP = MFC for some durable inputs only if MFC is based on a price lower than P_{acq}.

[11]Also Marginal Revenue (MR) since the entire production can be sold at the same price per pound.

Currently, a public controversy is raging over the costs of present government price support programs for agricultural commodities and more specifically, over the handling and storage costs for the surpluses of some basic commodities. Various program revisions and alternatives have been proposed for the commodities in general. However, specific policy proposals to balance supply and demand of peanuts have been lacking with the exception of Cochrane's supply control plan[12] which would include peanuts as well as other crops.

Peanuts were designated as one of the basic commodities by an amendment to the Agricultural Adjustment Act on April 7, 1934. On January 6, 1936, the production-control and processing-tax provisions of the Agricultural Adjustment Act were invalidated by the Supreme Court's decision in the Hoosac Mills Case. However, diversion payments on peanuts were resumed in 1937. Under the provisions of the Soil Conservation and Domestic Allotment Act, which became effective in February 1936, picked and threshed peanuts were designated a soil-depleting crop. Farmers with acreage normally planted to peanuts to be harvested for nuts could divert up to 20 percent of their "base acreage"[13] to soil-conserving crops and thus become eligible for payments of $25 per ton on the normal yield per acre diverted.

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[12] Cochrane, Willard W., "Some Further Reflections on Supply Control", Journal of Farm Economics, Vol. 41, Nov. 1959, pp. 697-717.

[13] A base acreage was determined for each farm by averaging the acreages picked and threshed in previous years on the farm.

Legislation enacted on April 3, 1941, amended the Agricultural Adjustment Act of 1938 to authorize marketing quotas for peanuts and to reestablish peanuts as a basic commodity. Mandatory price supports became effective under this marketing quota system.

The USDA announces the acreage allotments and marketing quotas. Peanut growers have the right either to accept or reject this quota in a referendum, held every three years. If accepted by at least two-thirds of the producers, price supports are mandatory for cooperators at a price level ranging from 75 to 90 percent of the parity price, according to the relationship of total supply to normal supply[14] (Appendix Table 1).

Harry Henderson states:[15]

> "Four steps must be taken in determining the minimum support level: (1) computing the estimated total supply (allowing for the effects of any control programs such as marketing quotas and acreage allotments), (2) computing the normal supply, (3) dividing the total supply by the normal supply to determine the supply percentage, and (4) referring to the appropriate line in (Appendix) Table 1."

If producers disapprove marketing quotas, the level of support drops to 50 percent of parity for cooperators.[16]

Acreage Allotments with Marketing Quotas

In the case of peanuts, quantities representing supplies adequate for consumption purposes are converted on the basis of average

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[14]Normal supply is the sum of estimated domestic consumption and exports plus a carry-out equal to 15 percent of the two.

[15]Henderson, <u>op. cit.</u>, p. 113.

[16]<u>Ibid.</u>

yields to national acreage allotments. The national marketing quota cannot be less than the level which would provide a national acreage allotment of 1,610,000 acres.[17] The national acreage allotment for peanuts is apportioned among individual farms in the various states producing peanuts. The supply level at which quotas must be proclaimed for peanuts is specified by law as follows: The "proclamation supply level" must be proclaimed each year by November 30 for the planting and harvesting season in the following calendar year. The referendum date on which farmers vote to accept or reject the marketing quotas must not be later than December 15 and is held every third year.[18]

Because of the per acre yield increases, production of peanuts from the minimum allotment of 1.6 million acres provides a surplus of peanuts above edible requirements and is likely to continue to do so in the immediate future.[19]

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[17]As an indication of the importance of this provision to owners of peanut allotments, it is estimated that if the minimum acreage allotment provision were not in effect, the national marketing quota for 1960 requirements would have been 720,000 tons and the resulting national acreage allotment of 1,241,000 acres. This would have represented an allotment loss of 369,000 acres or 23 percent of the current acreage allotment. The result would have been a tremendous capital loss to present owners of peanut acreage allotment.

[18]Peanut producers approved the current program for the 1963, 1964, and 1965 crop years by a 97 percent majority in the December 1962 referendum. This is interesting in view of the controversy over loss of freedom from participating in government programs.

[19]For example, in 1960 farmers planted less than 1,610,000 acres of peanuts, primarily because of participation in the Conservation Reserve Program. However, production was greater than in 1959 due to higher yields per acre. Approximately 275 million pounds or 15 percent of the 1960 production was placed under support. The CCC acquired 17 percent of the 1960 crop of peanuts, about 11 percent of the 1961 crop and is expected to acquire approximately 16 percent of the 1962 crop when the loans mature on May 31, 1963.

Parity prices for peanuts are now based on modernized parity. This change-over was responsible for part of the 10 percent reduction in the minimum support price for the 1959 marketing season. Another factor was the large supply of peanuts produced in 1958, resulting in the supply percentage being over 130 percent for 1959. The relationship between the estimated supply and normal supply used in determining the level of support for 1959 resulted in this level being at 75 percent of parity, the minimum support allowable. For the 1960 crop year, the price support level increased to 78 percent of parity due to the decreased production in 1959. Similarly, the price support for the 1961 and 1962 peanut crops was at 85 percent of parity.

The actual parity percentage support level, the average support price, and the seasonal average price received by the United States farmers for the period 1941-1962 are presented in Appendix Table 2. The percentage of parity in this table is based on the parity price as of August 1 for each year. It should be noted that peanuts for oil were supported at a mandatory level of not less than 90 percent of parity during the 1942 to 1948 crop years.

General Effects of Guaranteed Price Supports for Peanuts

Because of the need to supply America's allies in World War II, and since our imports of oil bearing products and other agricultural products needed for the war effort had been seriously impeded by shipping restrictions (e.g., enemy submarines), Congress passed what has become known as the Steagall Amendment. This amendment established minimum prices for many of our domestically produced crops and livestock. The expectation was that the induced expansion of peanuts could be channeled into crushing for critical oil needs. Increased production of peanuts did occur. Due to the shortage of other oil sources, peanuts came to occupy a more important place in the American diet. Increased per capita consumption of peanuts in edible form took a significant part of the increased production, with a smaller quantity of the increased production than expected going to oil.

Since 1949, when acreage controls were reestablished, peanut price supports have been at levels sufficient to encourage growers to adopt better varieties, use more fertilizer, replace labor with labor-saving equipment, etc. In general, then, the effect of the high price support has been to encourage these producers to utilize available technology to increase gross and net returns per acre. As a return for its "investment", the Federal Government through the CCC has become a buyer and "diverter"[20] of that excess quantity of nuts which will not move into commercial channels at the going market price, resulting from the price supports. Until recently, this market price had been stabilized at a minimum of about one-half cent per pound less than the support price,[21] except in low production years and/or, when due to

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[20]In the sense of taking peanuts off the edible market and diverting to crushing for oil purposes.

[21]Usually referred to as the "loan value". The one-half cent goes for handling, inspection, etc. This one-half cent charge was eliminated effective with the 1961 crop of peanuts.

weather, the quality of the nuts is such that they do not measure up to the standard for the higher level support price.[22]

Since the support program has consistently guaranteed prices above the equilibrium price that would allow the market to absorb the annual production, assuming a normal carry-in and carry-out of stocks, peanut farmers have developed their long-range investment plans, etc., on the expectation that peanut prices will continue to be supported at approximately the same price levels as currently exist. The result is continued overproduction, despite government measures to (1) cut back the allotment to the minimum allowable acreage (1,610,000 acres), (2) reduce price supports by the changeover to "modernized" parity, and (3) reduce the support level by use of a sliding scale of parity support when production exceeds normal supply, as indicated in Appendix Table 1.

As indicated in Appendix Tables 3 and 4, the price support program has tended to stabilize peanut prices around a level of 10 cents a pound (not deflated) with minor variations over the past several years. Compared to the large price fluctuations in earlier years, the prices received by farmers for peanuts in recent years has had a stabilizing effect on income on these farms. This price stabilization has allowed some "adjustments"[23] to take place through

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[22]The support program has a graduated scale to include the lower quality peanuts. However, the prices would be below the announced expected support price for the Number 1 quality of that type nut.

[23]Not in the sense of adjusting production of peanuts to an equilibrium level of supply and demand.

investments in capital assets and improvement of existing assets, e.g., increasing fertility of land by plowing under the peanut hay, resulting in higher crop yields in future years.

Summary

The USDA has exhausted or reached the limit of the available measures to "force" farmers to channel their resources into other enterprises. Thus, government sliding scale price support mechanisms that could supposedly be manipulated like "hot" and "cold" water faucets to obtain the mixture that would result in equilibrium supply and demand of peanuts and other basic commodities have not achieved that goal. Even in 1959, peanut farmers continued to make substantial investments in capital asset items such as tractors, combines, etc., even though the price support level was at its minimum of 75 percent of parity. This represented a support price of 9.7 cents per pound for farmers' stock peanuts.

Farmers have indicated a willingness to maintain a higher level of production in response to a stable average price and income for their product than they would produce at the same average price, but a price which is free to fluctuate up and down from year to year, causing fluctuations in annual income. In this sense, the government peanut program has increased efficiency, while in the sense of restricting allotments, it has impeded resource adjustments. This point will be discussed further in the Land Chapter.

With the background in asset fixity theory as developed in Chapters I and III, and this discussion of government programs and their influence on resource use, attention will now be directed to the empirical analysis of three general classes of resources used in producing peanuts, namely, land, machinery, and labor.

CHAPTER V

HISTORICAL CHANGES IN THE UTILIZATION OF LAND AND LAND SUBSTITUTES

Introduction

Land is the most controversial, most misunderstood, and most sought after of all the resources used to produce peanuts. Allotments represent a franchise or licensed right to use land to produce peanuts.

This Chapter will present a discussion of (1) the capitalization of the value of the peanut acreage allotment into the land price, (2) the Conservation Reserve Program, (3) the effect of the acreage allotment program and the Conservation Reserve Program on the aggregate supply response for peanuts and (4) the effect of irrigation and related land substitutes in offsetting the reduction in acreage planted to peanuts. It is hoped that this Chapter will clarify the effect of government programs on peanut production.

Capitalization of Acreage Allotment Values into Land Values

The major beneficiaries of the acreage allotment program have been the initial holders (owners) of the allotted acreage for producing peanuts, since a significant part of the benefits of the price support program appears to have been capitalized into the farm land values on farms having an allotted acreage of one or more of the basic commodities.

Maier states that an important part of the price raising benefits goes to those farmers who acquire the "right" to produce the supported crops. Such restrictions on production limit the number of farmers who can produce peanuts as well as limiting the acreage each farmer grows. "Thus, the right to grow an allotted crop becomes a production license, or franchise, created by the program."[1]

Farmers holding allotments obtain an important part of the price raising benefits of the program. This is so because the allotment for a particular farm is "owned" and its use is controlled by the farmer who owns the land. Thus, if the farmer rents out or leases the farm with the allotted acreage, he can demand a higher rent for that acreage than if production of the crop were not restricted to allotments. If the farm including the allotted acreage is sold while the government program is still in effect, and if prospects for its continuance appear bright, then the original owner of the farm and the allotment receives a windfall gain through the capitalized value of the allotment into the land price.[2]

The value of an acre of allotment depends primarily on (1) the level of the guaranteed support price and the estimated differential between it and the expected price based on annual supply if the price

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[1]Maier, Frank H., "Land and One of the Farm Programs", 1958 Yearbook of Agriculture, Land, USDA, pp. 310-314.

[2]Ibid., pp. 310-314.

support program were not in effect,[3] (2) the penalty rate for producing without a quota and the number of years one must grow peanuts to establish a base for a new farm allotment, (3) the allotment owner or potential purchaser's estimate of the expected duration or continuation of the present price support and acreage allotment program, and (4) the risk-free rate of interest.

Maier, et. al., argue that for tobacco, persons who owned the farms before the capitalization of the price raising benefits of the program into the land occurred realize "windfall" gains when they sell the land and its allotment. The extent of the gain depends on how much of the capitalization of future benefits took place between the time of acquisition and sale of the land with its allotment. However, the purchaser of this allotment is paying in advance for that part of the future price-raising benefits that have been capitalized into the selling price of the allotment land.[4]

The value of the acreage allotment is usually discounted for the uncertainty involved in the program. Several considerations tend to prevent the landowner from obtaining all of the price raising benefits of the price support program. The landowner possesses

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[3]Estimates furnished the U.S. Senate by an Advisory Committee of Land-grant college personnel in cooperation with Dr. Walter Wilcox indicate that "in the absence of controls, acreage and production of peanuts are projected to increase, with production reaching 1,875 million pounds by 1965. This would be 22 percent more than 1955-57. Prices received are projected at 6 cents per pound, 46 percent below 1955-57." Source: Report from the United States Department of Agriculture...on Farm Price and Income Projection 1960-65, Senate Document No. 77, 86th Congress, 2nd Session, Washington, D. C., 1960, p. 16.

[4]Maier, Hedrick, and Gibson, op. cit., p. 8 of draft (not in final bulletin).

<u>incomplete</u> knowledge of the way the program operates and, hence, of the way it strengthens the bargaining position of the owner of the allotment. Imperfect communication between the landowner and potential operators or renters of this land, <u>i.e.</u>, managers, tenants, sharecroppers, and laborers will cause the landlord to be unaware of all the favorable benefits or alternatives available to him. In fact, the landlord might not find a taker for his allotted land at the full imputed price resulting from the price program benefits. Finally, inflexible tenure arrangements may prevent the landowners from reaping all the benefits from the imputed capitalized value of the acreage allotment.[5]

Summarizing, a substantial capital gain is obtained by persons who owned peanut farms at the time people began to attach some degree of permanency to the program. Purchasers of peanut allotments through farm acquisitions after the program was initiated have had to pay in advance for a part of the benefits subsequently derived from the program. Once these benefits have been capitalized into land values, it is difficult to change or discontinue the program without adversely affecting many people.

An advantage of the price support program is that producers are able to organize production in the peanut enterprise on the basis of a guaranteed price for the peanuts produced. If peanuts represent a profitable enterprise in the total organization, farmers can use more complementary inputs such as fertilizer and gypsum, irrigation, improved methods of cultivation (new equipment) and harvesting. By not having to

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[5]Maier, Hedrick, and Gibson, <u>op. cit.</u>, p. 11.

discount product prices, producers are able to organize at a higher level of production, closer to the point of intersection of the actual MVP and MFC.

A disadvantage of the present program is the "fragmentation" of allotments, i.e., a large number of farms with small peanut allotments. This has occurred because the current supply situation has resulted in the aggregate acreage allotment being reduced from 1949 to 1954 until reduced to the allowable minimum of 1.6 million acres. The present acreage allotment program establishes approximately 2,000 acres each year for new farm allotments. Thus, more producers with small peanut allotments are added to the peanut industry every year. This partially offsets the annual loss of other small allotment holders, mostly marginal producers who have voluntarily stopped producing peanuts and sold their allotments. Such a policy results in small, inefficient operations unable to make use of labor-saving techniques due to the large units of machinery and large capital investments needed.

In an era in which the trend is to fewer but larger farms, resulting in consolidation, elimination of duplication, and more efficient use of machinery and other capital investment, a government program that continues to "initiate" small allotments is a decided hindrance to the national goal of producing greater output with fewer resources.

Effect of Land Substitutes on Aggregate Supply Response as Acreage Allotments are Reduced

During the period 1942-48, there were no acreage restrictions in effect on the production of peanuts. Thus any value a peanut allotment (P_{acq}) may have had before 1942 was lost during the acreage expansion in World War II. From 1949 on, the value of the peanut allotment began to be capitalized in the price of land. The reduction in allotments increased this capitalization process.[6]

In Figure 12, Let L_1 illustrate the initial situation in the peanut industry as it was in 1949 after allotments were established for peanuts but before they were decreased. Let L_0 represent the situation (size of acreage allotments) after the allotments were reduced to the allowable minimum of 1,610,000 acres through yearly allotment decreases from 1949 to 1954.

Based on the Law of Diminishing Returns, as less of one resource is used in conjunction with a given level of other inputs to produce peanuts, the MVP of the reduced resource will be higher, i.e., it will shift back up the MVP curve from a to b as the acres of land planted to peanuts are decreased from L_1 to L_0.

Allotment values increased even more rapidly from 1949 to 1954 due to the peanut support price increases from 10.5 to 12.2 cents per pound. This increase in support prices for peanuts caused both the MVP and P_{acq} of land to increase significantly.

Since both the MVP and P_{acq} for land increased when peanut prices increased, land may not have always been fixed, in an economic sense. More than likely, with imperfect knowledge, the MVP of allotted

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[6]As has been indicated by Maier, Hedrick, and Gibson, op. cit., as allotments are reduced, the acquisition cost per acre of allotment will increase. In the case of tobacco, as allotments were reduced by one-third, the total value of the original allotments was capitalized into the remaining allotments such that the value of an acre of tobacco allotment increased by one-third. Thus the acquisition price (P_{acq}) increases as the MVP increases.

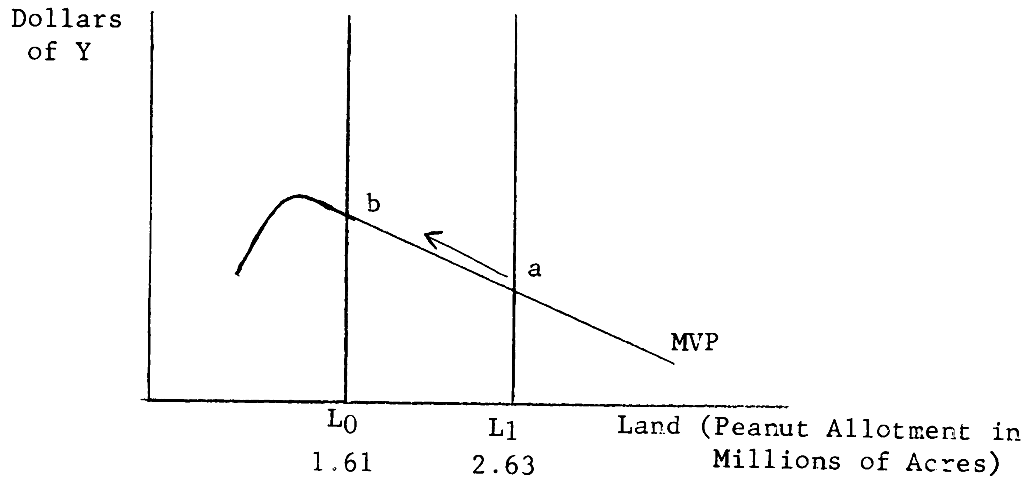

Figure 12: Shift in MVP per Acre of Land as Peanut Allotments Are Reduced and Other Resources Are Held Constant in the Production of Peanuts

land may have been greater than MFC based on P_{acq} in some years of high support prices. Reappraisals and adjustments have been made in pricing these peanut allotments by the owners in recent years as support prices have decreased. It is also likely that both the MVP and P_{acq} of land have been discounted for uncertainty of the program and other imperfections in knowledge. Thus, it is difficult to assess accurately the relationship of MVP to P_{acq} for an acre of peanut allotment.

As illustrated in Figure 12, the MVP shifts back up the slope (curve) as land is reduced and the remaining acreage is used more intensively. The MVP curve for land also will shift upward as peanut prices increase (from point b to c in Figure 13). When the support price is increased, the MVP of other durable factors also increases. Consequently, for some of these durables MVP $> P_{acq}$, *i.e.*, they are economically variable and it becomes profitable to purchase

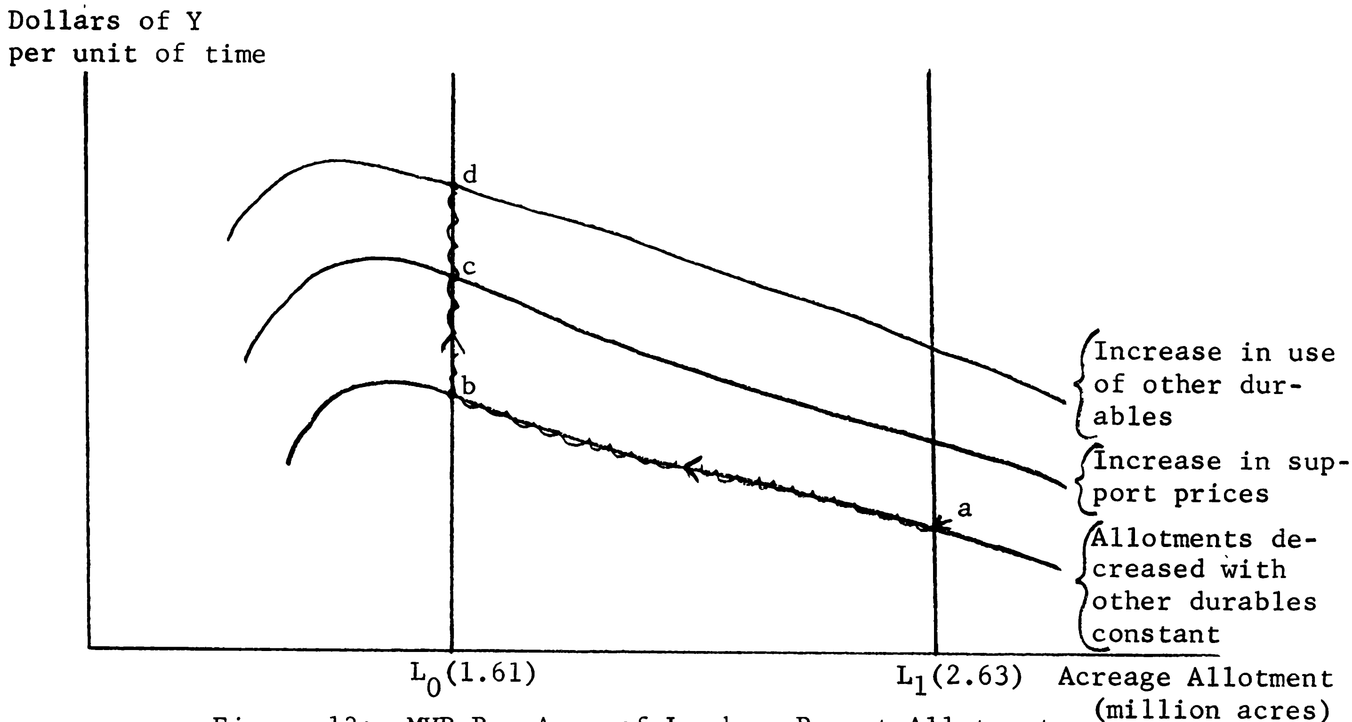

Figure 13: MVP Per Acre of Land as Peanut Allotments Are Reduced and Other Resources Are Increased as Peanut Prices Increase

additional quantities of these durables. This also causes an increase in the MVP of land from point c to d. The combination of these actions in the 1949-1954 period resulted in MVP increasing from point a to point d in Figure 13.

The salvage value (P_{salv}) for the peanut allotment also increases as the rent price for the land becomes higher.[7] Thus, if the farmer owns the peanut allotment, the off-farm opportunity cost or salvage value is the rent he could receive for allowing another producer to use his land and allotment, or is the sale value if he sold the allotment.

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[7]The P_{salv} for an acre of peanut land is the MVP of that allotment to some other peanut producer in the same area. Allotments cannot be shifted through leasing or rental arrangements to another area of production, or between two states in the same area, or even among counties within a state by the producer.

As peanut prices have increased and the land factor has been decreased, farmers have invested in such variables as higher-analysis fertilizer, gypsum, disease resistant peanut varieties, chemical weed sprays, chemicals to control diseases and insects, and irrigation. Consequently, yields per acre have increased significantly. Production could either remain at the previous level, increase or decrease depending on the severity of the allotment reductions. The sharp reduction in acreage planted during the 1949-1954 period resulted in aggregate decreases in production. However, once the minimum allotment was reached continued use of the other durables, as well as the increased use of variable resources, resulted in the aggregate supply of peanuts resuming its upward trend (1955-1962). This situation was presented theoretically in Figures 6 and 8 in Chapter III.

Summarizing, the additional acres of allotment which could be managed before MVP decreases below the acquisition price depends on many economic and non-economic factors, e.g., managerial ability. Empirical data are not available to determine this level for most peanut producers. It is also difficult to determine at what point MVP becomes less than salvage value (rent). For most peanut farm organizations, acres of peanuts probably could be expanded, assuming the allotments were "unfrozen" so as to allow this expansion, before MVP of land becomes less than P_{acq}. Obviously, if the support price program were also eliminated, MVP of an acre of allotment would decrease as peanut prices decreased, until the market was again in supply-demand equilibrium without the aid of the CCC purchases.

The Effect of the Conservation Reserve Program and Acreage Allotments in Controlling Production and in Resource Allocation

The Conservation Reserve Program was passed by Congress in 1956 as Subtitle B of the Soil Bank Act. In return for an annual payment and payment for part of the cost of establishing a covercrop, the farmer agrees to establish and maintain for the contract period a protective vegetable cover or other soil conserving uses on a specifically designed acreage of land on the farm regularly used in the production of crops.[8]

The contracts under the Conservation Reserve Program were for three, five, and ten years. The time period for making these contracts was during the five year period, 1956-1960. Thus all contracts will be terminated not later than December 31, 1969, except those contracts for the establishment of tree cover may continue until December 31, 1974, such contracts being for 15 years.

Congress did not renew the provisions of Subtitle B of the Soil Bank Act after the 1960 season, so there has been no new participation in this program during 1961 and 1962. A certain acreage of peanut allotments presently obligated in this program will be released during each of the next seven years (1963-1970), as the termination of the contracts is staggered over this period. Consequently, production will again be forthcoming from these released acreages, adding to the present supply of peanuts.

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[8] __________ Compilation of Statutes Relating to Soil Conservation, Marketing Quotas...and Related Statutes, Agriculture Handbook No. 192, Commodity Stabilization Service, USDA, Washington, D. C., (as of January 1961), p. 104.

A key feature which attracted many peanut producers was that participators received payment for acreage in the Conservation Reserve as well as having the government share the cost of planting the land in cover crops or pasture grasses. Peanut producers placed their peanut acreage allotment in the Conservation Reserve for several other possible reasons. Allotment owners did not lose their peanut allotment by participating in the program. Some producers wanted to become part-time farmers, or to produce crops having a smaller labor requirement and this program afforded them an opportunity to make this reorganization in their farm enterprise, yet retain control of their peanut allotments. For some producers, a shortage of family labor to cultivate and harvest the crop may have existed or developed. Off-farm alternatives for labor were better for some producers than the net MVP of their labor in peanut production. For others, there was a lack of owned capital and a lack of credit to purchase mechanized equipment, and fungicides and chemicals for weed control.

Participation in the Conservation Reserve is related to some extent to the fact that more farmers are working part-time off the farm now than in previous years to supplement their farm incomes. With very small allotments, it is not feasible to perform many of the tasks with machinery, particularly the harvesting and hoeing operations. Consequently, since the farmer's off-farm opportunity cost (i.e., his MVP in his off-farm job) is higher than what he could earn hoeing peanuts or putting up poles and threshing the nuts, he does not plant his acreage allotment. He can continue to hold the allotment by planting peanuts on his allotted land every third year, or from 1957-1960, by placing it

in the Conservation Reserve Program. Similarly, retired and semi-retired farmers can continue to hold their small allotments. Such allotments represent a significant investment and will be valuable if the farm is sold while the acreage allotment program is still in effect. Still other younger farmers are holding small uneconomic peanut allotments. Penny, et. al., state that these farmers tend to hold on to their allotments and produce the allotted crops even if the amount is too small to justify the enterprise on the farm. Consequently, there are thousands of "frozen" acreages that will remain for a long time with the farms to which now granted. This, of course, prevents resource adjustment among farms of an area as well as among regions.[9]

In 1960, the peak year of peanut acres in the program, it is estimated that there were 132,000 acres of peanut allotments in the Conservation Reserve Program (Appendix Table 5). If this figure is reasonably accurate, it indicates that 8.2 percent of the minimum national allotment of 1,610,000 acres was taken out of production by the Conservation Reserve Program in that year. Partly as a result of this participation by peanut acreage allotment owners, only 1,410,400 acres were harvested in 1960, and the acreage in the Conservation Reserve was almost 9.4 percent of harvested acreage. The estimated decrease in the production of peanuts from this participation was 147,428,000 pounds or about 8.3 percent of the actual production of 1,785,716,000 pounds in 1960.

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[9]Penny, N. M.; Purcell, J. C.; and Elrod, J. C., Peanut Price Income Support Programs, Mimeo Series N. S. 9, Georgia Agricultural Experiment Station, Experiment, Georgia, June 1955, p. 33.

The 1957 Conservation Reserve acreage of peanuts was estimated at 39,000 acres (Appendix Table 5). In 1962, participation was estimated at 122,000 acres of peanuts.[10] These are cumulative totals, since Soil Bank contracts are of more than one year duration. The acreage placed in the Conservation Reserve included some acreage which had previously been underplanted or underharvested. Thus, although the government estimates for production reduced by participation in the Conservation Reserve Program are based on all acres, some of the acreage had not been producing peanuts regularly in years preceding the sign-up.

This decrease in peanut production due to participation in the Conservation Reserve was estimated at 1,117 pounds per acre for each acre taken out of production in 1960. Similarly, estimated yield figures were 1,097 pounds per acre in 1961 and 867 pounds per acre in 1962. Land placed in the Conservation Reserve probably was of lower than average quality, and represented lower yields than the U. S. average yield per acre for peanuts.

It is reasonable to assume that the marginal or lower yielding acres on each farm would be placed under contract first resulting in an average <u>increase</u> in peanut yields per acre for all remaining acres of peanuts harvested for nuts. The per acre yield for allotments placed in

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[10]These figures were obtained from Commodity Stabilization Service, Soil Bank Division, USDA. Public Law 86-793, extended for twice the length of the Conservation Reserve Contract period the cropland and history acreage protection afforded by a Conservation Reserve contract provided the cover for the Conservation Reserve is maintained. The purpose of this new law was to encourage farmers after the expiration of a contract to leave the land on the same conservation use as carried out under the Conservation Reserve Program.

the Conservation Reserve Program is very difficult to determine since the average yield of the land taken out of production is not available except as an area or regional average.

The estimates presented in Appendix Table 6 indicate that the greatest participation by peanut farmers in the Conservation Reserve Program has occurred in the southeast, particularly in Georgia and Alabama. For example, Georgia had an average yield of 1,250 pounds per acre in 1960, above the national average. Part of this yield increase in Georgia (from 1,120 pounds per acre in 1959) was due to many lower yielding acres being placed in the Conservation Reserve. The yield per acre in Texas, the third largest producing state, was 770 pounds per acre in 1960. Texas peanut producers also participated in this program quite heavily. Obviously, if state averages are increased due to the lower-yielding acres being "eliminated" by being placed in the Conservation Reserve, this will also cause the national average yields to be higher.

This point can be developed further, using Oklahoma as a specific example. The increased participation in the Conservation Reserve Program by Oklahoma peanut producers in 1959 and 1960 was at least partially related to the increase in yields per acre. As indicated in Appendix Table 7, yield per acre of picked and threshed peanuts in Oklahoma was 1,075 pounds in 1958, and 1,115 pounds in 1959, a new yield record for that state. Another new state record was established in 1960 when peanut yields increased to 1,425 pounds per acre. High yields of 1,275 pounds per acre in 1961 and 1,415 pounds per acre in 1962 were also obtained. It appears this trend will continue upward, particularly since, in that state, exceptionally high yields have been obtained on irrigated acreage.

Also, over 8,000 acres in 1959 and over 12,000 acres in 1960 were placed in the Conservation Reserve. This combined with previous reductions due to acreage allotment decreases tended to remove the lower quality land from peanut production. As a result, for the 1955, 1956 and 1957 crop years, the average peanut yields per acre were 960, 725, and 800 pounds, respectively, while the 1949-1958 average yield was only 714 pounds per acre.

Obviously, the decrease in Oklahoma peanut allotments from around 188,000 acres in 1949 to 138,000 acres in 1958[11] caused a reallocation and concentration of the remaining allotments on the more productive land. This elimination of the lower yielding acreage from peanut production resulted in an increase in the State average yield per acre. Similarly, it can be hypothesized that a significant percentage of the peanut acreage placed in the Conservation Reserve in Oklahoma has been the lower-yielding, dry land (non-irrigated) acreage.[12]

Both the reduction in acreage allotments from 1949 to 1958 and the increased participation in the Conservation Reserve Program by Oklahoma peanut producers were more than offset by other factors to permit aggregate production to increase. Production increased from 115.6 million pounds in 1949 to 162.7 million pounds in 1962, even though

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[11]This reduction was in line with the national reduction down to 1,610,000 acres.

[12]Peanut acreage planted in Oklahoma for all purposes decreased from 123,000 acres in 1959 to 112,000 acres in 1960 while the estimated participation of peanut acreage in the Conservation Reserve increased by 4,000 acres in this same period.

acreage harvested decreased 55,000 acres during that period. It is also significant that total production in Oklahoma during each of the past five years (1958-62) has been greater than in any of the preceding nine years (Appendix Table 7). Irrigation is the key to much of this increased production.

Nationally, the 1962 acreage of peanuts planted for all purposes was 1,544,600 acres, which was the smallest acreage planted since 1926 (Appendix Table 8). This acreage was approximately 65,000 acres below the minimum allotment as established by the acreage allotment program. Some possible causes, other than poor weather at planting time for this general decrease in acres of peanuts being planted for all purposes are (1) fewer acres are being interplanted and fewer acres are being planted alone for hogging-off purposes,[13] (2) acreage allotments were decreased from 1949 until the legal minimum was reached in 1954,[14] (3) the Soil Bank Act in 1956 allowed farmers to place peanut acreage in the Soil Bank and later in the Conservation Reserve Program.

The Soil Bank Act did not allow for interfarm adjustments or a shift in peanut allotments to areas of more efficient production. Rather it worked to hold the allotments on the farm and in the present production area. Any part of a farm peanut allotment placed in the Conservation Reserve program was credited to the State, County, and individual farm. The result is the same as though the acreage had

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[13]Until recently, some producers, particularly in the Virginia-Carolina area and the Southeastern area, planted peanuts as a feed crop for fattening hogs for market. The peanuts were not dug for commercial use, but were "hogged-off".

[14]However, national acreage allotments have been pegged at the 1,610,000 acre minimum since 1954.

been devoted to the production of peanuts for the determination of future allotments. Also, this program kept the allotments in particular localities, since the farm retained its peanut allotment when the land "tied" to this allotment was placed in the Conservation Reserve. Small peanut acreage allotments on these farms thus are retained and the value of the allotment continues to be capitalized in the price of the land.

The Acreage Allotment Program and the Conservation Reserve Program have combined with some of the other factors responsible for underplanting of allotments to reduce acreage planted to peanuts by 3,605,000 acres from the peak year of 1943 to 1962 and by 1,349,000 acres from 1949 to 1962.[15] With land institutionally, if not economically fixed, producers sought ways to increase the use of other durable inputs in periods when peanut prices were sufficiently high so that the $MVP > P_{acq}$ for these durables. Figures 5 and 6 in Chapter III illustrate this situation. Although not shown in the diagrams, producers also increased the use of variable inputs during this period.

Higher yields and a higher percentage of the planted crop being harvested have tended to offset the decrease in planted acreage since 1949. Production in recent years has been well above that in all earlier production periods except 1942-1948, and 1949, 1950, and

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[15]Obviously, the large decrease in acreage planted in 1944, i.e., the reduction in acreage planted was over one million acres from 1943 to 1944, accounted for a significant proportion of the above decrease. A similar reduction of over one million planted acres occurred between 1948 and 1949 when the acreage allotment program was reinstated.

1958 (Appendix Table 8). Production in 1962 was 1,810 million pounds, only four million pounds less than in 1958, although the 1958 crop was harvested from 106,000 more acres.

The decrease in use of land in peanut production has been offset by increased use of other capital inputs. Figures 8 and 10 in Chapter III provide a logical explanation for this occurrence even under conditions of uncertainty. A subsequent chapter on machinery will treat this situation more fully. The Acreage Allotment and Conservation Reserve Programs have not been successful in controlling production through restricted use of land. As indicated in Appendix Table 9, the CCC has had to acquire a significant portion of the crop during most years since 1949.

If the Conservation Reserve Program had been expanded sufficiently and had been limited entirely to the whole farm approach, production could have been kept in line with demand at the announced support price. For example, in 1961, this would have required the removal of 151,200 acres of peanut allotment based on the U.S. average yield of 1,250 pounds per acre (151,200 acres times 1,250 pounds per acre equals 189,000,000 pounds purchased by the CCC). This would have required the Conservation Reserve Program to take out more than twice as much acreage as the 131,000 acres removed from production by the program in 1961.

Irrigation and Related Factors as Land Substitutes in Peanut Production

Irrigation has become a most important land substitute in increasing yields per acre and consequently total production. Peanuts are irrigated primarily in Texas, Oklahoma and New Mexico. Peanuts grow best with (1) moderate rainfall during the growing season, (2) long days with plenty of sunshine, and (3) relatively high temperatures. The type of soil which produces the highest yields are usually well-drained, light, sandy loams. The above three States have all the desirable characteristics to produce high-quality peanuts except adequate moisture.

The favorable and relatively stable prices guaranteed by the price support program have encouraged some farmers in these areas to invest large amounts of capital in irrigation and/or deep well systems. These irrigation systems have been private investments and have not been subsidized by the government, as such. Almost all the peanuts grown in New Mexico are irrigated. In Oklahoma, irrigation of peanuts tends to be concentrated in Caddo County, where approximately 15,000 acres were irrigated in 1959. Ralph Matlock, Agronomist at Oklahoma State University, estimates that 26,000 acres of peanuts were irrigated in Oklahoma in 1960. He indicated that not much further increase was likely because of water supply limitations. Most of Oklahoma's 1962 irrigated peanut acreage was still in Caddo County, although there was some irrigated acreage in Hughes County. Matlock believes 3,000 pounds per acre is the average yield on irrigated acreage, with some growers obtaining 4,000 to 4,500 pounds per acre.

Texas farmers irrigated approximately 27,000 acres out of a total acreage of 315,000 acres in 1957.[16] It is reasonable to assume

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[16]Wilborn, Ed, "Aiming for 100-Bushel Peanuts", The Progressive Farmer, June 1958, p. 28.

that additional irrigation facilities have been added in the past six years, and that if moisture becomes a problem due to a dry year, an additional several thousand acres could be irrigated. Since roots of peanuts grow two to four feet deep, the plant has the capacity to absorb water from the surrounding area. Whitt and van Bavel believe that the extensive root system and its capacity to absorb water may partly account for the lack of widespread irrigation of peanuts in the Southeastern States, and in eastern Oklahoma.[17]

The aggregative impact of irrigation has been to greatly increase the production potential of existing peanut acreage in Oklahoma, Texas, and New Mexico. One irrigated acre of peanuts in Caddo County, Oklahoma, will produce two to three times as much as the state average yield, and four to five times as much as an acre of dryland peanuts in the same county even in a normal growing season. There would be little comparison in a drought year since some dryland acreage is never harvested in an extremely dry growing season. With irrigation resulting in such high yields, acreage controls are not an adequate measure to balance supply and demand at the supported price.

In 1957, slightly more than 18 percent (19,942 acres) of the total peanut acreage was irrigated in Oklahoma. The average yield of picked and threshed peanuts on the irrigated acreage was 2,207 pounds per acre, compared with the state average yield of 800 pounds. Forty-four million pounds were produced on the irrigated acreage or about 51

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[17]Whitt and van Bavel, "Irrigation of Tobacco, Peanuts and Soybeans," Yearbook of Agriculture, Water, USDA, 1955, p. 379.

percent of the total state production of 87.2 million pounds of peanuts for that year.[18] Since 109,000 acres of peanuts were harvested in Oklahoma in 1957, and 19,942 of these were irrigated, this means that the remaining 89,058 acres produced only 43.2 million pounds. Thus, the average yield on non-irrigated land in Oklahoma was only 485 pounds per acre in 1957.

To obtain maximum benefits from the use of irrigation, other practices must be followed simultaneously. Besides increasing the rate of seeding per acre, increased amounts of fertilizer are needed. One grower used an additional 120 pounds of 11-48-0 fertilizer per acre, as well as about 600 pounds of gypsum per acre. Some farmers in Texas have changed their seeding rate from 57 pounds of shelled peanuts per acre in 38-inch rows to 100 pounds per acre in 30-inch rows. Without irrigation, such close planting widths and seeding rates would be highly impracticable.

The use of different cultural practices, fertilizer, higher seeding rates, etc., with irrigation results in the production of exceptionally high yields per acre. Irrigation of peanuts has compounded the problem of aggregate overproduction. However, for individual farmers, irrigation in combination with other improved practices has resulted in a net return per acre that is two to three times greater than the net return from dryland peanuts. This situation was illustrated in the fixed asset terminology in Figure 8 of Chapter III, where land was decreased or limited by the acreage allotment program, but increased peanut support

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[18]Chaffin, Wesley, Peanut Production in Oklahoma, Circ. E-410, Oklahoma State University, Stillwater, Oklahoma, June 1959, p. 5.

prices made it profitable to adopt an irrigation system as a new durable input since its MVP $> P_{acq}$. On the other hand, when peanut prices decrease, the MVP of the irrigation system would likely become less than P_{acq} but greater than P_{salv}, converting the system to a fixed asset in an economic sense. This appears to have been a common phenomenon in the peanut industry.

Summary

The extra income from peanut allotments has been capitalized into the price of land. As acreage allotments were reduced during the years 1949 to 1954, the value of the remaining allotments was increased. Similarly, when the price support level was raised, the value of the allotment was increased. Conversely, when the price support level has been decreased, the value of allotments has decreased.

The Acreage Allotment and Conservation Reserve Programs have had little effect on controlling aggregate production of peanuts. Some reduction in production was achieved during the early 1950's through the sharp reductions in allotments down to the allowable minimum. However, with the adoption of new and improved technologies and increased use of other durable and variable resources, per acre yields have been increasing rapidly. Favorable support prices, particularly since 1960, and a higher relative P_{acq} for labor than for other inputs have made it profitable to combine irrigation and related inputs as land and labor substitutes. The result has been significant increases in per acre yields.

Once the irrigation system is adopted on a given farm, and peanut support prices decrease, the producer continues to use the irrigation system at the same level of usage even through MVP falls

below MFC (based on P_{acq}) for the system. The usage will continue as long as MVP $>$ P_{salv}, where the P_{salv} is the MVP of the irrigation system in irrigating other crops, or is its sale value to some other user.

It appears that these land substitute trends will continue as long as support prices remain at current levels or higher. Aggregate production may soon approach the previous peak of 2,336 million pounds attained in 1948 but will be achieved with less than half the 1948 acreage.

The major effect of government programs on peanut production appears to have been that land has become higher priced. The value of allotment has been capitalized into the land price. Although owners generally discount for the uncertainty of the government program and other imperfections in knowledge, these same uncertainties cause errors in the capitalization process. Consequently, when support prices are lowered, as they were in the 1956-1959 period, MVP decreases. For many producers the MFC becomes greater than the MVP of the land where the MFC is based on the purchase price of the land with its allotment (P_{acq}).

Reappraisals are then made in the price of an acre of peanut allotment, which allows MVP = MFC, based on a new land and allotment price between the old P_{acq} and the P_{salv}. This reappraisal results in capital losses for owners of the allotment and for those renters who have a fixed rental agreement based on previous higher allotment values. Although the land is economically fixed, peanut producers continue to make use of this land to produce peanuts as long as the MVP of the land in producing peanuts is greater than using the land for some other purpose. The net result is continued overproduction.

CHAPTER VI

HISTORICAL CHANGES IN THE UTILIZATION OF MACHINERY

Introduction

Use of combines began in the Southwestern production area of Texas and Oklahoma around 1946 and then expanded into the Southeastern area. Only within the last few years have combines and artificial curing equipment come into general use in the Virginia-Carolina area. The economical use of this equipment through ownership and custom work is considered in this Chapter. The interrelated problems of discontinuous units of a stock and varying rates of flows of service from this fixed durable resource also will be discussed. Bird's thesis[1] provides some insight into this area, particularly in the problem of varying the rates of flow of a durable resource.

Peanut combines and artificial drying equipment, including diggers and shakers and bulk handling facilities represent an investment of as much as $9,000. However, these are durable stocks which give forth an annual flow of services. Profitability of investment in such machinery items is related to hours of use which varies from farm to farm within an area as well as among areas. For example, the average size peanut allotment in the Virginia-Carolina area is considerably

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[1]Bird, op. cit.

smaller than that in the Southwest, thus affecting the adoption rate of combines between these two areas.

Peanut combines are typically manufactured in one standard size, designed to operate, with minor variations for the different peanut types, at about the same rate per ton of peanuts harvested. The acres per hour figure will not be the same for all three areas, however, since yields and rankness of vines vary, depending on the production area and the type of nut.

A peanut producer needs to consider whether it is more profitable to custom hire or to own the various peanut machinery for mechanized operations, especially if his acreage is small. His decision will be based on (1) hours of use, (2) the custom service availability, (3) timeliness of the harvesting operation, (4) pride of ownership, and (5) capital or credit availability.[2]

Trend to Peanut Combines in Major Production Areas

It is estimated that nearly all of the acreage harvested for nuts in Texas and New Mexico and over 90 percent of the acreage in Oklahoma are harvested with a combine. The adoption rate for combine harvesting in the Southwest has been more rapid than in the other two major producing areas. Production habits and customs are not as deeply ingrained since peanut production is relatively new in this area compared to the Virginia-Carolina area.

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[2]Larson, George H., Methods for Evaluating Important Factors Affecting Selection and Total Operating Costs of Farm Machinery, unpublished Ph.D. Dissertation, Michigan State University, 1955, p. 21.

Also, vines are not as rank on the Spanish type peanuts grown in the Southwestern area. Since they cure faster, the peanuts can be combined 4 to 6 days after digging and windrowing. Lower yields and less bulky vines allow four to six rows to be windrowed together. Even the early combine models did a relatively efficient job of harvesting under such conditions. Finally, drying equipment is needed in some seasons and after rainy periods during harvest, but it is not as necessary in the Southwestern area as in the other two areas because of the warm, dry climate, and a lower moisture content.

In the humid Southeastern area, particularly in Georgia, the use of peanut combines spread rapidly during the 1950's. The moisture content of the nut ranges from 30 to 40 percent when dug. Peanuts can be combined 7 to 8 days after digging, at which time the moisture content has declined to 10-18 percent. Commercial drying facilities are common and the drying operation is rapid since the excess moisture (above 8-10%) is not as great as that in nuts combined in the Virginia-Carolina area.

The Virginia-Carolina area has lagged in the adoption of the peanut combine and drier. Only since 1957 has this method of harvesting peanuts been used in this area. The small acreage allotments in the Virginia-Carolina area made it appear impracticable to invest large amounts of capital in expensive harvesting equipment. Several problems had to be solved prior to the adoption of this harvesting equipment by the majority of Virginia-Carolina peanut producers. Some of these problems were lack of (1) a suitable combine and adequate drying facilities for Virginia type peanuts, (2) a windrower which would prevent peanuts

from touching the ground and from being exposed to direct sunlight, and (3) an educational program to familiarize the farmer with the combine's advantages.[3]

Characteristics of the harvest season have posed problems in the use of combine harvesting in the Virginia-Carolina area. Farmers usually dig their peanuts in October when the season is cooler than in the Southeast and Southwest. Short days, cool nights, and high humidity tend to offset the natural drying capacity of the climate. The larger Virginia type nut has a moisture content around 50 percent when dug. After 6-8 days, the moisture has declined to only 20-30 percent. If left in the windrow too long to dry, rainy weather causes the vines and nuts to shatter. To prevent this, artificial drying is necessary. It takes approximately four days of continuous forced air drying to lower the moisture content to 8-10 percent. Drying was a fairly expensive operation in Virginia under these conditions until some new technological developments were made in curing equipment. However, adequate drying facilities and improved combines have been developed since 1957, and it is now feasible to combine and artificially cure peanuts in this area.

Differences in Combine Adoption Rate Among Areas

The development of the peanut combine is a significant example of the differences in adoption rates of new technology among production areas. Peanut combines were first used in the West Cross Timbers area of Texas in 1946. Within five years, approximately ninety

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[3]Mills, W.T., as quoted in "Factors Affecting Quality as Influenced by Harvesting," by H.F. Miller, Jr., Peanut Research Conference, 1957, Atlanta, Georgia, February 1958.

percent of the peanut crop was being harvested by combines. Since 1952, practically all the peanuts produced in Texas have been harvested with combines (Figure 14).

Due to the reasons given in the preceding section, North Carolina and Virginia producers were slow to move towards the adoption of peanut combines (Appendix Table 10). Initially the combines were used on a trial basis, during which time drying procedures were further developed and refined. The number of combines and percentage of crop harvested in North Carolina and Virginia have increased rapidly since 1959, however, and indications are that these trends will continue. An estimated 45 percent of the Virginia acreage was combined in 1962, while it is estimated that 75 percent will be combined in 1965. In North Carolina, an estimated 40 percent of the acreage was combined in 1962, and it is estimated that 50 percent will be combined in 1965, (Figure 14).

Perry states:[4]

> "The big increase in combining of peanuts in the next few years undoubtedly will come about by the expansion of custom operations since most of our growers with acreage large enough to justify a combine have already bought one."

Attempts to obtain data on production and shipments of combines to each state from individual manufacturers were unfruitful. A few manufacturers did respond to written requests and personal visits with some information. Production of combines by one manufacturer indicates that of 289 combines sold by that firm in 1958, 50 went to the Virginia-Carolina area, 237 to the Southeast, and 2 to the Southwest. In 1959,

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[4]This statement taken from article by Mr. Astor Perry, North Carolina peanut extension specialist in the <u>Daily Reflector</u> (newspaper) Greenville, North Carolina, November 12, 1962, p. 12.

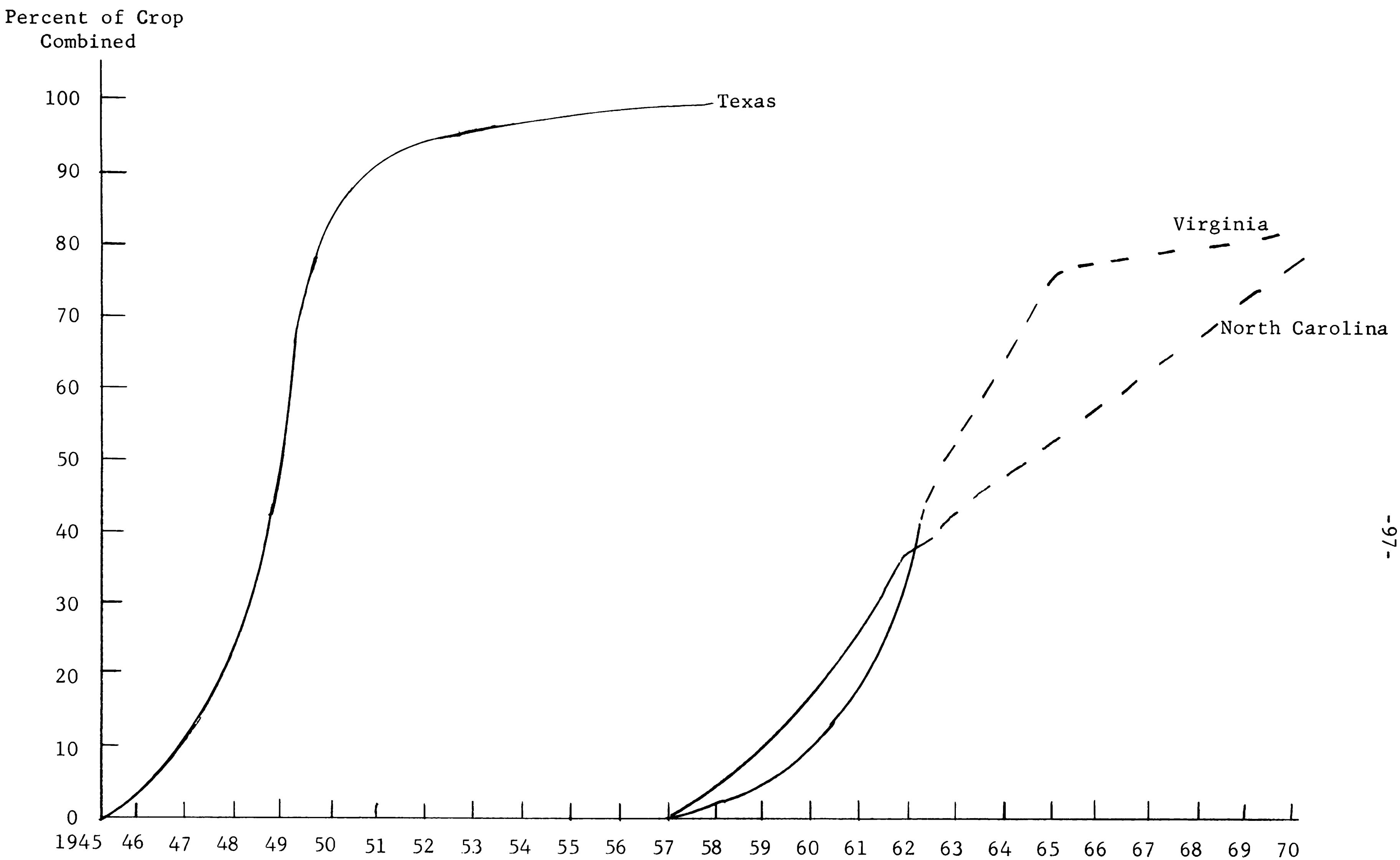

Figure 14: Percent of the Peanut Crop Harvested by Peanut Combines, West Cross Timbers Area, Texas, Southeastern Virginia, and Northeastern North Carolina. These percentages are based on estimates developed by the writer and the projections may not necessarily hold true for 1963-1970.

40 were sold in the Virginia-Carolina area, 250 in the Southeast and 35 in the Southwest for a total of 325 combines.[5]

If yearly figures for numbers of peanut combines and related equipment had been available by areas, area indices of mechanization could have been constructed. However, the figures are not available for certain years. Consequently, there is no way to establish trends by area. Another complication is that some combines are moving onto farms where no combines had been used before whereas others are being used for replacements of earlier model combines. No information on these two related developments is available from any State or Federal Government sources.

Farmers in the peanut producing states have moved in the direction of more combines and related equipment, and fewer pickers and threshers (Appendix Table 11). This trend has coincided with the reduction in the farm labor force. However, the table does not reveal all the change that has taken place in this trend to machinery. The machines purchased by farmers in recent years are, in general, improved in the sense of (1) being larger, (2) having more horsepower, (3) possessing greater maneuverability, and (4) being easier to operate. A combine manufactured in 1962 is capable of doing much more work than a similar make combine manufactured in 1950.

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[5]If similar data had been available from other manufacturers, it would have been possible to compute an index of combine adoption by areas. This would, in turn, have allowed a more realistic analysis of this trend.

While shipments and actual use of peanut combines have been increasing at a rapid rate since 1950, manufacturers' shipments of peanut pickers and threshers and stationary threshers have decreased. By 1959, most of the existing threshing machines were almost completely outdated and very few were being manufactured (Appendix Table 11).

Mechanization of harvest has increased peanut yields by improving the timeliness of operations. Use of peanut combines results in less shattering than would occur with the stack pole-thresher method. The quantity of peanuts harvested (saved) per acre increases through the use of a combine, i.e., research data indicate the increase in yield per acre ranges from slightly higher up to an average of 250 pounds higher in the Virginia-Carolina area. Other advantages and some major reasons for the upward trend in mechanization, primarily through use of the windrow-combine method and use of driers are (1) high labor costs and a shortage of labor when needed in some areas,[6] (2) adverse weather conditions during harvest time and the fact that combines and driers allow (a) a shorter harvest period and a more uniform quality crop and (b) the nuts to be dried under cover, reducing the risk from weather damage and particularly storm damage, and (3) the peanuts can be sold at least 30 days earlier, meaning that the income is available earlier for retiring debts and other uses.[7]

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[6]The combine method of harvesting results in an estimated 80 percent reduction in man-hours of required labor to harvest an acre of peanuts.

[7]Gibson, W.L., Jr.; Lambert, Andrew J.; and Loope, Kenneth E., Sharing the Costs of Drying Peanuts on Rented Farms, Circular 917 Agricultural Extension Service, V.P.I., Blacksburg, Virginia, October 1962, p. 7.

A major determinant affecting the rate of adoption of new equipment and investment in equipment is the price support program with its stabilizing effect on income. Although weather causes some income variation from year to year, farmers can plan on the basis of long time production averages and trends in estimating future income. They are actually able to pledge future crop incomes in some instances, since the lending agency usually will finance equipment for a farmer who has the advantage of a guaranteed price.

Break Even Point for Owning a Peanut Combine Compared with Custom Combining

It appears logical to discuss break even points for ownership of a peanut combine at this point. A major determinant of the fixity of the peanut combine is the minimum acreage needed to justify ownership. Once the combine is purchased based on a given set of price and institutional arrangements, such as level of allotments, then decreases in peanut prices could result in economic fixity for the combine.

Similarly, a loss in acreage allotments through government decree could result in the combine becoming fixed in an institutional sense. Thus, the combine could become fixed in the enterprise if the peanut producer has sold his picker-thresher and if labor is no longer available to harvest peanuts by the old method. Then the producer is forced to continue using the combine even though MFC per unit of flow of the combine increases such that it becomes greater than MVP. MFC increases as the acreage of each farm is reduced, causing the combine cost to be spread over fewer harvested acres annually. MFC as used here is based on acquisition cost (P_{acq}), not salvage value.

Ownership

Agricultural economists and agricultural engineers have estimated the acreage required to justify the ownership of a peanut combine. Although these estimates vary by time and place, they do give some indication of the size of peanut allotment needed to justify ownership of a durable stock representing a large capital investment.

The formula used to develop these estimates is:

$$\text{Number of acres harvested to justify ownership} = \frac{\text{Overhead cost of combine per year}}{\text{Custom rate charged per acre less variable operating cost per acre for own combine}}$$

Based on a custom rate of $13.20 per acre[8] and a total variable cost of $4.20 per acre for combining, the margin left to pay overhead costs of owning a combine would be $9.00 ($13.20 - $4.20). The annual overhead cost[9] of owning a $3,400 combine would be $453.00. Thus, the number of acres required to break even would be $\frac{\$453.00}{\$9.00}$ or 50.3 acres of peanuts yielding 1,200 pounds per acre. This is approximately the break even point for combine ownership by a Georgia peanut producer.[10] The Virginia average yield per acre has been approximately 2,000 pounds per

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[8] This is based on a custom combining rate of $22.00 per ton and using the U. S. average yield of 1,200 pounds per acre to convert to a per acre basis.

[9] This includes depreciation, taxes, housing, insurance, and interest.

[10] Fortson, James C., Break Even Points for Harvesting Machines, Bulletin N. S. 66, Georgia Agricultural Experiment Station, Experiment, Georgia, December 1959.

acre for the past several years. Again, using the $22 per ton custom combine rate, $4.20 as the variable costs per acre, and $453.00 as the annual overhead costs of combine ownership, the break even acreage for the average Virginia producer would be approximately 25.45 acres.[11] This figure corresponds closely to the estimated break even point of 26 acres as developed by Mills, et. al.,[12]. This latter figure is based on a yield of one ton per acre and a slightly lower combine cost, but accounts for the cost of all harvesting equipment needed for the windrow method including digger, windrower, and combine. The figure is computed using $45.00 per acre as the custom harvest charge. This custom charge includes digging, shaking, windrowing, combining, and curing.

With a custom combine rate of $45.00 per acre, including digging, windrowing, and drying, the stack-pole thresher method is more economical than the combine method up to 24 acres of peanuts.[13] However, if custom combining is available, it will be more economical up to 26 acres, at which point it becomes profitable to own a combine. Custom combining will pay over the stack-pole method up to 28 acres, as illustrated in Figure 15.

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[11]$22.00 - $4.20 = $17.80 per acre left to pay overhead costs of combine ownership; $453.00 ÷ $17.80 = 25.45 acres as the break even point in combine ownership.

[12]Mills, W. T., and Dickens, J. W., Peanuts: Harvesting and Curing the Windrow Way, Bulletin 405, North Carolina Agricultural Experiment Station, Raleigh, North Carolina, April 1958, p. 9.

[13]These computations do not take into account the additional yield (or nuts saved) using the combine method.

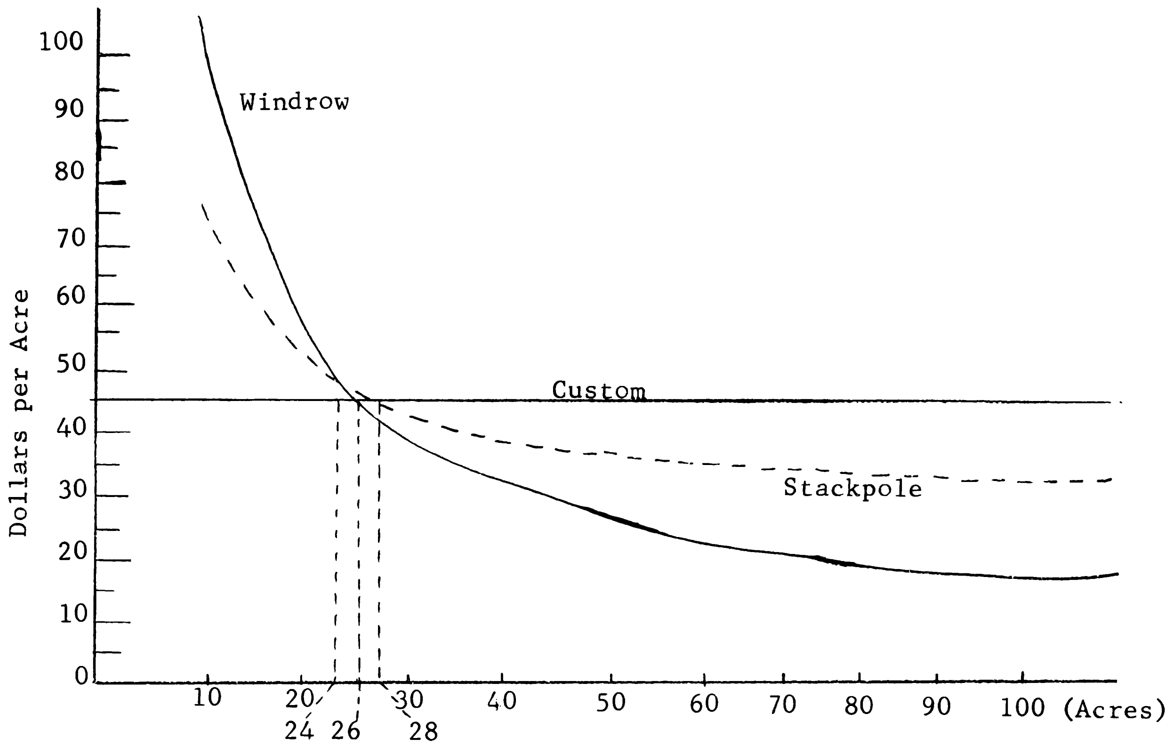

Figure 15: Comparison of Peanut Harvesting Costs in North Carolina by Three Methods, Stack-pole, Custom Combining, and Owned Combine-Windrow Method, Assuming a Yield of 2,000 pounds Per Acre

Source: Pierce, Walter H.; Mills, William T., An Evaluation of a Mechanized System of Peanut Production in North Carolina, Agricultural Experiment Station, North Carolina State College, Raleigh, North Carolina, Bulletin 413, August 1961, p. 18.

Custom Combining

If the farmer does not have sufficient peanut acreage to justify a combine, he may then consider custom combining. There are two alternatives under this situation: (a) the producer may purchase the combine with the intention of harvesting his own peanuts and then custom combining enough additional acreage for his neighbors to justify purchase of the combine; or (b) the producer may decide not to purchase the combine but make arrangements with some other producer with a combine to have his peanuts harvested the windrow-combine method, *i.e.*, he hires the combining done.

Georgia figures indicate the most prevalent rate for custom combining in 1957 was $14.95 per acre, with the average figure at $17.00 per acre. This is based on average yields of approximately one-half those in the Virginia-Carolina area. The custom operator furnished all labor and equipment to pick and haul the nuts. The average custom rate when the custom operator furnished only the labor to pick the nuts was $13.64, with the most frequently reported rate being $12.50 per acre.[14]

Information obtained from Mr. Herbert Brown's office files[15] indicates that the custom rates for combining in Alabama vary from $20 to $30 per ton, with the most common rate at $20 per ton. Based on average yields in Alabama of 1,000 pounds per acre, this represents approximately $10 per acre.

A significant portion of the Alabama crop was custom combined in 1957. There were an estimated 296 combines in Alabama and 60,709 acres of peanuts were combined, or an average of approximately 205 acres per combine. Mr. J. H. Yeager indicated that in Southeastern Alabama in 1958, peanuts were combined by customer operators at a charge of $25.00 per ton which included hauling to market.

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[14]Fortson, James C., Break Even Points for Harvesting Machines, op. cit., pp. 58-59.

[15]These data were obtained from Mr. Brown's files in ERS, USDA, Washington, D. C., by this writer in September 1959. The information was based on a survey taken on January 5, 1957.

Varying Flow of Service of Combine to Justify Combine Ownership

The total acres of peanuts harvested have not varied much between 1954 and 1959 for the seven major peanut counties in Virginia (Appendix Table 12). The number of farms producing peanuts has decreased by 1,807. This resulted in the average size of peanut allotment per farm increasing from 15.14 acres in 1954 to 21.16 acres in 1959. A significant proportion of this increase has been accomplished through leasing of farms with allotments, rather than by outright purchase.

By controlling several separate allotments, the peanut producer may be able to justify the purchase of a combine, i.e., by spreading the total acquisition cost over a larger acreage. MFC per unit of flow of service from the combine decreases such that $MVP \geq MFC$. Thus, in the asset fixity sense, the combine is economically variable.

Support price increases during the 1960-63 period, particularly the 10 percent increase in 1960 also have been a determining factor in the rapid adoption of combines in this period, in the Virginia-Carolina area particularly. Farmers' expectations of peanut support prices evidently have resulted in reappraisals and upward shifts in the MVP of combines. Although these expectations are perhaps based on imperfect knowledge, the parity level of support is still near the minimum of 75 percent as established by Congress. Thus, discounted MVP's should allow a sufficient margin to account for a situation where support prices may again reach 75 percent of parity.

Average size of allotments in Virginia is still very small compared to other areas, making it difficult to increase efficiency

through the use of large items of machinery such as a combine. As indicated previously, the break even point for combine ownership is approximately 26 acres. The average size allotment in Virginia is below this figure, indicating that custom combining must continue to play an important role in Virginia peanut production if an increasing proportion of the total crop is to be combined.

Certainly, a producer with less than 26 acres who owns a combine cannot afford to leave it idle after he has completed harvesting his small acreage. If he has a slack labor period, i.e., no competing uses for his labor after harvesting his own crop, the combine owner can justify ownership of a combine by hiring himself and his combine out to other producers with small acreages. In this manner, the flow of service from the fixed durable can be increased above the break even point of 26 hours of annual use, assuming a combine rate of one hour per acre.

Bird has argued that the flow of service of an asset cannot be varied over a wide range without varying the useful life of the equipment.[16] However, the useful life of a peanut combine has been limited by obsolescence long before its stock of services is exhausted. At least this has occurred during the early developmental stages of the combine, as new developments and improvements in peanut combines have caused older models to become obsolete. The progressive producer

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[16] Bird, Alan R., "Fixed Asset Theory Examined," (unpublished paper written at Michigan State University), p. 21.

will likely abandon the old combine or sell it to some other peanut producer as a replacement for the stack-pole method before the available flow of services of the combine is exhausted.

Another method combine owners have used to at least partially counteract this obsolescence factor has been to increase the flow of services of the combine in earlier years. This, in effect, increases the annual MVP of the combine in the earlier years by harvesting more acres during that period to allow for uncertainty of future combine developments. This relationship is explained in Figure 16.

A durable asset such as a combine would be expected to depreciate at a faster rate as its flow of services is increased. The larger repair costs would also be shifted forward to earlier years as the flow of services increased. On the other hand, the combine owner is able to recoup his investment more rapidly and thus has a shorter planning horizon. This allows the producer to make greater use of the combine before it becomes obsolete, or at least shortens the period in which he continues to use the older model combine when technologically improved and more efficient combines are on the market.

The break even number of years of useful life can be computed if the annual flow of services from the stock can be arbitrarily specified. The following formula developed by Smith[17] can be used to determine the break even useful life of the owned combine in years.

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[17] Smith, Edward J., "Buying Versus Renting a Combine", Agricultural Economics Research, Vol XIII, October 1961, USDA, Washington, D. C., p. 116.

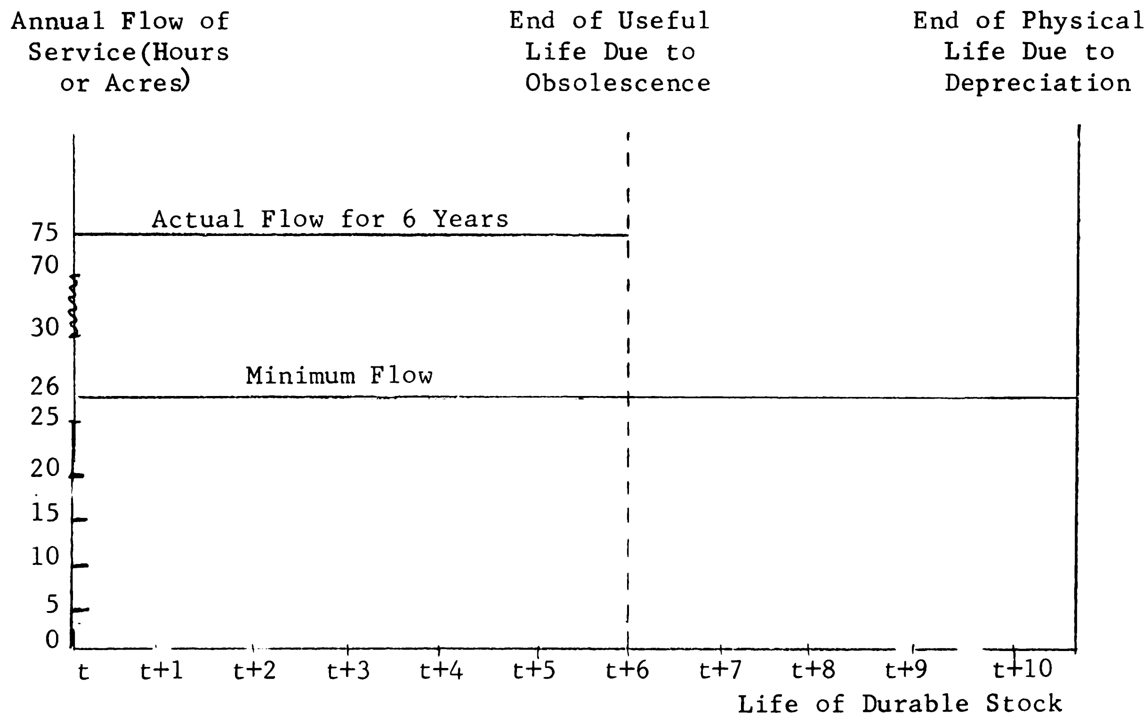

Figure 16: Illustration of Flow of Services from an Owned Combine, Based on Uncertainty of Future Combine Developments

$$Y_2 = \frac{0.9C_2}{A(\overline{V}_1 - \overline{V}_2 - \overline{L}_2W) - C_2(r/2 + t)}$$

Where: Y_2 = break even useful life of the owned combine in years;

C_2 = original cost of the owned combine ($3,400.00);

A = acres to be harvested per year or annual flow of services from the durable asset (40);

$\overline{V}_1$ = variable costs per acre of custom combining (i.e., the custom rate per acre). ($13.20 acre);

$\overline{V}_2$ = variable or operating costs per acre of the owned combine and tractor ($2.20);

$\overline{L}_2$ = labor requirements in hours per acre with owned combine (2);

W = value of labor per hour ($1.00);

r = opportunity cost of capital, or the annual interest rate (6 percent);

t = cost of taxes, insurance and housing, as an annual rate (1.5 percent of original cost);

The figure 0.9 times the initial cost of the combine is used because salvage value is estimated at 0.1 original cost.

$$Y_2 = \frac{0.9\ (\$3,400)}{\left\{40\ \left[\$13.20 - \$2.20 - 2(\$1.00)\right] - \$3,400\ \left(\frac{.06}{2} + .015\right)\right\}}$$

$$Y_2 = \frac{\$3,060.00}{\left[40\ (\$9.00) - \$3,400\ (.045)\right]} = \frac{\$3,060.00}{\$360.00 - 153.00}$$

$$Y_2 = \frac{\$3,060.00}{\$207.00} = 14.78,$$ or approximately 15 years for 40 hours annual use per year.

However, if the annual flow of services through combining of owned acreage and custom combining is 100 hours, *i.e.*, if A = 100 acres, then

$$Y_2 = \frac{\$3,060.00}{\$900.00 - \$153.00} = \frac{\$3,060.00}{\$747.00} = 4.10 \text{ years.}$$ Similarly, if A = 75 acres, Y_2 = approximately 6 years' useful life. This example is illustrated in Figure 16. If A = 60 acres, Y_2 = 7.91 or approximately 8 years' useful life. The peanut producer would have to get the equivalent of this many years' use out of his owned combine in order to justify its ownership. If he believes the useful life will be so limited by the prospect of obsolescence that he cannot get this much use from the combine, then he would be better off not to own the combine, but to use custom combining or leasing of equipment to harvest his crop.

The above analysis implies that the annual flow of service is inversely related to the useful life in determining either the break even years or the annual break even flow of services from the stock. By using an increased rate of repairs, the producer could probably maintain a high annual rate of flow of services without unduly shortening the useful life. On the other hand, a point is reached in the life of the combine where newer combines with more efficient picking mechanisms, bulk tanks, etc., cause the older model to be obsolete. When the producer determines that the annual cost per acre of the new improved combine less

the difference in MVP in favor of the improved model[18] is smaller than the annual cost of the old combine, then it becomes profitable to write off the old combine and purchase the newer model. Account must be taken of the remaining years' life of the older model and its salvage value in the above analysis.

Relationship of Various Price Indexes and Trends in Purchase of Selected Items of Farm Equipment

Although the peanut prices in recent years have been supported at <u>lower</u> prices than the high support levels of 1954-56, sufficient technological improvements have been made in the harvesting of peanuts to make it profitable to make capital investments in durable resources such as a peanut combine. Timeliness of harvesting associated with the combine, shortages of labor in critical periods and higher wage rates have all been factors in the continued adoption of more combines and the replacement of older models with newer, improved versions.

Perhaps Wilcox had perceptive vision of farming conditions in 1963 in a statement he made in 1951:[19]

> "Production innovations are being developed at an increasing rate in recent years, innovations which would be profitable for large numbers of families to adopt irrespective (within wide limits) of the level of farm product prices. Innovations of this character are the development of chemical weed and insect control sprays, improved

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[18] Improved models of combines have saved as much as 300 pounds more nuts per acre than older model combines. At 10¢ per pound, this represents $30 additional MVP per acre in favor of the new combine. Bulk tanks and other improvements have also decreased labor requirements per acre over the old combines.

[19] Wilcox, Walter W., "Effects of Farm Price Changes on Efficiency in Farming", <u>Journal of Farm Economics</u>, Vol. 33, February 1951, p. 51.

> strains of seeds, and power and tillage machinery which permits more timely and thorough preparations of the seed bed for crops. Innovations in mechanical equipment, such as the fertilizer attachments on the grain drill, and the field forage harvester, also make new production (or harvesting) practices economical, irrespective of the level of farm product prices. At any particular time, only a very small fraction of the farmers have adopted the newer production innovations which are profitable under existing factor-product price ratios."

The price indexes presented in Appendix Tables 13 and 14 explain partially the relationship between prices received for peanuts and all farm products and the purchases of farm equipment. From 1930 to 1932, prices received by farmers for farm products declined sharply (Appendix Table 13). However, prices paid by farmers for motor vehicles and farm machines decreased very little. As a result, purchases of machinery and motor vehicles decreased severely, reflecting the 48 percent decrease in cash receipts during the 1930-1932 period. Peanut prices received also retreated very sharply from 1927 to 1932 and it is highly likely that the purchases of peanut pickers and other mechanical equipment, including tractors, used in peanut production decreased significantly during this period, and probably ceased almost completely.[20]

During this early depression period, when acquisition prices (P_{acq}) became greater than the MVP of farm machinery due to the sharp decrease in peanut prices, whatever machinery existed on the farms became fixed in an economic sense. This also meant that it was unprofitable to purchase additional machinery, although this latter was probably

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[20] Wheeled type tractors manufactured in the United States (for all farms plus exports) decreased from 195,980 in 1929 to 176,075 in 1930 and to 61,940 in 1931. Similarly, farm trucks manufactured in the United States decreased from 61,000 in 1929 to 16,000 in 1931. Source: Statistical Abstract of the United States, 1936, U. S. Dept. of Commerce, Washington, D. C., Table 792, p. 779.

impossible anyway due to a shortage of capital by most farmers. Peanut producers continued to use their existing durable resources since P_{salv} also decreased (as the MVP of this machinery in alternative enterprises decreased sharply). Labor became relatively less expensive than machinery. The net migration of labor to the farm during this period resulted in an abundance of labor for most farms. Perhaps, the depression years represented a period of "machinery-saving labor" usage, as labor again was used to do tasks which had gradually been taken over by machinery. Figure 7 in Chapter III with the labels transposed on the two input axes would show the fixed asset interpretation of this occurrence, as labor was substituted for machinery to maintain production at a high level.

Although the discussion of Figure 7 on pages 43-47 was theoretical, it is applicable to this depression period when production was maintained at a high level despite the decrease in peanut prices.[21] As indicated in Appendix Table 8, the acreage of peanuts harvested for nuts continued to trend upward during the 1930's after a decrease from 1929 to 1930. Total production was influenced more by yield changes due to weather than by any changes in production practices, i.e., production was up in good weather years and down in poor weather years, although the general production trend was up during the 1930's. This increased production occurred despite the stability in peanut prices from 1934-1939

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[21] In Figure 7, land was assumed fixed, which was not the case during the 1930's.

and the slight increase in both wage rates and farm machinery prices during this same period.

The index of prices received by farmers for all farm products did not again exceed the index of prices paid by farmers for farm machines until 1943. The index of prices received by farmers for peanuts exceeded the farm machinery price index in 1944. However, due to wartime restrictions, any increased demand for machinery could not be met until materials could be diverted from the wartime effort.

Peanut producers fared well relative to farm machinery prices during 1944-48 period (Appendix Table 13). During this period, the MVP of machinery increased rapidly, and became more favorable relative to P_{acq} for machinery. Thus, in asset fixity terminology, machinery MVP $> P_{acq}$, and machinery became a variable resource as it was profitable for peanut producers to purchase these types of resources. As indicated in Appendix Table 14, there was a sharp increase in tractors and trucks on all farms in selected peanut producing states from 1945 to 1950.

This increase reflects to a large extent the favorable ratio of prices received to prices paid (or alternatively MVP to MFC) position of farmers during the period 1945 through 1948. Obviously, the restrictions on farm machinery purchases until the end of World War II helped to increase the numbers of tractors and trucks purchased during the 1945-1948 period as existing machinery on many farms was obsolete and/or in poor condition by 1945. Once wartime restrictions were abandoned, the numbers of trucks and tractors on farms expanded rapidly to 1954. Despite a greater increase in prices paid for machinery than in

peanut prices received from 1949 to 1954, the high level of support prices for peanuts (12.2 cents per pound in 1954) prompted many peanut producers to invest in machinery items.

Since 1954, machinery prices have continued to rise more rapidly than the prices received indexes. Indications are, however, that the relatively high price support level for peanuts and the increasing yield per acre have resulted in some purchases of new items of equipment by peanut producers. However, the upward trend in machinery purchases leveled off sharply from 1958 to 1959. Again this reflects the fact that for some peanut producers, as well as other farmers, MVP decreased due to product price decreases and MFC increased as machinery prices continued their upward climb. Consequently, machinery became fixed, in an economic sense, as $MFC > MVP$. In such instances, producers continued to use these fixed assets as long as $MVP > P_{salv}$. Consequently, production remained at a high level during the 1955-1959 period (Appendix Table 8).

Although the data presented in Appendix Table 14 represent purchases of tractors and trucks by all farmers within the particular state, a logical assumption is that the adoption rate of these items by farmers holding allotments of peanuts and other supported crops was as high or higher than the purchases by all farmers in that state.

Actual prices paid by farmers for motor vehicles and farm machinery have increased about two and one-half times over the prices paid for similar equipment in 1940. However, the deflated price of a 20 to 29 horsepower wheel tractor in 1940 was around $1,000; in 1962

it was approximately $1,033.[22] The newer tractors have many improvements and are more efficient. These improved machines have helped contribute to a greater output per unit of input, causing machinery costs per unit of output to decrease.

Some Side Effects on the Adoption of Labor-Saving Technology on Aggregate Peanut Production

The peak labor requirements for producing peanuts under the stack-pole thresher method of peanut production occurred during the harvest season. A general rule of thumb was that a farm family could plant three to five times as many peanuts as it could harvest, thus requiring a plentiful supply of hired labor at harvest time. When surplus or underemployed labor began to move out of the peanut areas, in response to rising salvage prices for their labor, peanut producers had to seek other alternatives.[23] An individual producer had two alternatives in offsetting the shortage of labor. He could either (1) reduce his acreage such that the immediate family could harvest the planted

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[22]The tractor prices for the two time periods were deflated by the index of prices received by farmers with 1910-14=100. The 1940 index was 100 with an actual tractor price of $1,000 and the 1962 index was 242 with an actual tractor price of $2,500 (see Appendix Table 13 for index of prices received).

[23]Although unskilled Negroes represented much of this underemployed labor, salvage prices for the young whites and Negroes in the Southeastern production area have risen. These unskilled workers have learned some trade in the city, be it janitor, elevator operator, or factory worker, where full-time employment results in a higher MVP for their labor than they could earn working only when peanuts needed hoeing or harvesting.

acreage with old techniques, or (2) mechanize so that the same acreage could be planted, cultivated and harvested with the available labor.[24]

Technologically improved inputs continue to be adopted at a rapid pace in the peanut enterprise. This is particularly true in the substitution of labor-saving machinery and equipment for labor. In doing this, farmers can usually shift their average cost curve downward to obtain a lower average cost. Marginal cost per unit of peanuts produced also decreases. This holds true not only because machinery is becoming cheaper relative to labor, but because machinery, such as diggers, shakers, combines, and other new technologies also increase output per acre at the same time. Another consideration is that larger items of equipment require a farmer to attempt to increase total production to make maximum use of the equipment. As a result, new technological adoptions usually involve increased output if the total resources are not restricted by some control program. Again, in asset fixity terminology, once the producer commits himself to large capital investments in durable resources, it is more profitable, or less unprofitable, to continue using these durable resources in production as long as $MVP > P_{salv}$ even though a peanut price decrease may cause $MVP < P_{acq}$.

One other point is that as long as the MVP of variable resources is greater than their MFC, the producer will continue to use these resources also. Thus, if the producer was not initially in

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[24] Cannon, Buford J., A Progress Report on Peanut Harvesting, Inf. Circ. No. 11, Dept. of Agricultural Engineering, North Carolina Agricultural Experiment Station, Raleigh, North Carolina, August 1955, p. 4.

equilibrium, i.e., if for some resources MVP $> P_{acq}$, and he was not maximizing profit, then even with a price decrease, there may be no decrease in the use of the variable resources as long as MVP $\geq P_{acq}$ under this new situation.

Besides the saving in labor costs, and the ability of the family labor to handle a larger acreage of peanuts, preliminary experiments have proven that more peanuts are saved per acre using a windrow-combine instead of the stack-pole thresher method. North Carolina tests[25] on the two methods of combining indicate that the windrow method averaged 2,686 pounds of nuts per acre in 1953 compared with 2,441 pounds of nuts per acre using the stack-pole method, or a difference of 245 pounds per acre in favor of the windrow-combine method. The stack-pole method did yield a slightly larger quantity of vines and the threshed nuts sold for one-tenth of a cent more. However, taking both of these factors into consideration, and including both hay and peanut value, the windrow method had a gross return of $299.60 per acre compared with $273.56 per acre for the stack-pole method.

In 1954, the difference was even more significant in favor of the windrow-combine in the North Carolina tests. The yield per acre for the windrow was 2,944 pounds per acre, and 2,306 pounds per acre for the stack-pole, or 638 pounds per acre in favor of the windrow method. The gross receipts per acre for both the hay and peanuts were $472.01 for the windrow-combine method and $384.09 for the stack-pole method. It might be noted that these differences in favor of the

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[25] Ibid., pp. 17-22.

windrow-combine method are exclusive of the highly important reduction in labor costs as a result of this method.

Similar research results were obtained by Duke at the Tidewater Research Station, Holland, Virginia, on both the runner and bunch type peanuts. These yields-per-acre results are presented in Appendix Table 15. The three year averages reflect approximately a 100 pound per acre yield increase through the use of the windrow-combine method. Actually, in this experiment the 1959 results are probably more indicative of the actual difference between the two methods of harvesting. There have been considerable improvements made in the combines since the 1957 experiment. The newer, improved combines have a greater picking efficiency and leave fewer nuts on the ground than did the earlier models. Statistical tests indicated that the yields per acre from the use of combines were constantly improving over the test period. The lower overall yields in 1959 reflected the poor harvesting season.[26]

Continued improvements in combines will result in yields per acre continuing to increase. The combine method presently represents an advantage of at least 300 pounds per acre over the stack-pole thresher method of harvesting peanuts. After modifications have been made in the present combines, after older model combines presently in use have been replaced, and after producers presently using the stack-pole method

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[26]Mr. Duke indicated in personal correspondence dated January 28, 1963, that the windrow-combine versus stack-pole tests were not continued after 1959. He believes, however, that there would be an even larger yield difference favoring the combine now, since "combine efficiencies have gradually increased".

change over to the combine operation, by either custom combining or by ownership of the combine, the aggregate effect should be to increase peanut production per acre by even more than 300 pounds per acre. Based on the 1962 estimated acreage not harvested by combine, the additional production would be approximately 77,460,000 pounds[27] of peanuts.

Summary

The trend in combine use has been discussed in this Chapter. The break even acreage for combine ownership, as compared with custom combining has been discussed. An analysis of varying the rate of flow of service to justify combine ownership also has been presented.

A discussion of the relationship among price indexes for motor vehicles, farm machinery, hired labor and prices received indicated that the relative increase in wage rates has corresponded to the increased adoption of tractors and trucks particularly since 1950. The major effects of these price changes may be summarized as follows: (1) farm wage rates have increased at a faster rate than machinery prices, (2) labor-saving machinery has been rapidly adopted by peanut producers during the 1950's and early 1960's, (3)for many farms with small peanut allotments, custom combining has allowed the producer to reduce his labor requirements through mechanization, (4) improvements in the newer model combines have resulted in higher yields per acre, and (5) break

[27]This figure was computed by multiplying the estimated 258,200 acres not combined in 1962 (Table 22) by 300 pounds per acre.

even point for owning a peanut combine appears to be 25 or 26 acres in the Virginia-Carolina area and approximately 50 acres in the Southeastern area. Due to lower yields per acre, the break even point for combine ownership in Southeastern area and dry land production area in the Southwest is somewhat higher than for the Virginia-Carolina area. The break even point for irrigated acreages in the Southwest probably is as low or lower than the Virginia-Carolina estimate.

Peanut producers have rapidly adopted combines and other labor-saving machinery since World War II. Even though peanut prices are presently lower than the high levels of the early 1950's, the MVP of machinery has remained fairly stable or may even have increased as improvements in production and harvesting techniques have increased the MPP (Marginal Physical Product) per unit of input. Such increases in efficiency have tended to offset the lower support prices.[28] Thus, combines and other types of machinery generally have been variable, in an economic sense during the period 1945-1962, as $MVP > P_{acq}$. However, during the 1956-1959 period when peanut prices decreased rather sharply, fewer purchases of farm machinery were made. Also, for some peanut producers with large investments in machinery, $MVP < P_{acq}$ and the machinery became fixed in an economic sense. In such instances, producers continued to use these fixed assets as long as $MVP > P_{salv}$. Consequently, production did not decrease in response to lower peanut prices during this period.

A more detailed analysis of the substitution of machinery for labor can more logically be presented in Chapter VIII after the discussion of the labor factor in Chapter VII.

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[28]In general, for the peanut industry, MVP=MPP times P_y (Peanut price) as the producer generally sells his nuts at the supported price, i.e., P_y=MR in this situation.

CHAPTER VII

HISTORICAL CHANGES IN THE UTILIZATION OF LABOR

Introduction

In the early years, hand labor, much of it by unpaid members of the family or by tenants and their families, was the dominant factor of production in the peanut industry. Most of the tasks involved in producing peanuts, particularly the hoeing operations, required many hours per acre. Much hand labor also was required to dig, stack, and thresh the peanuts.

Since 1940, off-farm job opportunities and resulting general net out-migration of unpaid family and hired labor have reduced the availability of this labor during peak farm labor periods. Labor-saving technology thus has been adopted to eliminate these periods of peak labor needs. The trends which have developed in the labor market and the relationship between wage rates and prices of other resources need to be studied to understand peanut supply responses.

Trends in Wage Rates

In recent years, particularly since the beginning of World War II, labor has become expensive relative to other factors used in peanut production. In the major peanut producing areas, farm wage rates have quadrupled and in some states, *e.g.*, Virginia, have increased even more than this since 1941. Prices of other resources have increased,

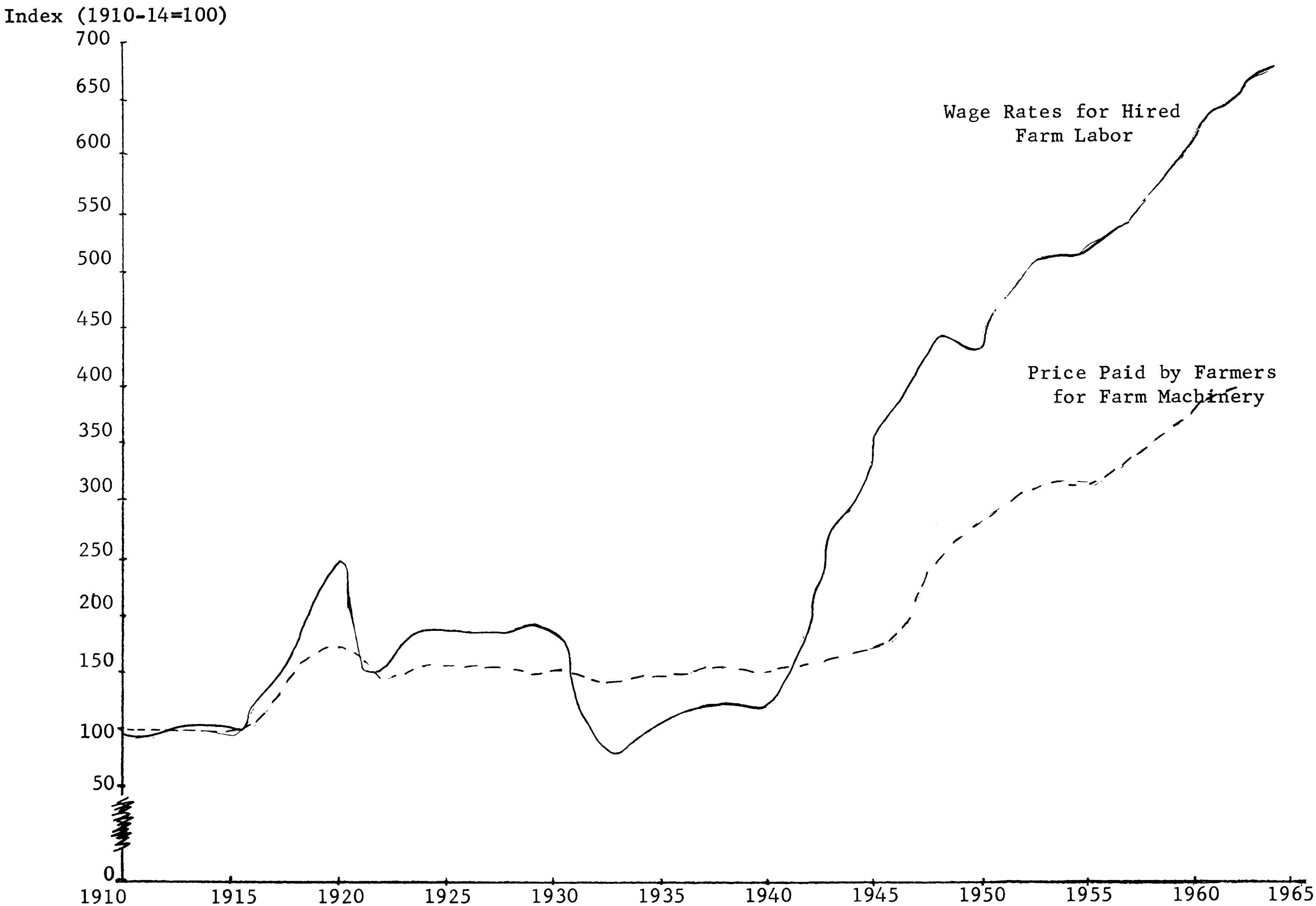

Figure 17: Comparison of Indexes of Prices Paid by Farmers for Farm Machinery and Wage Rates for Hired Farm Labor, 1910-62 (1910-14=100).

but not as much proportionately as wage rates. Farm machinery (tractors, harvesting and planting equipment) prices have increased by more than 2 1/4 times during this period. Only during the period 1931-41 was the index of farm machinery prices higher than the index of wages paid for hired farm labor (figure 17). As indicated in Chapter VI, new and improved labor-saving machines such as the peanut combine have come into use, partly as a means of reducing labor costs.

The increases in the cost rates of the various factors used in peanut production have not been in the same proportion. Consequently, since 1950 there has been a greater substitution of durable items of machinery such as combines, two-row diggers and digger-shaker combinations, and other inputs such as chemical weed control methods, for labor. A review of the labor requirements per acre and per hundred-weight for peanuts and for competitive enterprises will provide some insight as to the substitution of other inputs for labor in each of the three major producing areas.

Changes in Man-Hour Requirements for Peanut Production Over Time

In 1910-1914, the average man-hour requirements per acre for peanut production were 69.1 hours per acre (Appendix Table 16). Assuming there had been no substitution of other inputs for labor since that period, and that this quantity of labor would have been sufficient to produce the increased yield of peanuts in 1955-1958, at an average wage rate of $.75 per hour compared with $.12 an hour in 1910-1914, the

increased cost of production would have been 69.1 hours times \$.63 (\$.75 - .12) or \$43.53 additional cost per acre for labor.

Viewing the labor cost situation from another standpoint, labor requirements per <u>acre</u> have decreased significantly from 1910-1914 to 1955-1958. For example, the decrease was 39.7 hours per acre. At prevailing wage rates of \$.75 per hour during the latter period, this represents a reduction in labor costs of \$29.77 per acre. Similar reductions in labor requirements per unit of production have also occurred with tobacco, cotton, soybeans, grain sorghum and corn.

The reduction in man-hours per 100 pounds of peanuts produced has been even more dramatic, due to increased yields per acre as well as the adoption of labor-saving technology. For peanuts, the labor requirements per 100 pounds of peanuts produced have been reduced by 6 hours from 1910-1914 to 1955-1958 (Appendix Table 16). With the increased use of the combine and improved related equipment since 1958, these labor requirements have been reduced even further in the last four years. Based on average yields per acre of 2,000 pounds, and using the 1910-1914 to 1955-1958 data, this reduction represents a labor-saving of 120 hours per ton equivalent under present conditions (20 cwt. times 6 hours saved per cwt.). Based on a rate of \$.75 per hour, this represents a savings of \$90 per ton in labor costs. A recent North Carolina study[1] indicates that in 1957-1959, the average labor requirements per acre for production of peanuts were 33.6 hours or approximately 1.7 hours per 100 pounds of peanuts produced, assuming a yield of 2,000

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[1]Pierce and Mills, <u>op. cit.</u>, p. 5.

pounds per acre. This represents a reduction in man-hours from the 1910-1914 base of 7 hours (8.7 - 1.7) per 100 pounds. Assuming a yield of 2,000 pounds per acre, a labor savings equivalent to 140 hours per acre has occurred during this period. Multiplying this figure by $.75 per hour results in a net labor saving of $105 per acre.

Man-hours per unit of physical production have also decreased significantly for the other crops shown in Appendix Table 16. Labor requirements for soybeans have been reduced by 83 percent, from 126 to 21 man-hours per 100 bushels. Cotton, grain sorghum, and corn have also had sharp reductions in labor requirements. However, in the tobacco industry, where very little merchanization has occurred, the man-hour requirements per unit of production have decreased by only 36 percent.

These data indicate that there has been a reduction in labor requirements per acre and resulting labor costs by the adoption of mechanical methods in planting, tilling, and harvesting peanuts. Undoubtedly, labor-saving technology will continue to flow into the peanut industry in the future. An obvious example would be (1) the continued adoption of combines in the Virginia-Carolina area and in certain states (notably Alabama) in the Southeast; and (2) the complete change over from bags to bulk-tank operations in the harvesting operation.

The development and adoption of tractors and trucks have played a significant role in reducing man-hours per acre of peanuts planted and harvested since the 1920's. However, even during the 1940's, horses and mules were used to produce one-third to one-half of the peanut acreage in the Southeast. Consequently, man-hours per acre of peanuts produced were highest in these areas. On the other hand, peanut producers in the

Southwest area used only 18 hours per acre in 1950.[2] Weather and other climatic factors were ideal for the adoption of early combine models in this area. With the higher price supports, the MVP of these durable factors became greater than their acquisition cost. Since wage rates were rising faster than machinery prices, it became profitable to substitute machinery for labor as hypothesized by the illustration in Figure 7 in Chapter III.

Increases in yield per acre, particularly in the irrigated areas, have only a small effect on man-hours of labor required per acre. Producing 2,000 pounds rather than 800 pounds per acre causes digging and combining operations to take possibly an additional 3 or 4 hours per acre. This figure includes handling or hauling the additional peanuts caused by the increased yields. Conversion to combines with tanks and the use of enclosed trailers, i.e., the bulk method of handling the harvested nuts, would result in a still smaller difference in labor requirements per acre for 800 and 2,000 pound yields.

A reasonable assumption is that increasing wage rates and lack of competent labor during and since World War II have been partially responsible for the development and use of labor-saving machinery in the peanut harvesting operations during the past 18 years. The reasons for the delay in the acceptance and use of such equipment in the Virginia-Carolina area was primarily due to lack of adequate drying

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[2]Hecht, Reuben W., and Vice, Keith R., Labor Used for Field Crops, Stat. Bul. No. 144, USDA, ARS, Washington 25, D. C., June 1954, p. 41.

facilities to counteract the longer drying period needed for the high moisture peanuts and the higher probability of rainy weather during the harvesting season in this area. The proximity of major non-farm industries, particularly the shipyards in the nearby Hampton Roads, Virginia area, also caused a serious drain on the available labor supply from the surrounding farming area. These shipyards were able to pay much higher wages than the farmer was accustomed to paying. These are two reasons why peanut acreage expanded less in the Virginia-Carolina area than in the other areas in World War II.

Although these factors, i.e., higher wage rates and the increase in new industries in the immediate area were critical developments for Virginia and North Carolina peanut producers in the early 1940's, it is interesting to note that as far back as 1912 economists were writing about the same problems.

Holmes wrote as follows in a 1912 USDA publication:[3]

> "Farm labor in this country has presented the problem of a diminishing supply relative to population since the days of original settlement. It is the old familiar feature of the industrial nations of the world. Until recent years, the problem was almost entirely confined to the quantity of the supply, but during the last decade or two, it has assumed a new phase in which not only the amount of supply has almost critically declined, but the quality has also absolutely declined, or has failed to keep pace with the need for labor, more skill and more intelligence.
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> "In spite of all that the farmer has done or has been able to do, there has been a drift of labor from farm to city and industry, and the potential supply of farm

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[3]Holmes, George K., Supply of Farm Labor, Bulletin No. 94, Bureau of Statistics, USDA, Washington, D. C., 1912, as quoted in Farm Labor, March 1961, p. 6.

> labor has been diverted from the farm. The movement of farm labor to town and city, and to industry and transportation is to be accounted for quite as much by the student of psychology as by the student of economics. To the farm laborer who has been in the city little if at all, there is a glamour in the city life which has a powerful influence upon his volition. The case is similar to that of the boy who runs away from home to hunt Indians. When this is joined to the greater nominal rate of wages that can be earned in the city, the combination of little reasoning with a good deal of imagination is likely to rob the farmer of his hired man."

Labor-Saving Technology

Recently, a digger-shaker-windrower combination has been perfected for harvesting peanuts. It eliminates the need for windrowing as a separate operation. If it rains during the drying period, the windrow can be lifted and "fluffed" (light, loose windrow), and inverted with the new machinery. Thus, the use of the side-delivery rake, which caused loss of some nuts due to shattering, is declining and in a few more years the new digger-shaker-windrower combination should be in widespread use in all three areas.

Oklahoma field tests indicated a significant difference in labor requirements for the two primary methods of harvesting peanuts, i.e., the stack-pole thresher method and the combine method. Putting up poles, plowing, shaking, and stacking peanuts required 18 to 20 hours per acre. With complete mechanization of the harvesting operation, Chaffin states that less than one man-hour per acre is required.[4] A

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[4]Chaffin, Wesley, Peanut Production in Oklahoma, Cir. E-10 Oklahoma Agricultural Extension Service, Stillwater, Oklahoma, June 1959, p. 20. It is believed that the bulletin author intended this one hour to represent only the digging-shaking-windrowing operation and not both this and the combining operation. If the latter were included, labor requirements would be greater than one hour per acre.

combination digger-shaker-windrower eliminates all the hand labor previously required to shake the vines, place the vines in rows and later place the vines on the stack pole.

A comparison of the man-hours per acre for the windrow-combine and the stack-pole-picker methods of harvesting during the period 1953-1956 in North Carolina indicated that the stack-pole method required 30.8 man-hours per acre while the windrow-combine method required only 8.0 man-hours per acre.[5]

Assuming that this difference in labor requirements is representative of the peanut industry today, and using a wage rate of $.75 per hour, the reduction in labor cost by using the combine method is 22.8 hours times $.75 per hour which equals $17.10 per acre. Against this savings must be balanced additional costs of owning a combine over a picker. These ownership costs include depreciation, repairs, interest on investment, insurance, housing, and taxes. The difference in variable costs, such as fuel, oil, lubrication, associated with the two operations also should be compared.

A more recent North Carolina study[6] on peanut production practices presents labor and equipment requirements for every operation in peanut production, such as land preparation, planting, hoeing, cultivation, fertilizer and chemical application, combine harvesting operations

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[5]Mills, W. T., and Dickens, J. W., Peanuts: Harvesting and Curing the Windrow Way, Bulletin 405, Agricultural Experiment Station, North Carolina State College, Raleigh, North Carolina, April 1958, p. 5.

[6]Pierce and Mills, op. cit., pp. 5, 21-23.

(including hauling to bins and drying), marketing of the peanuts (hauling to buyer) and baling and hauling hay. These data are based on three years' records for 10 acres of peanuts in a three year rotation with corn and milo.

Pierce and Mills state:[7]

> "The average amount of labor inputs per acre in the production of peanuts when the stack-pole method of harvesting is used is approximately 57 man-hours per acre (based on mechanized production in the pre-harvest stage). Use of the windrow method not only has reduced the number of workers from about 12 workers to two workers needed by the operation, but has reduced total harvest labor approximately 84 percent. Average results for three years of study show an over-all reduction in labor inputs per acre of about 41 percent as compared to the customary practices associated with the stack-pole method of harvesting."

Based on this labor saving of 41 percent, the North Carolina study indicates that completely mechanized peanut production including combining would result in a savings of approximately 4.7 million man-hours per year for North Carolina farmers--if all peanut producers adopted this method. At $.75 per hour, this would amount to $17.55 per acre (57 - 33.6 = 23.4 x $.75), or approximately $3.2 million annual labor savings.

Unfortunately, all this "saved" labor would not be used in other production as at least some farms would have no alternative uses for the "saved" labor. In other words, the on-farm salvage value for some of this labor is very low. While off-farm migration may be increased a little, surplus labor will remain in some of these areas

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[7] _Ibid._, pp. 5, 7.

even after labor-saving technology is adopted. This is because non-peanut alternatives just do not exist on many small farms in the peanut producing area of North Carolina. Also, the adoption of complete mechanization just is not feasible for many farms in this area holding small allotments, particularly when the family labor would otherwise be idle.

Research results for Virginia peanut farms indicate that the combine-drier method reduces man-hours or labor required for harvesting an acre of peanuts by 22 hours. These researchers add:[8]

> "Some of this saving in labor may not be a reduction in labor costs if the labor is regularly employed and if it cannot be profitably employed at other farm work. Data are not available to determine the actual reduction in labor costs. However, the tremendous reduction in hours of harvesting labor per acre (around 80%) provides a great incentive for the tenant to adopt the combine-drier method of harvesting. Savings in labor cost should exceed the additional cost for equipment except under unusual circumstances."

On many peanut farms in Virginia, some of the labor saved through the combine method consists of regularly employed laborers and family workers and as such, represents a fixed cost to the farm operator. Unless productive employment in alternative enterprises is readily available, the reduction in man-hours per acre from using the combine method is not the 22 hours saved multiplied by the prevalent wage rate. However, as indicated previously in Chapter VI, the combine-drier method permits harvesting nearer the optimum time as the peanuts can stay on the ground in the windrow longer after digging if they are to

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[8]Gibson, Lambert, and Loope, op. cit., p. 5.

be combined than they can if they are to be stacked. Also, since timeliness of harvest is a critical factor in peanut production, not having to rely so much on an unpredictable labor supply at harvest time, when additional "outside" labor generally must be hired, is an advantage of the combine method.

Gibson, et. al.,[9] estimate that approximately 35 percent of the labor saved is a fixed cost. This leaves an actual or real labor savings of 14.3 hours per acre (22 hours times 65 percent). The average wage rate for the type of labor normally hired to do the jobs which are eliminated by the combine method was $.75 per hour in 1962. Thus, the actual labor savings per acre is 14.3 hours times $.75 per hour or $10.73 labor savings per acre. In 1962, approximately 46,800 acres of Virginia's 104,000 harvested acres of peanuts (45 percent) were harvested by the combine method. Thus, the net labor savings to Virginia peanut producers in 1962 were $502,164.00 (46,800 acres times $10.73 per acre). Had the total peanut acreage been combine harvested, the estimated labor savings would have been over $1.1 million in 1962.

Peanut producers still face the same problem today, i.e., to what extent they should substitute new and improved machinery for labor in view of present and expected future economic conditions. Factors which have a major effect on this substitution of labor saving machinery are: (1) the size of the peanut allotment; (2) other crops grown on the farm (share machinery use); (3) future government control programs

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[9] Ibid., p. 8.

likely to be offered to peanut producers, or the expectation of the continuance of the present program; and (4) the relative costs of machinery and labor. Since World War II, many producers have made the decision to substitute labor-saving durable factors such as machinery for labor, in a manner similar to the theoretical fixed asset illustration presented in Figure 7 in Chapter III.

Effect of Draft and Industrial Wartime Effort on Labor Supply and Wage Rates in the Peanut Producing Areas

Entry of the United States into World War II resulted in an increasing scarcity of farm labor, particularly due to the draft of many young farm workers and the opportunities for older rural people and persons deferred for various reasons in defense industries (munition, tanks, etc.). Competition with these nonagricultural employers, as well as with other farmers, for the limited supply of farm laborers led to a rapidly rising farm wage level beginning in 1941.[10] (Figure 17).

Various government measures were taken to insure a farm labor force adequate to produce vitally needed food and fiber for the needs of allied nations as well as our own needs. These measures included (1) deferment of agricultural workers from military service, (2) recruitment of farm laborers from domestic and foreign sources, e.g., from Mexico and Jamaica, (3) use of prisoners of war, (4) initiation of measures for controlling job shifts from agriculture to other industries,

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[10] Ducoff, Louis J., Wages of Agricultural Labor in the United States, Technical Bulletin 895, BAE, USDA, Washington, D. C., July 1945, p. 2.

and (5) the detailing in emergency situations of some units of the armed forces for farm work. Ducoff states that although such measures were directed toward the problems of farm labor supply, they affected to some extent the movement of farm wage rates, since in the absence of such measures farm wages more than likely would have risen even more than they did.[11]

Average wages received by hired workers in agriculture are substantially below average wages received by workers in manufacturing, construction, and other non-farm industry groups. Annual incomes of hired workers are also substantially lower, by one-half to one-third, than the incomes of non-farm laborers.[12] Appendix Table 18 indicates the widespread difference in farm wage rates and industrial or factory wages.

Farm wage rates are influenced by other factors as well as by farm income or prices received by farmers for the particular crops being grown in the peanut producing areas. Wage rates paid by farmers vary with (1) the profitability of alternative farm enterprises in the same area, (2) the level of nonagricultural wages, particularly the wages being paid by nonagricultural firms in or near the rural areas, (3) the amount of employment and/or unemployment within and between areas, and (4) the volume of rural-urban migration. These highly interdependent variables produce changes in the supply of available farm labor which

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[11] Ibid.

[12] Kantor, Harry S., Problems Involved in Applying a Federal Minimum Wage to Agricultural Workers, Vol. 1, U. S. Dept. of Labor, Washington, D. C., April 1960, p. 25.

have some effect on agricultural wage rates in the peanut producing areas. The relatively rapid adoption rate of new technology during the period prior to World War II, resulting in some reduction in the demand for labor, counterbalanced the effect on the above pressures for wage rate increases. Also during the depression of the early 1930's, the farm labor supply was boosted by a migration to farms of the unemployed "urbanites", as well as by the decrease in the normal migration rate from farms to cities. This contributed to a sharp reduction in real wage rates on farms.

With the advent of World War II, the draft and increased off-farm migration removed much of this "surplus" labor and farm wages increased. When the economy is booming and the level of employment is high, labor tends to move out of agriculture even though the wage rate relationship between industry and agriculture is relatively more favorable at such a time. This was the case in World War II, as competition for labor forced farmers to raise the wage rates of hired labor.

The basis for deferment in World War II for all three peanut producing areas was at least 16 war units or 32 acres of peanuts (2 acres equal 1 war unit) for one deferment. However, more man-hours were required to produce and harvest an acre of peanuts in the Virginia-Carolina area than in the Southwest and Southeast due to (a) higher yield per acre and (b) less mechanization of the peanut industry in the Virginia-Carolina area than in the other two areas. Thus, it was logical to expect that, even if the same number of deferred workers remained on peanut farms in each of the three areas, acreage planted to peanuts could be expanded more in the Southwest and Southeast than in the Virginia-Carolina area.

However, as indicated previously, off-farm employment opportunities in the Virginia area, e.g., Newport News Shipyard and civilian employees at military installations in Hampton Roads area, drew many farm workers away from the rural areas during the critical war years. As indicated by the annual averages in Appendix Table 18, Virginia nonagricultural employment increased by over 200,000 employees from 1940 to 1943. Many of these additional workers came from rural areas in the eastern sections (the peanut producing areas) of North Carolina and Virginia. So many North Carolina natives moved into the Norfolk area during these years that Norfolk was called the "Tarheel City".

Although Virginia nonagricultural employment temporarily decreased after World War II when the slackening of wartime demands caused lay-offs in these defense industries, very few of the workers returned to their native rural areas to become farm workers. Once they gained a taste of nonagricultural wages, it was extremely difficult to entice them back to back-breaking manual farm jobs at wage rates less than one-third or one-half of what they had been earning.

Data presented in Appendix Table 19 illustrate the decrease in the labor force which has developed in the major peanut producing states since 1950. Regional averages for the 1940 to 1950 period indicate that a significant decrease in both hired and family labor occurred during that period also, as expected.

The greatest reduction in farm labor, both in absolute numbers and on a percentage basis has been in operators and unpaid family workers. This differential in rate of decrease means that hired workers are becoming a slightly larger part of the farm labor force. In 1962, the hired

labor made up more than 27 percent of the average monthly employment compared with about 23.5 percent in 1950 (Appendix Table 20).

There are at least two valid reasons why unpaid family labor may be more mobile, or less sticky or fixed, than hired labor. First, unpaid family labor includes the farm operator's wife and/or children. These people tend to have a higher educational level than hired labor, and corresponding higher P_{salv} due to a higher MVP in off-farm jobs. Second, the unpaid family laborer tends to be younger than the hired farm laborer. This results in the off-farm opportunity costs, i.e., MVP in nonagricultural jobs being higher for these younger workers. P_{salv} would be higher for this class of labor for at least two reasons and thus tend to move off farms at a faster rate.

Reduction in number of farms and advances in technology, particularly mechanization, are significant factors in the reduction in number of farm workers. Of these, the drop in number of farms has considerably more effect on numbers of operators and family workers. Gains in technology also reduce numbers of these kinds of workers, but the effects of advances in technology are often more pronounced on hired workers than on operators and family workers.

The pull of more attractive labor markets has been reflected in the net migration from the rural population, particularly in the family worker classification. High rates of out migration tend to be associated with low farm wage rates, or from another standpoint, with the relatively higher wage rates in non-farm employment.

Three pieces of legislation enacted by the first session of the 87th Congress have affected, either directly or indirectly, farm

wage rates or labor costs on peanut farms. The net result through higher wage rates has been to increase the trend to labor-saving technology in peanut production. The legislation (a) raised the nonfarm minimum wage and extended the coverage of minimum wages to additional workers, (b) increased the contribution rates for social security, and (c) tightened the requirements for employing contract workers brought in under the Mexican Farm Labor program.

On the other hand, the relatively weak bargaining position of farm laborers who are untrained for nonagricultural jobs and the relative immobility of a large share of the low income family-type sharecroppers in many areas have offset to some extent the higher wage rates in manufacturing industries in surrounding areas. Also, the long-term downward trend in farm labor requirements in the peanut production areas and the relatively high birth rates in these same rural areas have worked to counteract farm wage increases and to intensify the problem of rural underemployment.

The net result of all the above factors was to increase farm wage rates in 1962 and these wage rates have continued to increase in 1963. The total <u>hired</u> farm wage bill in the next few years is expected to remain fairly constant as the decline in number of <u>hired</u> workers (farm) in the peanut producing areas almost offsets the expected wage rate increases.

In 1962, the rate of unemployment was appreciably lower than in 1961. This unemployment rate will probably continue to decrease as the economy improves. Also, the smaller number of foreign workers on Southern farms has resulted in a reduction of this <u>unemployment</u>, and a reduction in the underemployment of domestic farm workers in the

major peanut states. There were approximately 25 percent fewer foreign workers in agriculture (nation-wide) in 1962 than there were in 1961.[13]

The more stringent regulations regarding the use of foreign nationals have caused many Southern peanut producers to intensify mechanization as well as to use domestic rather than foreign workers. Again, the consequences of government legislation and the resulting action taken by farmers has resulted in a greater pressure to increase farm wage rates in the affected areas. Also, the increase in mechanization contributes to higher wage rates by increasing the need for more skilled labor to operate the more complicated machinery and equipment. A hard-working laborer who can wield a $3.50 pitchfork in stacking peanuts on a pole for $.75 an hour may know nothing about driving a tractor pulling a peanut combine. Consequently, to get a skilled man to handle $7,000 worth of equipment may require a wage rate of $1.00 or more per hour.

Summary

Wage rates have increased at a more rapid rate than have prices paid for farm machinery since 1942. Consequently, there has been an increase in mechanization in the peanut industry, resulting in a decrease in labor requirements per acre of peanuts of approximately 22 hours per acre.

This reduction in labor requirements in peanut production has meant a considerable savings in cost reduction to producers. However,

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[13] The Farm Cost Situation, Economic Research Service, USDA, Washington, D. C., November 1962, p. 6.

all the labor which has been replaced by machines has not found profitable employment elsewhere. Many of the "replaced" laborers were family workers or hired laborers on a fixed weekly or annual rate. Thus, part of the reduction in labor becomes a fixed cost to the peanut producer. As much as 35 percent of the labor displaced by the combine-drier method of harvesting peanuts falls in this fixed cost category.

The reduction in labor in the Southern peanut areas has had little effect on aggregate production of peanuts. However, due to high nonagricultural wage rates and opportunities for off-farm employment, the expansion in acreage of peanuts harvested during World War II was limited in the Virginia-Carolina area. As a result, the historical base acreage in this area was smaller than in the other two areas and when the acreage allotment program was reinstated, Virginia and North Carolina producers were left with smaller acreages than the other two production areas.

The aggregate impact on the peanut industry of the reduction in labor and the corresponding increase in mechanization will be discussed in the aggregate analysis in Chapter VIII. It is felt that the fixed asset analysis could be presented more adequately in a combined manner, rather than working with labor alone.

CHAPTER VIII

AGGREGATIVE EFFECT OF CHANGES IN LAND, LAND SUBSTITUTES, MACHINERY AND LABOR ON THE PEANUT SUPPLY RESPONSE

Introduction

Peanut production expanded rapidly during World War II in response to higher support prices to meet wartime needs for oil. However, after the war, imports of oil bearing commodities again entered domestic markets and domestic oil-bearing crops such as soybeans began to compete even more as an alternative source of oil.

Since 1949, production of peanuts has not been adjusted downward willingly primarily because the high support price, in most years, on peanuts has made this enterprise the most profitable farming alternative for many producers. It took a reduction in acreage allotments of two-thirds from the peak acreage of the World War II years to 1962 to reduce production of peanuts by slightly more than one-fifth (22 1/2 percent). This unwillingness on the part of peanut producers to make downward adjustments in production in response to decreases in the support price for peanuts is characteristic of an industry which has built in excess capacity for normal needs. This excess productive capacity has been caused by excess commitment[1] of resources to peanut production.

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[1]Excess commitment in the sense that once economically variable assets were purchased at P_{acq}, and subsequent product price decreases occurred, MVP became less than MFC where MFC is based on P_{acq}, but MVP remained greater than P_{salv}. Thus, these resources were economically fixed and it was more profitable (or less unprofitable) to continue using these resources, even though capital losses were incurred.

The effect of changes in the use of land, land substitutes other than machinery, machinery, and labor will be considered jointly to determine their aggregate impact on peanut supply responses. Land reduction is related to the government acreage allotment program for peanuts. The increase in the use of machinery and the decrease in use of labor in the peanut industry are related through wage rates, machinery prices, technological advances, and opportunities for off-farm employment.

The theoretical fixed assets analysis presented in Chapter III will be used to explain how changes in the use of the above factors have influenced production, product prices, and capital gains and losses. Finally, implications of these factors on future production will be presented.

The Aggregative Analysis

Peanut producers have made large capital investments in durable resources, primarily land and machinery. Some indication of the magnitudes of their investments was presented in Chapters V and VI. After these investments were made, subsequent action by the government reduced support prices due to an accumulation of surplus peanuts. Resulting capital losses indicate that these investments have been in error even though they were often the result of apparently logical decisions when the investments were made, based on uncertain conditions and imperfect knowledge.

Farmers and society are subject to substantial actual and potential losses when the price received for peanuts decreases as a

result of excess production and government reduction in price supports. If the system of acreage allotments as a method of production control were now abandoned, land values on peanut farms would decrease, causing severe capital losses to both original and "paid-in"[2] allotment owners. Peanut prices would also decrease to a level closer to the world market price for peanuts for oil. In such a circumstance, capital losses would be sustained on all durable production items because of the time lag in responding to the lower prices, i.e., many producers would continue their operations as long as $MVP > P_{salv}$, or until the asset was physically depleted.

Even with the government program of guaranteed support prices for peanuts, peanut producers still face many uncertainties, e.g., weather, insects and diseases, the world situation and needs for oil at any given time,[3] as well as the whims of politics in making changes in the existing program. Back-to-back good weather years also can bring forth such a large supply of peanuts, affecting the carry-over stock, that the support price could be decreased quite significantly.

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[2]"Paid-in" owners are those who have purchased the allotment from an original allotment holder. These purchasers pay a substantial sum for the value of the allotment which had been imputed to the land price. Original allotment owners would also suffer capital losses, due to a decrease in land value, since they could have obtained the higher price if they had sold their farm and allotment before the price support level was lowered or before the allotment program was abandoned.

[3]The situation developed in World War II whereby a great shortage of oil presented peanut producers with a market which they could not supply until sufficient adjustments had been made over a period of several years to increase production of peanuts.

Although the minimum support price[4] is announced before the planting season in any given year, producers' investment decisions are necessarily based on long time expectations. Most producers generally discount expections of MVP's for uncertainties such as the above. However, they may have been misled by official predictions and announcements, _e.g._, that the demand for peanuts was increasing or that a shortage of oil-bearing crops existed. Consequently, they may base their investment decisions on a higher level of anticipated prices than actually occurred. Other producers also may base their decision to invest in combines and other machinery on overly optimistic expectations of the performance of these machines and their MPP's.

Regardless of causes, many peanut producers have gone through the decision-making process and have made logical decisions to make significant capital investments in land (obtain additional acreage allotments) and machinery. Subsequent decreases in allotments and decreases in support price levels have caused capital losses on these investments as MVP's decrease below MFC's based on P_{acq} for these investments. In many instances, producers have continued using these assets as they suffer fewer capital losses by using the assets than by selling them at salvage value (P_{salv}).

Under the latter situation, the producer sells peanuts at a level different from that at which MVP = MFC, where MFC is based on the acquisition cost (P_{acq}) of the asset. In fact, since the asset is fixed in usage to the point where MVP = P_{salv}, the producer equates MFC with

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[4]The final announced support price can be the same or higher than the preseason announced price for peanuts, but it cannot be lower.

MVP only if he reappraises his assets on the basis of a price near or equal to P_{salv}. Figure 6 and the related discussion on pages 39-41 in Chapter III present a theoretical illustration, using asset fixity terminology, of this situation. The 1956-59 period is the outstanding example of producers continuing to produce despite continued decreases in the support price by the government, although the government had hopes that the aggregate production of peanuts would be decreased. Figure 9 with its discussion on pages 46-47 is also useful in explaining why production is maintained in such a situation.

Thus, even with government programs, peanut producers have made substantial errors of overcommitment and overinvestment in the peanut enterprise. Subsequent production from these fixed assets, even at lowered government price supports, continue to add to CCC stocks, since the government established price is not at a level sufficient low to cause the MVP of these fixed assets to fall below P_{salv} for many producers. If the latter did occur, i.e., if $MVP < P_{salv}$, the assets would become variable in an economic sense, and it would be more profitable or less unprofitable to sell these assets and decrease production of peanuts. Capital losses would be incurred under this situation as well as when $MVP < MVP$ with MFC based on P_{acq}.

It should be noted that during 1941-45 when it was established that there was a need for increased production of peanuts, the government promised incentives to producers in the form of guaranteed prices with the CCC being the only purchaser. The Southeast expanded production by more than one-half from a one-third increase in acreage, and the Southwest doubled both acreage and production. However, the Virginia-Carolina area expanded planted acreage and production by only one-fourth. Total

production of picked and threshed nuts in this area was greater during the 1940 crop year than for any year in the 1941-48 period. Production was 588 million pounds in 1940 compared to 586 million pounds in 1948, the highest production year for the government sponsored expansion era. This has been explained partially by the analysis of the labor factor in Chapter VII.

Data have been presented which indicate that all inputs, including land, machinery, and labor have undergone real price increases since World War II.[5] Yet peanut producers have maintained production at almost the same high level of previous years when costs were lower and product prices higher. Despite the sharp reduction in the use of land, production has not decreased proportionately as peanut producers have countered by producing greater yields per acre. This has occurred in spite of rising factor costs, and in spite of the fact that real[6] factor prices have increased more relative to prices received by farmers for peanuts.

The conventional explanation is that as input prices rise, farm firms would be expected to decrease production to again equate marginal cost with marginal revenue. The fixed assets theory, with its recognition of differences between acquisition costs and salvage values, provides a

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[5]These prices were deflated by the index of prices received by farmers for all farm products. Based on 1910-14, this index was 207 in 1945 and only 242 in 1962. Labor was at 359 in 1945 but had risen to 662 by 1962. See Appendix Table 13 for additional comparistons using index of prices received as a deflator.

[6]Real factor and product prices means that the figures have been adjusted for inflationary trends by dividing by the wholesale price index. Appendix Table 4 presents the deflated (real) price received for farmers' stock peanuts.

better understanding of farmers' reactions to input and product price changes. Fixed asset theory allows a logical explanation of why individual farmers are more responsive to real input price decreases than they are to real input price increases. It thus provides a better understanding of why the supply response is at least partially irreversible, i.e., in the sense of production being more elastic upward in response to input price decreases than it is downward in response to input price increases.

New technology and improvements in methods of harvesting have encouraged the rate of adoption of equipment involving larger capital investments. A combine requires a significantly larger capital outlay than does a stationary picker or thresher. However, an individual operator can handle larger acreages of peanuts since there is no longer the need for large quantities of labor at harvest time. This, in turn, has yielded some efficiencies in production.[7] The end result is that production has been maintained at a relatively stable level, except for years of bad weather at harvest or droughts during the growing season, despite the reduction in allotments since 1950.

Effects of Variations in Price and Other Factors on Peanut Production Since 1949

From 1949 to 1955, the announced support price moved generally upward, shifting from 10.5 cents per pound in 1949 to 12.2 cents per pound

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[7]With a larger acreage allotment, the producer can more readily justify labor-saving and output-increasing technology. Also improved models of combines glean more nuts per acre than did the picker-threshers.

in 1954 and 1955. From 1956 to 1959, the support price level was decreased, reaching a low of 9.7 cents per pound in 1959. The announced price support level since has increased and was 11.1 cents per pound in 1962. Thus, since the acreage control program was reinstated in 1949, there have been three separate price trends as represented by three line segments in Figure 18: solid for 1949-55; dots for 1955-59; and dashes for 1959-62. As indicated in Figure 18, there is no direct relationship between the announced support price and the production in that year.[8]

Livermore had difficulty fitting equations for peanut supply responses during the pre-allotment period using reversible prices, i.e., using the assumption that the same percentage price changes referred equally well to both increases and decreases in production.[9] Obviously, the sharp reduction in acreage allotments from 2,629,000 acres in 1949 to 1,610,000 acres in 1954 (a decrease of 1,019,000 acres) was responsible in large measure for the decrease in production during that period. It should be noted that the resulting phenomenon was a net decrease in total production every year in which the support price increased from 1949 to 1952. Production then increased in 1953. Producers would probably have increased or at least maintained the same production in 1954 had it not been for an extremely poor crop year, weather-wise, resulting in only 1,387,000 acres being harvested. Production decreased to a low of 1,008 million pounds in 1954. However, except for 1957, which was another bad weather year for peanuts, production increased in response to lower support prices from 1956-1958.

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[8]Initial price supports for peanuts, based on parity levels are announced usually in January or February. Upward adjustments in this level of support can be made prior to the planting season for that year but the support price cannot be lowered.

[9]Livermore, op. cit.

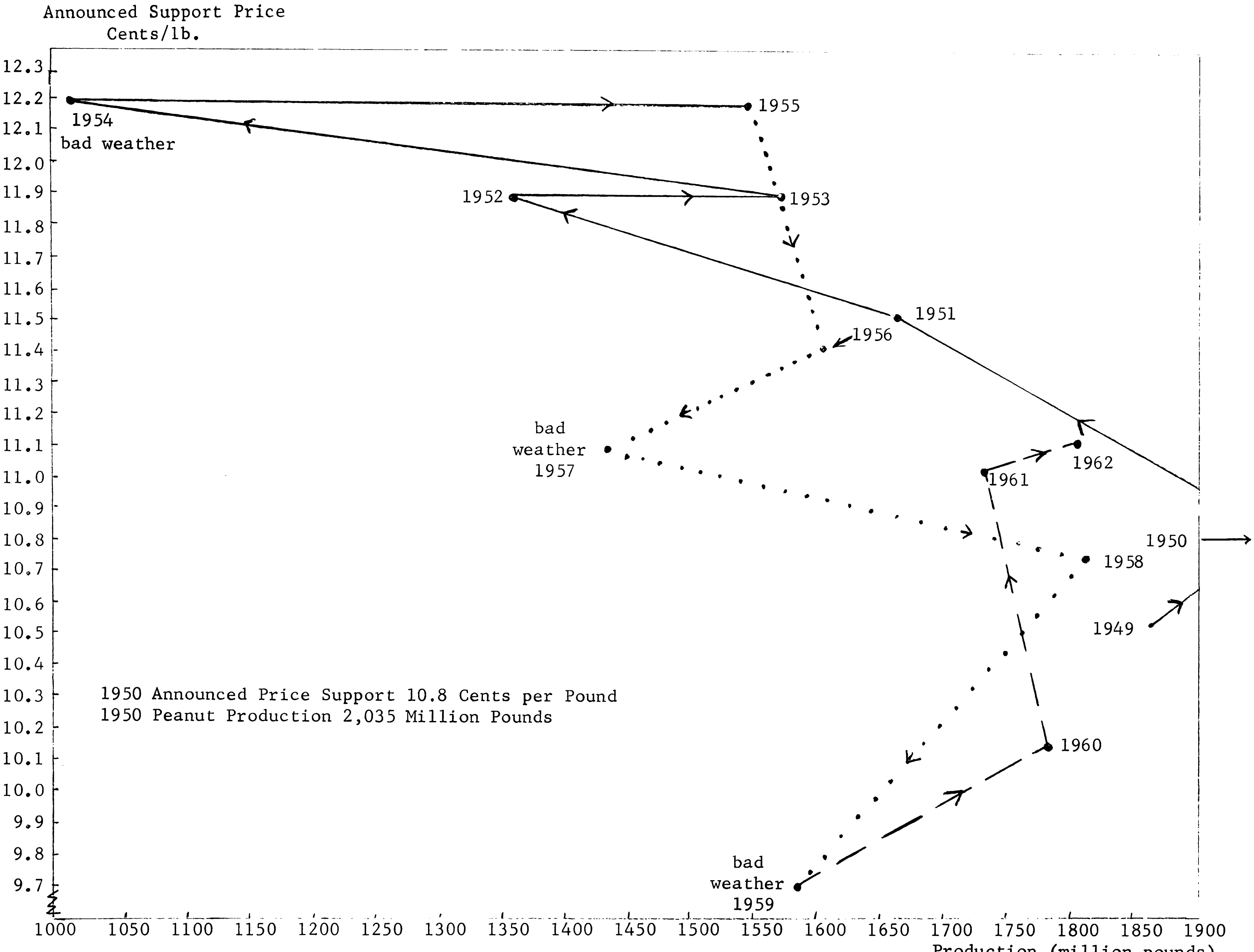

Figure 18: U. S. Announced Support Price and National Peanut Production in That Year, 1949-62.

Extremely wet weather in 1959 at harvest time reduced yields considerably and resulted in a sharp decrease in production which was not anticipated.[10] Even with the 1959 announced support price 2.5 cents per pound lower than in 1955, and despite a reduction in acres harvested by over 200,000 acres from 1955 to 1959, production was still higher in 1959 than in 1955. In fact, production in 1958 and 1962 was greater than for any year since 1951 despite somewhat lower support prices, and lower real prices received (Appendix Tables 3 and 4).

The conventional conclusion that farmers will decrease production in response to a product price decrease in the same proportion that they increase production in response to the absolute product price increase has not held for the peanut industry.[11] On the contrary, due to differences in acquisition costs and salvage values, it is more likely that peanut producers have responded as hypothesized in Figures 7, 8, 9, and 10 in Chapter III. These diagrams explain farmers' response to peanut price decreases as well as to reductions in acreage allotments and higher labor costs.

What has actually happened in the peanut industry? As land planted to peanuts has decreased, as wage rates have increased and the amount of hired and family labor on peanut farms has decreased, peanut producers have responded by increasing capital outlays in (1) fertilizer

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[10]Final peanut production estimates in 1959 were 4 percent lower than the November 1, 1959, estimate by USDA. This was due to fewer acres harvested as well as lower yield per acre.

[11]The reader may want to refer to Appendix Tables 2 and 9 for the time-series data referred to in this section. As indicated by these tables and by the statement, the "ceterus paribus" condition does not hold for the two situations since some durable factors become economically fixed assets when product price decreases.

and other improved agronomic practices such as crop rotations and closer seed-spacing, (2) irrigation facilities for peanut production, particularly in Oklahoma and Texas, and (3) improved and new technology in the form of combines and related harvesting equipment and more pre-harvest equipment and machinery, e.g., four- and even some eight-row peanut planters.

Also, as prices and income fall, some producers seek alternative methods of regaining their former income position. Assume the producer previously had made capital investments in such inputs as a combine and related equipment based on imperfect knowledge of product price changes. A reduction in product price causes the MVP of these fixed durables to decrease. However, assume that MVP still is greater than salvage value and the producer had previously failed to equate the MVP of certain expendable services with their MFC due to imperfect knowledge or for other reasons. Since he needs to increase production to regain his former income position, he can use more of these expendable inputs with his durable inputs and also may increase the rate of flow of services from the economically fixed assets to use up the total stock of durables in a shorter period of time.

One logical explanation for increasing the rate of flow of service from the durable asset is that the producer reappraises the situation when the peanut support price decreases. He may also assign a shorter life expectancy to the durable due to uncertainty of obsolescence. Discounting the value of the services of the durable at a higher rate tends to shorten the expected useful life of the resource, and shifts

the greatest proportion of the accumulated MVP's to the earlier years in the life of the stock.[12]

As indicated in Figure 18, the index of wage rates for hired farm labor has increased continuously since 1940. Based on a 1910-14 index of 100, these wage rates increased to 662 in 1962. The index of prices paid for farm machinery has also increased since 1940, but on the same 1910-14 base, machinery prices reached a level of only 398 in 1962. Thus, machinery prices have increased at a much slower rate than have hired wage rates during this 1940-62 period.

Both hired labor and unpaid family labor have continued to move out of the peanut producing areas, and have been replaced in the peanut enterprise by additional labor-saving machinery. The average reduction in <u>harvest</u> labor requirements has been approximately 22 hours per acre due to this substitution of combines for the stack-pole thresher method.

An estimated 82 percent or 1,153,180 acres of peanuts harvested for nuts in 1962 were combined (Appendix Table 21). Based on a labor savings of 22 hours per acre, total harvest labor requirements were reduced in the peanut industry by approximately 25,369,960 hours in 1962 from what they would have been had no combines been used in harvesting the crop.[13]

There has been a tremendous increase in capital investment in peanut combines and related harvesting equipment. Again based on estimates,

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[12]This has caused producers who own combines to actively seek custom combining of additional acreages, and has increased the percentage of the total crop harvested by combines in recent years, particularly in the Virginia-Carolina area.

[13]This figure was determined by multiplying the estimated 1,165,000 acres harvested by combines in 1962 by 22 hours per acre.

the total number of combines in use in 1962 was 6,735.[14] North Carolina research indicates the average cost of combines and related equipment including diggers, windrowers, and dryers to be $8,700 in 1958. This figure has probably increased to $9,000 or higher in 1963, based on increased machinery costs. Assuming all peanut combines were purchased in 1962 (obviously they were not), the estimated total investment in combines and related harvesting equipment would have been $60,615,000.

Summarizing, land in peanuts harvested for nuts has decreased by 885,000 acres from 1949 to 1962, labor has decreased by approximately 25.4 million hours since combines were introduced around 1950, and combine numbers have increased by 6,735 since 1950. The net effect of these changes from 1949 to 1962 was a reduction in production of peanuts harvested for nuts of only 55 million pounds. Thus, aggregate production has been maintained at a high level despite the uncertainty due to weather and factor and product price increases and decreases during this period. Even more important, producers counteracted a net decrease in acreage allotments of over one million acres during this period by obtaining increased yields per acre.

Certainly, irrigation, fertilizer and other land substitutes as well as combines and related harvesting equipment have played an important role in maintaining production of peanuts at a high level. These factor substitutions and improvements have offset reductions in labor and land. With a guaranteed price, even at a reduced support level, individual producers have found it to their advantage, or to their least disadvantage

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[14]This figure is based on 1962 estimates for combines in individual states as follows: 450 in Va.; 600 in N.C.; 2500 in Ga.; 400 in Ala.; 200 in Fla.; 25 in S.C.; 25 in Miss.; 1000 in Okla.; 1500 in Tex.; and 35 in New Mexico. Estimates for some of these states may not be highly accurate.

to continue producing peanuts at the same or even a higher level of output.

Once large capital items such as a combine are acquired, it is often in the producer's best interest to continue producing peanuts **when** the product price falls, provided MVP $> P_{salv}$. This is so because there is a relatively wide range between the acquisition cost and the salvage value of these inputs.[15] Also, when peanut prices fall, acquisition costs remain the same or increases while the P_{salv} and MVP of the combine decreases. The producer suffers smaller capital losses by continuing to use the flow of services from the combine.[16] This individual decision, repeated thousands of times, has caused the aggregate production of peanuts to be maintained at previous high levels in spite of reduced price supports and the fact that for land and some other durable inputs, MVP became less than MFC, based on acquisition cost (P_{acq}).

A partial explanation of this phenomena is presented in Figure 19. Let point A represent the 1955 crop year when 1,683,000 acres of peanuts were harvested for nuts and approximately 2,000 combines[17] were in

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[15]If the combine owner borrowed the capital to purchase the combine, the interest rate must be included in his P_{acq}. An interest rate also should be charged for "owned" capital. Also, machinery dealer to farm movement involves almost immediate depreciation in combine value. A peanut combine has no alternative uses except in harvesting peanuts for another peanut producer. Hence, its P_{salv} is either its MVP to another peanut producer or its junk value.

[16]The combine owner-producer is minimizing his losses in this situation.

[17]The estimate of combine numbers for 1955, 1958, and 1962 was made by the thesis author. It may not be completely accurate, but based on incomplete figures from various states, the estimates appear reasonable.

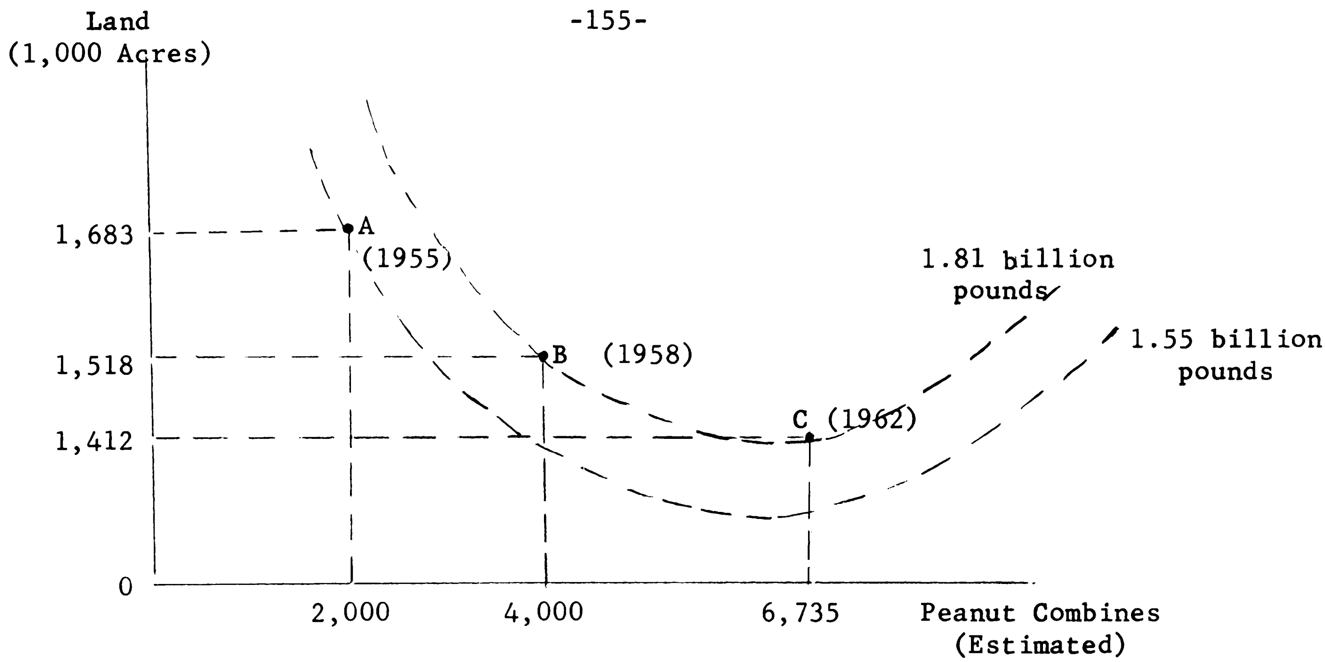

Figure 19: Aggregate Effect of Substitution of Other Durable Resources for Land on Aggregate Peanut Production

use. Production was 1.55 billion pounds. Family and hired labor were still used intensively in the Southeast and in the Virginia-Carolina peanut areas because peanut combines had not been adopted to any great extent in these two areas, except in Georgia. However, combines were in general use in the Southwestern area and had replaced much labor in that area. The announced support price was 12.2 cents per pound in 1955 and the actual season average price received by farmers was 11.7 cents per pound (Appendix Table 2).

Obviously, combines are not a direct substitute for land, although they have increased yields 250-300 pounds per acre over the stackpole-thresher method of harvesting. Although combine numbers are shown on one axis of Figure 19, it is to be understood that other durable inputs and some variable factors have been increased simultaneously with the increase in combines to obtain these levels of production.

By 1958, the support price had decreased to 10.7 cents per pound. The actual price received by farmers in 1958 was 10.6 cents per pound. Harvested acreage of peanuts in 1958 was 1,518,000 acres, a reduction of 165,000 acres from 1955 (Appendix Table 8). The estimated number of combines in use was 4,000. However, as represented by point B in Figure 19, production increased to 1.81 billion pounds, an increase of 266 million pounds over 1955. It is interesting to note that this increase represented almost 70 percent of the 383 million pounds of the 1958 crop acquired by CCC under the support program (Appendix Table 9). Increased use of combines and other labor-saving equipment as well as continued increases in both farm and non-farm wage rates were responsible for continued reduction in the labor used in peanut production.

Despite the decrease in the level of price supports from 1955 to 1958, some of the peanut producers with large allotments continued to make capital investments in peanut combines, and to a lesser extent in other types of labor-saving machinery. Evidently, for some of these producers, machinery MVP had been greater than P_{acq} previously, but either (a) sufficient capital had not been available to purchase the machinery, or (b) labor at low wage rates had been available in sufficient quantity for peak harvest needs, or (c) the producer was waiting until further technological improvements were made in the combine, and the "bugs" worked out by the innovators. However, for many other producers who were working at the margin in previous high support years, the decrease in MVP meant that many of the durable assets they did own became fixed in an economic sense. In other words, $MVP < MFC$ if the assets were priced at P_{acq}. These producers suffered capital losses in this period although many of them continued producing.

The index of wage rates continued to increase faster than the index of farm machinery prices during the 1955-58 period. Also, labor came to be in short supply in some areas. These facts, coupled with more efficient combines and a higher MPP than in 1955 made combines a sufficiently attractive and/or necessary investment for many producers. Whether combines became economically fixed or were variable, in the fixed assets sense, during this 1955-58 period could not be determined due to lack of data. It is highly likely that the 10 percent price decrease in 1959 resulted in some of these machinery items becoming fixed assets as $MVP < P_{acq}$. It has been substantiated that allotment owners suffered capital losses on their land during the 1956-59 period as support prices decreased from 12.2 cents to 9.7 cents per pound.[18]

As indicated in Appendix Table 11, manufacturers' shipments of peanut combines, diggers, and crop drying fans were substantially larger in 1958 than in 1955. Appendix Table 10 presents evidence that combines were almost non-existent in the Virginia-Carolina area in 1955, but that by 1958, adoption and use of combines in this area was a reality.

Although figures on tractors and trucks on farms in the peanut producing states are not available for 1955, the data are present for 1954 and 1959 in Appendix Table 14. In every state, there was a substantial increase in numbers of these durable factors from 1954 to 1958. Although

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[18]The capitalized value of an acre of peanut allotment in Southeastern Virginia fluctuated during the 1956-60 period of sales, but in general the price of an acre of allotment decreased in 1958, 1959, and 1960. Source: Prliminary estimates of research project by Robert F. Boxley and William L. Gibson, Jr., Virginia Agricultural Experiment Station, Blacksburg, Virginia.

these figures are concerned with all farms in these states, presumably those farms with price supported crops would be represented in these trends in at least the same proportion as the figures for all farms.

Conclusive evidence thus exists that from 1955 to 1958, (1) peanut prices decreased, (2) acres of land planted and harvested in peanuts decreased, (3) both family and hired labor decreased, (4) capital investments in combines, diggers, crop dryers, trucks, and tractors increased, and (5) production increased.

The estimated number of peanut combines in use in 1962 was 6,735, as indicated in Figure 19. Referring to the same Appendix tables as indicated above, the other changes from 1958 to 1962 can be summarized as follows: (1) peanut support prices increased slightly to 11.1 cents per pound or .4 cents per pound above 1958, (2) acreage harvested decreased 106,000 acres to 1,412,000 acres, (3) family and hired labor continued to decrease, (4) numbers of combines, diggers, crop dryers, etc., increased, and (5) production was approximately 1.81 billion pounds, the same as the 1958 production. The 1962 production relationship is indicated by point C in Figure 19.

Particularly in the Virginia-Carolina area, increased use of combines and related harvesting equipment further decreased the labor requirements for peanut production in this area. The decrease in acreage of peanuts planted and harvested was due primarily to participation in the Conservation Reserve Program and abandonment of small allotments.[19]

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[19] This abandonment in any one year may be partially the result of many part-time farmers, widows, etc., who hold on to small allotments by planting only every third year.

However, aggregate peanut production in 1962 was greater than in 1959, 1960, and 1961.

Empirical evidence has been presented to support the hypothesis that peanut producers have not been price responsive in the aggregate and that the supply response is not reversible, as would be dictated by the conventional supply analysis.[20] Conversely, in some years, farmers actually increased production in response to a peanut price decrease. This occurred despite the continued increase in factor prices. In other years, *e.g.*, 1959, after a four-year period of declining peanut price supports, some marginal producers were undoubtedly forced out of production.

The above discussion on aggregate production can best be summarized in tabular form, as this allows empirical data from various places in other chapters to be assembled in one place. In Figure 20 the changes in the various factors related to the aggregate supply of peanuts are presented in a more concise manner through the use of single words or symbols, interpreted as follows:

↑	:	means the variable has increased in use, price, etc.
↓	:	means the variable has decreased in use, price, etc.
Constant	:	means the variable has remained constant in use, price, etc.
S	:	with an arrow means the variable has changed (either increased or decreased) slowly.
R	:	with an arrow means the variable has changed (either increased or decreased) rapidly.
I	:	means the variable has changed (either increased or decreased), or has remained constant over the period indicated, but with irregular movements during this period.

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[20] Livermore, *op. cit.*, Livermore was unable to explain peanut supply responses to changing product prices, despite working with many variables, such as weather, underplantings, etc. After much research effort on his part using the conventional supply analysis, Livermore's results only tend to substantiate this writer's conclusions that the aggregate supply response for peanuts is not reversible.

		1934-36	1937-41	1942-45	1946-48	1949-55	1956-59	1960-62
Price Supports		Yes[a]	No[b]	Yes ↑	Yes ↑	Yes ↑	Yes ↓	Yes ↑
Production		↑	↑ I	↑	↑	↓ I	Constant	↑
Civilian Consumption		Constant	Constant	↑	↓	Constant	↑ S	↑ S
CCC Acquisitions		--	↑	↑ R	↓ I	↓	Constant I	↑ I
Land	(flow or use	↑	↑	↑ and[c] ↓	↓ I	↓	↓	Constant I
	(Status	--	--	Capital Gains	Capital Gains	Capital Gains	Capital Losses	Constant
Machinery	(Flow	↑	↑	Constant[d]	↑ R	↑ R	↑ S	↑ S
	(Status	--	--	Capital Gains	Capital Gains	Capital Gains	Capital Gains & Losses	Constant
Irrigation	(Flow	--	--	--	--	↑	↑	↑
	(Status	--	--	--	--	Expanding	Expanding	Expanding
Fertilizer Chemical Spray, etc.	(Flow	--	--	↑	↑	↑	↑	↑
	(Status	--	--	--	--	Expanding	Expanding	Expanding
Labor	(Flow	Stable	↓ S	↓ S	↑ S	↓	↓	↓
	(Status	Important	Important	Important	Important	Less Important	Minor	Minor

Figure 20: Relationship of Various Factors in the Peanut Industry, for Selected Time Periods, 1934-1962.

[a]With exception of 1936, when Supreme Court invalidated production control and processing tax provisions of Agricultural Adjustment Act. Thus, peanuts were not a basic commodity from 1936-41.

[b]However, peanuts were designated a soil-depleting crop in 1936 and eligible for diversion payments during this period (Chapter IV).

[c]Acreage planted and harvested increased in 1942 and 1943, then decreased sharply in 1944-45.

[d]Adoption rate of labor-saving machinery was slowed during World War II due to defense demands for steel and other equipment needs.

Flow : can be increasing, decreasing or constant.
Status : can be capital gains, capital losses, expanding, etc.

Despite the decrease in labor requirements in producing peanuts, labor earnings and net incomes are still disappointly low on many peanut farms. No figures on net income and labor earnings for separate peanut enterprises are in the "Farm Costs and Returns" series of the USDA. However, data are presented for a typical peanut-cotton farm in the Southern Coastal Plains (Alabama, Florida, and Mississippi). Peanuts represented the most important enterprise on the farm in terms of cash receipts. In 1960, the acres of crops harvested were as follows: peanuts, 19.5 acres; cotton, 12.2 acres; and corn, 28.7 acres. 1960 was a relatively good year, yield and price-wise, yet net farm income was only $3,222 and return per hour to operator and family labor was only $.72 per hour. In 1959, the comparable figures were $2,428 and $.51 per hour, and the 1947-49 averages were $2,313 and $.60 per hour respectively.[21]

Although there were government support programs for both peanuts and cotton during the above years, these programs have been no guarantee of high net income or labor earnings. Yet farmers continue producing these crops, many of them because of institutional and economic fixities.

Future Trends in Peanut Production and the Outlook in 1975

The Agricultural Research Service of the United States Department of Agriculture has made a study of farm production potential in

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[21] ____________, Farm Costs and Returns, Commercial Farms by Type, Size, and Location, Ag. Information Bulletin, No. 230, ERS, USDA, Washington 25, D. C., June 1961, p. 49.

1975.[22] The 1975 production needs are based on a projected population of 230 million and exports of agricultural commodities somewhat below the high 1956 level.[23] The required yield of picked and threshed nuts per acre in 1975 is 1,322 pounds based on the 1951-53 average of 1,647,000 harvested acres. The required yield in 1975 would be 1,410 pounds per acre based on the 1956-58 average of 1,486,000 harvested acres.

This same report also presented estimates for two levels of yield per harvested acre. "The economic maximum yield is based on full, efficient economic application of presently known technology under assumed economic conditions. Economic attainable yields are yields that would be expected by 1975 from actual application by farmers of presently known technology. The latter yields were estimated, taking into account limitations on management, materials, equipment, and available capital, together with past experience in rate of adoption of technology by farmers."[24] The 1975 projected economic attainable yield for picked and threshed peanuts is 1,357 pounds per acre; the economic maximum yield is 1,877 pounds per acre.

It is interesting to note that the U. S. average yield for the 1962 crop was 1,273 pounds per acre. Since the 1959 average yield was 1,096

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[22]Rogers, Robert O., and Barton, Glenn T., Our Farm Production Potential, 1975, Ag. Information Bulletin No. 233, USDA, AMS, Washington, D. C., September 1960, p. 6.

[23]"A moderate increase in overall per capita use of farm products was projected after considering demand characteristics of various farm products, the projected increase in disposable personal income, and projections of trends in consumer tastes." Ibid., p. 3. No specific product figures were given for per capita consumption increases of peanuts. If per capita consumption of peanuts increases, the required yields would be somewhat higher than those given in the above publication.

[24]Ibid., p. 3.

pounds per acre and the 1949-58 average yield was 951 pounds per acre, it appears the trend is toward increased yields at a rather rapid rate. Based on 1958-60 average yields, it seems almost certain that the 1,410 pounds per acre required in 1975 based on 1956-58 acreage is well within the realm of attainability long before 1975. This would mean that 1975 projected economic attainable yield would be reached even sooner. If this is the case, and per capita consumption of peanuts remains stable at 7.0 pounds of farmers' stock peanuts, then it would follow that peanut farmers would be producing more peanuts in 1975 than would be consumed.[25]

There is one factor which is tending to counterbalance the higher yields. In 1958, 1,518,000 acres of peanuts were harvested for nuts; in 1959, only 1,453,000; and in 1962, only 1,412,000 acres were harvested. The gradual reduction of acreage allotments down to the minimum allowable of 1,610,000 acres was responsible for the downward trend until 1958. However, this mandatory reduction to comply with the acreage allotment program has not been a factor since then.

The Conservation Reserve was responsible for 122,000 acres being out of production in 1962. However, it is not certain how many of these acres would have been harvested if the Conservation Reserve program had not been available. These acres generally do not represent a significant percentage of the peanut acreage in the higher yielding areas.[26]. Also, the Conservation Reserve program was not extended beyond 1960. There is

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[25]However, there are many pitfalls to any such statement. Wars, resulting in greater oil needs, increased per capita consumption in peace time, a continuation of the trend of fewer acres being harvested for nuts each year, etc., are factors that could lead to a shortage of peanuts.

[26]As emphasized previously, participation by peanut farmers in the Conservation Reserve is partly responsible for the per acre yield increase, since a large majority of the acreage placed in the Conservation Reserve is from lower yielding areas.

the possibility of (1) a new program similar to the Soil Bank and Conservation Reserve, but expanded greatly and including only whole farms, and/or (2) various other programs for manipulating acreage planted to any given crop. However, all of these alternative programs depend on the political policies and programs of the administrative and legislative branches of the government.

The value of the peanut allotment has been capitalized into the price of the land. Since this capitalization was based to a large degree on the level of the support price, it stands to reason that the value of the land has decreased in recent years as price supports have decreased. Peanut allotment owners suffered capital losses on their land due to the lowering of the support price from 12.2 cents in 1954 to 9.7 cents per pound in 1959.

The allotment value continues to represent a significant portion of the land (real estate) assets for those farmers holding allotments of basic commodities such as peanuts. If the price supports were eliminated altogether, these same farmers would sustain even large capital losses, which might well cause a collapse in their financial organization, ability to borrow, and to meet debt commitments made in the previous period of higher product prices. Part of the current and previous losses resulting from overinvestment in production capacity of the supported crop is being, and has been, borne by the taxpaying public in the form of appropriations to operate the price support and production control programs.

As a result of the referendums held every three years on the continuance of the present program peanut farmers have a guarantee of price supports for three years ahead. They have good expectations of the

approximate price support level. They also know the national minimum acreage allotment as well as the maximum acreage they as individual producers may plant. Furthermore, their acreage allotments may not be decreased further under the present program, since these allotments are now at a minimum.[27] Thus, peanut producers' aggregate response to economic, institutional and weather probably will continue to increase the supply of peanuts at the national level.

Summary

With and without programs, imperfectly informed farmers have made mistakes leading to output in excess of that which can be sold at prices equating MVP and MFC, where MFC is based on P_{acq} for all resources. Hence, producers suffered losses on investments even with government programs.

Many durable resources used in peanut production require large capital investments. Fixed asset theory aids in explaining how it is possible for peanut farms to be organized so that the producers cannot profitably make immediate adjustments in the use of these resources, in response to product price decreases, or input price increases. As a result, the aggregate effect is a sluggish and/or an irreversible supply response. Such an irreversible supply response has characterized the peanut industry both before and since the government began a series of perennial attempts, through acreage allotments, marketing quotas and product price decreases, to control production.

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[27]There is a possibility they might be able to increase acreage planted.

For the peanut industry and for some individual producers, decreases in peanut prices result in over-capitalization in the industry and the enterprise, "trapping" durable inputs in production. Consequently, farmers maintain production of a commodity for which no consuming market exists at support price levels, and CCC is burdened with the surplus. Thus, the goal of the acreage allotment program to keep production in line with civilian consumption during the 1949-62 period has met with very little success, particularly since prices received by farmers for peanuts have been above the free market equilibrium price. Farmers have also suffered capital losses as a result of decreases in earning power of these durable inputs when peanut prices decreased. If the level of support price were reduced, it is probable that production would not be affected much, at least in subsequent production periods after the price decrease. Peanut producers generally have tended to react to product price decreases by maintaining or expanding production in the short run to minimize losses on their fixed assets.

If prices tend to stabilize at the new lower level or if the support price levels are again lowered and remain at that low level for several years, peanut producers would be forced to make adjustments in their obligations or debt commitments. They would have to write off these fixed investments, i.e., absorb the capital losses due to MVP of the durable inputs being less than their acquisition costs.

While this study concerns a Southern crop of minor significance nationally, the analyses and recommendations should have implications for other commodities, both basic and nonbasic, for which equilibrium adjustments at the aggregate level are needed currently, or will be

needed in the future. If the aggregative supply response for peanuts is irreversible--and some empirical evidence has been presented to substantiate this belief--then separate supply functions are necessary for rising and falling prices. That is, the supply responses to price changes are not the same for an increase, as for a decrease, in the prices received by farmers for their crop. This method of handling the supply response aids in the explanation of why farmers react quickly to product price increases or input price decreases, but sluggishly, or is some unusual pattern to a reduction in price received for the product or increase in input price.

Some implications of peanuts being a basic commodity are presented in Chapter IX and, finally, some conclusions and recommendations for "right actions" are presented in Chapter X.

CHAPTER IX

NORMATIVE CONSIDERATIONS FOR A PROGRAM TO MODIFY INSTITUTIONAL AND ECONOMIC FIXITIES

Introduction

Before examining the normative considerations affecting governmental policies and programs for peanuts, it seems appropriate to caution the reader that (1) farm price supports and production control policies have evolved out of the political processes, (2) government programs implement these policies, and (3) farm policy involves normative as well as non-normative considerations.

Normative[1] considerations involve the "goodnesses" and "badnesses" of a situation, condition or thing either existing or likely to result from an action plan, program, or policy which has been or could be developed. The non-normative[2] considerations deal with the "neutral" characteristics of a state of an existing or possible condition, thing, or situation, and as such, do not involve "goodness" and "badness". Information may be unreliable with respect to either the non-normative or normative aspects of a problem. Man is not ordinarily conceived as

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[1]A normative belief or value is concerned with "goodness" and "badness".

[2]Some writers classify concepts as normative and factual (beliefs). This writer believes that at least some values may be factual. Hence, for clarification, the term non-normative, rather than factual or belief, is used in this thesis.

capable of having absolute or perfect knowledge of either; hence, questions about the existence of absolutes are not particularly relevant here.

In dealing with government programs for peanuts, the concepts of "goodness" and "badness" become involved in defining the "right" goals about "what ought to be" as solutions to the problems which exist in the peanut industry. A goal can be defined as a condition which individuals or groups are striving to attain as a solution of a problem. It will involve the attainment of some goodness or the avoidance of badness. It may deal with an intermediate end, as well as with a more ultimate end. Determining right goals requires the use of a method of selecting the right.

Once the right goals are established as a solution to the problem, the next step is for policy-makers to develop a plan to attain these right goals. If perfect normative and non-normative knowledge existed, and if a perfect method of selecting the right were available, policy-makers and program designers would be able to develop a set of unquestionable recommendations or right goals.

Hindsight is often more revealing than foresight in pinpointing right actions or goals. The farm program emerged from, and is continuously being modified by, the give and take of politics. Over time, additional normative and non-normative experience improves knowledge and changes conclusions about the "rightness" and "wrongness" of goals and actions. For instance, some producers and certain interested organizations may argue from their experience and/or standpoint that a program contains only right actions. Conversely from the standpoint of the CCC, the public taxpayers, and even some of those producers who have to purchase an allotment franchise or license before they can produce, the farm program can be regarded as including some wrong actions.

It seems appropriate to examine the concepts of goodness which policy-makers use as guidelines in developing agricultural programs. Such an examination can be objective in the sense of insisting that the normative concepts be subjected to the tests of (1) consistency with previously accepted concepts and with current experience, (2) clarity and interpersonal communicability, and (3) applicability or leading to "workable" solutions to problems of individuals and societies.

Guidelines for Agricultural Programs[3]

There are at least four concepts of goodness which policy-makers strive to attain, at least in part, in programs designed to aid the farmer. These are (1) income, (2) efficiency, (3) equity, and (4) political and economic freedom.[4]

With respect to income, it is accepted that it is good (a) that farmers participate in increases in net national product, and (b) that sharp fluctuations in year-to-year income be eliminated or substantially

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[3] Hathaway discusses these concepts in his new policy book, *i.e.*, Hathaway, Dale E., *Government and Agriculture*, the Macmillan Company, New York, 1963, pp. 3-23, and pp. 60-79.

[4] *Ibid.*, p. 13, and pp. 74-75. In a sense, if a producer desires certain benefits from a program, he is forced to vote for the program in its entirety or vote for the man who will support it. Thus, for that particular vote, he may suffer a loss of political freedom, as well as some restriction on his economic freedom to grow and market what he desires, if the program is adopted. These are some of the consequences of government farm programs. At least one major farm organization holds the belief that farm programs give some individuals political and economic controls over others. Expressed more explicity, political freedom means freedom of individuals from political domination by the central government.

reduced. The concept of efficiency, from the economy standpoint entails maximum output from a given level of inputs. The equity[5] value holds that it is good that each member of rural society attain the same levels as the non-rural society members in health, education, religion, recreation, etc., and that they participate equally in increases in national productivity. Finally, political and economic freedom of the individual farmers is regarded as good.

Application of These Concepts of "Goodness" to the Peanut Program

The major goals of the peanut program are to (1) raise the level of prices received by farmers for their peanuts and (2) to restrict peanut production so that supply will be adjusted to market demand at these support prices. These goals result from employment of the goodness concepts of efficiency, income, and equity. Some freedom is given up in this process. In forming these goals, losses and gains of achieving these different goods were balanced against each other in view of what was possible given the political, technical, economic, and social conditions believed to exist at the particular time.

Political and Economic Freedom

Political and economic freedom are restricted when price supports and acreage allotments are in effect. However, many producers have seemed willing in the past to "trade" some of this freedom when the "consequences are loaded"[6], *i.e.*, in return for some degree of increased income, greater

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[5]Equity is generally concerned with a fairness and justice.

[6]The consequences of farmers not approving the quotas are that price supports may be made available to cooperators only at 50 percent of parity, instead of the present 75 to 90 percent range of parity support.

equality and security.[7] Also, when the majority of peanut producers themselves vote to accept quotas, in the form of acreage allotments, as did 97 percent of them in December 1962 referendum, they evidently are more concerned about the goodness of income and price stability than they are with the loss of the goodness of freedom to plant as much as they want. A two-thirds majority of the peanut farmers voting in the referendum is required to keep the program in effect. Thus, there conceivably could be almost one-third of these farmers who suffer an unwanted loss of freedom from a program imposed upon them by the majority.

Income

With reference to the income concept and the present peanut program, most would agree that the price support and supply control features have aided somewhat in maintaining prices at a higher level than would have occurred in the absence of a price support program. However, yield fluctuations have resulted in some large variations in the gross value of the peanut crop.[8] Without the price support program, undoubtedly, value of production would have fluctuated even more.[9]

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[7]For a discussion of how farmers react to given alternatives proposed by Congress, and others, which have caused some restriction of individual freedom, see the article by Dale E. Hathaway, "Agricultural Policy and Farmers' Freedom: A Suggested Framework", Journal of Farm Economics, November 1953, pp. 496-500.

[8]The total value of production for picked and threshed peanuts varied from almost 221 million dollars in 1950 to 123 million dollars in 1954, an extremely poor crop year due to weather. In 1962, this value was approximately 200 million dollars.

[9]Peanuts, 1909-1945, unnumbered mimeograph, BAE, USDA, Washington, D. C., March 1948, p. 5. For example, value of production from 957,000 acres picked and threshed in 1919 was $64 million. In 1920, value of production from 995,000 acres picked and threshed was only $33 million, almost a 50 percent decrease, although a greater acreage was harvested and yield was almost as high in 1920 as in 1919. Similar instances are interspersed throughout the history of this crop. Value of production decreased from $43.5 million in 1927 to $14.5 million in 1932.

With price supports, weather has been the major determinant affecting the value of peanuts in any given year. Some form of weather crop insurance, such as that proposed by Halcrow,[10] possibly would do more than the present support program in stabilizing farmers' income from producing such crops as peanuts.

However, assuming that the peanut program has provided some aid in reducing fluctuations in yearly income of farmers, it does not necessarily follow that it has assured incomes comparable with other members of society. Neither has it assured farmers of a proportionate or "fair share" of any increase in net national product as the support price for peanuts is not an automatic device which raises the price of peanuts directly with gross national product increases. Thus, the government program has not eliminated many of the non-pareto better losses which peanut producers have suffered as adjustments have been made in size of allotments and owners of small allotments have been squeezed out of profitable production. Thus, there is conflict among the efficiency, equity, and equality concepts as well as built in conflicts in the government program itself. Recognition of the "facts of life" concerning the political and economic environment has caused farmers to accept lower support prices in recent years while net national product, and farmers' cost of production as well, have continued to rise. Farmers have been caught in an environment characterized by what is known as the "price-cost squeeze".

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[10] Halcrow, Harold G., "Actuarial Structures for Crop Insurance", <u>Journal of Farm Economics</u>, August 1949, pp. 418-443.

Efficiency

There have been increases in efficiency though not as great as might have occurred. This has resulted in lower prices per unit of output and the marketing of a higher quality peanut. Peanut farmers have moved also towards more efficient allocation of resources in producing the required production needed for consumption purposes. The number of farmers producing peanuts has decreased, and average acreage harvested per farm has increased. Consequently, there has been some reorganization and reallocation of the remaining resources. Adoption of improved technology has resulted in larger income for some producers.

However, efficiency through increased yields per acre and higher production on the given acreage allotment is not the only objective. Efficiency in the allocation of resources among enterprises and among farms, as well as between the farm and non-farm economy, is also desired. If the present program of acreage allotments is to be continued, then measures need to be taken to consolidate small allotments of peanuts by establishing a fair method of transferring these allotments among farms to obtain a size of allotment amenable to labor-saving technology. A method of determining the value of the allotments that is fair to both seller and buyer would need to be worked out so that the "old" allotment owners do not suffer capital losses. As indicated previously, capital losses have been incurred by peanut producers under the present government program for peanuts, even though the government has been willing to purchase the surplus peanuts at a loss to clear the market. Some method of compensation is needed to purchase the allotments rather than arbitrarily reducing the allotment to prevent unnecessary capital losses to allotment owners. In periods of low peanut prices, producers are able to equate MVP with MFC only if assets are priced below P_{acq}.

Some Consequences of Basic Commodity Legislation

Some of the consequences of previous actions in supporting, and hence controlling, some commodities, but not supporting their substitutes, i.e., competitive farm products, have occurred with corn and wheat acreages over the past few years. When acreages of these crops were reduced, other feed and food grains were planted on the acreages released from the production of corn and wheat. Consequently, the problem of surpluses was not solved. The CCC only added to its stockpiles of unconsumed farm products.

There is no one solution or one set of right actions, whose consequences will completely attain the four concepts of goodness. Should all crops be classified as basic commodities so their production would be controlled? Of should production controls and price supports be abandoned, so as to allow the market demand and supply to determine the price the farmer will receive for what he produces? This writer is not advocating either of these two proposals.[11] An idea of some earlier reasoning on this controversy is presented in a letter written in 1934 by Secretary of Agriculture Henry Wallace to Senator Harry F. Byrd (Appendix Table 22).

Summary

No one ideal solution or right action to meet the multiple objectives and the concepts of goodness inherent in the objects of

[11]Proposals to solve, at least partially, the above surplus production and resulting low income farm problem are many and are discussed in various professional journals, farm magazines, and other publications. It is not the purpose of this thesis to reconcile or resolve such discussions.

a farm program has been proposed. Even more likely, none ever will be adopted as a workable program. It is almost impossible to develop a program involing actions which are unquestionably right. Compromises must be worked out, so that the rights of minority groups are not unnecessarily damaged. Compensation through various methods must be considered as a means of reducing or allaying the harmful repercussions of capital losses if the present program is eliminated. It does seem apparent, however, that a program containing more right actions than the present peanut program could be developed. Such a program should be one in which the consequences of the actions allow a higher level of attainment of the equity, income, efficiency, and freedom concepts. Certainly, the present program has not been able to restrict production to that level whereby consumers will take all the production at the supported price. This has caused the CCC and the peanut industry much embarrassment from the public media as a result of expensive storage programs, etc.

A more feasible program would recognize the effects of fixed assets on the supply response for peanuts. Certainly any future policies should take into account the aggregate effect of fixed assets on peanut production.

The factual and normative analyses, involving fixed assets presented in this thesis, helps explain why peanut producers have continued to overproduce the market demand for peanuts despite returns to productive assets below acquisition cost. This better understanding of the basic causes of the failure of farmers to make production adjustments makes it easier to envision the right actions needed in the peanut industry.

Understanding the major causes of overproduction provides legislators and economic advisers an opportunity to devise methods to bring supply in line with demand with a minimum loss of individual freedom, and with minimum capital losses to present peanut producers. Currently, for some producers, MVP $<$ MFC where MFC is based on P_{acq}. Labor earnings for many peanut producers are disappointly low and are much lower than earnings for comparable jobs in the non-farm sector. However, much of the labor remaining on the peanut farms is either untrained, uneducated young workers or older workers whose P_{salv} (MVP in off-farm jobs) is low and much below the cost of attracting more workers into peanut production. Any government program to supersede the present program should consider the labor and the durable resources which are economically fixed in peanut production. Some means of compensating the producer for at least part of his capital losses will be needed, if the current allotment program and price supports are reduced.

CHAPTER X

CONCLUSIONS

Summarizing the Present Situation

The acreage allotment-price support program for the basic commodities has maintained a relatively high level of prices for peanuts, and has stabilized the income received by farmers. If the price support program were not in existence, the market price for peanuts for edible requirements would be nearer the world market price for peanuts for oil purposes, which is presently 5 to 6 cents per pound. Also, peanut prices would fluctuate more from year to year as they did in earlier years.[1]

As a result of the support price operations, farmers' production decisions concerning peanuts have been made with reduced price uncertainty. The program has also contributed to a more stable and prosperous farm economy in the Southern states as well as having improved the welfare of rural people in general. Although the peanut program has aided in partially achieving these goals for the peanut industry and the economy, it has not eliminated all risk

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[1]The reader may wish to refer to Appendix Table 4 for evidence that prices fluctuated greatly in earlier years. For example, Virginia-Carolina peanut prices decreased from 10.3 cents in 1919 to 4.9 cents per pound in 1920, a decrease of over 50 percent. Also, from 1924 to 1925, U.S. prices decreased from 4.1 to 2.9 cents per pound, a decrease of almost 30 percent.

and uncertainty arising from imperfect knowledge among producers. As indicated by the fixed assets analysis, peanut producers have continued to overproduce, i.e., in the sense of producing more peanuts than are used at the effective support prices, and in the sense of making errors of committing resources so that MVP $<$ MFC (where MFC is based on P_{acq}) even with the price supported under the government program.

Increased production is sufficient to keep the support price at or near its minimum price support level of 75 percent of parity under current legislation. This plus higher quality nuts has favored consumers. Thus, peanut consumers, but not the tax-paying public, have gained some benefits as a result of government programs. However, from the standpoint of the national economy, non-peanut producers, taxpayers and the CCC as a "surplus" buying organization, the present government program does not necessarily represent a right action, in terms of the normative considerations presented in Chapter IX.

The present program has not fully achieved equity, efficiency, income, and freedom for peanut producers. From the aggregate standpoint, it has impeded resource adjustments and has resulted in tax money being used for CCC purchasing operations to clear the market of excess peanuts. For many individuals, capital losses have been suffered on assets fixed in the peanut enterprise because of decreases in acreage allotments and support price decreases. Furthermore, production has been maintained in some years at points where MVP = MFC for the inputs only when the inputs are priced at some value below P_{acq}. In other words, production has occurred where $P_{acq} >$ MVP but where MVP $> P_{salv}$. Finally, there has been no provision for government purchase of allotments

after the value of the allotment has been capitalized into the land price. The second goal of the peanut program, to restrict peanut production such that supply will be adjusted to demand at support price levels, has not been achieved in any year since 1949, with the possible exception of 1954.

In summarizing the peanut supply-demand situation, there are at least four major factors affecting production. These are (1) the acreage allotment currently fixed at a minimum of 1,610,000 acres, (2) the yield per acre which has been trending upward in all three areas, (3) the allotted acres placed in the Conservation Reserve, and (4) the percent of allotted acres not planted and in some cases not harvested. Under harvesting of the planted acreage has varied from 4 to 10 percent in the last five years while underplanting of allotments has averaged around 3 percent in recent years.

Four factors affecting consumption of peanuts are (1) changes in the population, (2) changes in real per capita disposable income, (3) price elasticity of demand for peanuts, and (4) effectiveness of merchandising programs.

Population is increasing at a rate of about 1.7 percent per year, or approximately 3 million people per year. Based on the current consumption rate of 7 pounds per capita, (farmers' stock basis), this represents an increased consumption of 21 million pounds annually as a result of population increases. The income elasticity of demand at the wholesale level varies from .74 to 1.28 depending on the time period.[1] Thus, there

[1] Badger and Plaxico, op. cit.

is a positive effect on consumption from increases in real disposable income. However, this still is not sufficient to eliminate the large carry-over stocks.

Based on a price elasticity of demand estimate of -.3 to -.35 for farmers' stock peanuts, a 3 percent change in price will result in a 1 percent change in consumption in the opposite direction. It appears that the promotion and advertising programs of some of the large end users of peanuts have increased peanut consumption. Even though fairly stable prices at both the farm and retail level were probably a factor, the above programs should be given some of the credit for the per capita consumption increase of .7 pounds per capita (farmers' stock basis) in the 1962-1963 marketing season over the consumption rate of the past decade.

Contribution of This Thesis

The main purpose of this thesis was to study the effects of land and land substitutes, labor, and machinery on the aggregate peanut supply response, using asset fixity analysis, during the 1949-1962 period of acreage allotments and price supports.

Some producers have expanded production in response to lower product prices because they have made previous errors in the organization of their enterprises and then find ways to minimize losses by expanding use of variable inputs to bring the business into better balance. Large capital investments have become fixed in the production of peanuts, and it is to the advantage of individual producers to utilize these assets fully.

During periods when the support price has decreased, peanut growers have suffered capital losses on their land and machinery as well as being disappointed in the earnings of their labor. However, their loss has not been as great as it could be, because taxpayers, through the government programs, and consumers have borne part of the burden in maintaining the value of assets at a higher level.

The primary contribtuion of this thesis has been to explore more fully some of the theoretical and practical implications of fixed assets concepts as they are applicable to the peanut industry. The theory has been applied to various resources in the peanut industry to acquire greater understanding of the causes of overproduction in periods of declining product prices and of rising factor prices. Land (acreage allotments) and land substitutes, labor, and machinery have been examined as the primary resources in peanut production.

Labor availability is less critical than formerly as labor-saving machinery substitutions have eliminated most of the peak labor requirements for peanuts. Consequently, the peanut producing operation can now be handled by a much smaller hired and unpaid family labor force. The producer, and one or two hired men at the peak periods of labor, can now handle the many production and harvesting operations. Pockets of surplus labor continue to exist in a few peanut producing areas and some of these workers are willing to work at low wage rates. Until more off-farm opportunities siphon off this labor and farm wage rates increase even more, it may not be feasible to further mechanize peanut production in those areas.

The machinery adoption rate increases when wage rates increase. When wage rates decrease and/or a sufficient supply of labor for peak harvest needs is available, this flow of technology in the form of

machinery tends to slow down as it did in the 1930's. Other factors also had an effect in the decreased purchases of farm machines during this period, however.

As a result of analyzing the impact of land, labor, and machinery on aggregate production of peanuts, the following points became evident. First, the decrease in land use through the reduction in acreage allotments has not reduced peanut production proportionately. Although total production has been reduced by one-fifth, the acreage planted has been reduced by two-thirds. For example, in Oklahoma, 12,217 acres were in the Conservation Reserve Program in 1960. Also, acreage allotments were reduced by another 50,000 acres from 1949 to 1962. Thus, there has been a reduction of over 62,000 acres or approximately a one-third reduction in peanut acreage in Oklahoma since 1949. Despite this reduction in acreage planted, estimated production in 1962 of 165.2 million pounds is the largest ever for Oklahoma and exceeds 1949 production by almost 50 million pounds.

Second, reduction of labor has not prevented some increases in production in recent years. During the expansion period of World War II, shortage of labor and inability to compete with nonagricultural industry wage rates resulted in a smaller than expected--and smaller than desired--increase in acreage planted to peanuts. Labor requirements per acre are still relatively high in the Virginia-Carolina area compared with the two other major producing areas. There is still a peak labor period on many peanut farms in this area during harvest when additional man-hours are required to shake and stack the peanuts and later to pick and thresh them. Less than one half of the acreage in the Virginia-Carolina area was combined in 1962.

This peak period of labor during harvest and the decrease in the labor supply in this area has created some problems. Off-farm job opportunities in this area and the higher wage rates in the non-farm industries have siphoned off much of the labor previously depended on to hoe and harvest peanuts. Farm wage rates have also increased, but not nearly so much as has the off-farm wages. It is more likely that the MVP of labor on these peanut farms is equated to the P_{salv} (highest MVP of the worker in an alternative occupation for which he is qualified) of the remaining workers on the farm. These workers generally are untrained for other occupations and are either too young (immature) or too old to obtain off-farm employment. A high majority of this farm hired labor force is Negroes. However, as the trend towards peanut combines continues in Virginia and North Carolina, labor will occupy a less important place in the peanut industry in this area, as it has in the other two production areas. The use of combines has reduced harvest labor requirements by approximately 22 hours per acre.

Third, and as indicated by the reduction in the labor requirements per acre and increased use of combines and other mechanical equipment, capital investments in these durable assets by peanut producers have been sizable. Presently these capital investments are increasing at a somewhat slower rate, mainly because of the "saturation" of the Southwest and the high percentage of peanut farms in Georgia which have completely mechanized the harvesting operations. There is some evidence which indicates peanut producers have overinvested in durable resources for peanut production. Subsequent peanut price decreases have caused capital losses.

Producers continue to use these assets as long as MVP $> P_{salv}$. In some cases, expenditures on supporting expendable factors are increased and hence yields per acre are increased.

The aggregative impact of combine harvesting, due to the reduction of peak labor requirements during harvest has been towards a demand for larger acreages attainable through leases and other types of rentals, as well as through purchases of other allotments. There is some evidence that use of the newer combines results in higher harvested yields per acre since fewer nuts are left unharvested in the fields. Thus, combining itself increases production through a higher harvesting percentage of nuts per acre, as well as by allowing the use of a higher seeding rate, irrigation, fertilizer, and other determinants of higher production per acre. Although support prices have decreased, the MVP of these expendable resources appears to be greater than the P_{acq} for at least some producers, despite losses on durable investments.

Fourth, private investment in irrigation equipment in the Southwest has also been significant. The result has been a large fixed investment in the peanut enterprise, placing many of these farmers in the position of having to continue to produce, despite product price decreases, in order that they may fully utilize the fixed investment. Irrigation of peanuts in the Southwest has resulted in greatly increased per acre yields in several counties in Texas and Oklahoma and in the entire peanut production area in New Mexico.

Recommendations

There are several alternatives to the present program as possible solutions to the general problem of continuous overproduction. Examples

are: (1) to revise the present acreage allotment law, which prevents the national acreage from being reduced blow 1,610,000 acres, and/or to reduce the parity level of support for all--or at least a certain proportion--of the peanuts produced; or (2) to eliminate the present program completely, replacing it with a program that will allow adjustments to be made in supply such that the annual production will clear the market; or (3) to eliminate the present program and let the free market operate to keep supply and demand in equilibrium. A modification of this third alternative is to continue the present program, but establish an industry-wide marketing pool, financed by producers to divert surplus supplies of peanuts.

This writer is not recommending that the peanut price support and allotment program be eliminated. However, it is obvious that increasing production, as a result of earlier errors of organization on the part of producers, at current guaranteed support prices have created difficulties for the present program. Some other method of handling acreage allotments could be a step in the right direction. The acreage allotment program and resulting high support prices have led to the allotment value being capitalized into land prices. As a result, when prices received by farmers for peanuts decrease, these farmers suffer capital losses through reduced land values. Acreage allotments have become monopoly patents for their owners. These allotments become institutionally and/or economically fixed in certain areas and on farms, often in such a small size that the result is inefficient use of resources. Similarly, capital losses have been incurred on machinery, and the lifetime earnings of farm workers have been disappointly low, even with the price certainty of the present program.

One alternative action utilizing the existing program would involve the transfer of base acreage allotments for short periods of time. New producers could then enter into the select group of those growing peanuts. This would allow the "unfreezing" of allotments by letting the ASC control the allotment as far as redesignation. In other words, the original allotment owner could keep title to his allotment, but release it for specified periods of time through the ASC. The ASC in turn could assign this allotment to individuals desiring a peanut allotment. The owner would receive no return for the use of the allotment. However, since he still owned the allotment, his land or farm value would still include the value of the allotted acreage.

From the macro-efficiency standpoint, this would allow a more efficient allocation of resources among peanuts and other enterprises. For example, the owner of the allotment might find it more profitable to use some of his other resources in non-farm employment, i.e., $P_{salv} > MVP$ for some of the resources being used in the peanut enterprise. Individual producers, particularly older farmers, who might be unable to obtain sufficient hired labor to tend all of their allotted acres, would gain from this alternative.

This alternative right action would allow young farmers and others with no allotments, or with small allotments, to control a more efficient-sized production unit. Presumably this would result in a net aggregate gain in efficiency, and possibly higher incomes, increased equity for certain individuals, and more economic freedom in the sense of being able to produce more of a crop in which the producer has a

competitive advantage. All this would be at the expense of large government purchases of peanuts, assuming no change in support price levels. There would still be imperfect knowledge of prices, yields, etc., and errors of overproduction and underproduction on the part of individual producers. More than likely, some capital losses would be incurred from time to time due to these overproduction errors.

This alternative also does not solve the capitalized value problem, i.e., the fact that the allotment does have a value, and that this value is capitalized into the price of the land. Resulting price changes change the MVP of the allotment. Consequently, capital gains and losses occur. A method is needed for handling allotments by which the acreage allotment cannot be capitalized into the land factor.

An alternative suggested by Bishop, et. al.,[2] would possibly decrease underplantings and solve the overpricing of land at the same time. If the allotments were made negotiable, a market would be created for the purchase and sale of allotments. Through this market farmers who find it unprofitable to produce the crop because of better alternatives, too small allotments, etc., or impossible to handle all their allotted acreage due to insufficient labor at critical periods, and/or insufficient capital to invest in labor-saving machinery,

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[2]Bishop, C. E., Henry, W. R., and Finker, A. L., Underplanting Tobacco Allotments; Factors Affecting Planting Decision in Forsythe County and the Northern Piedmont, AE Info. Series No. 42, Dept. of Agricultural Economics, N. C. State College, Raleigh, N. C., March 1955, pp. 2-4.

could sell their allotments, or parts thereof, to other peanut producers. This sale could be accomplished without selling the land.

Such sales and purchases could be handled by the ASC. Over time, this would permit production of the allotted crops to flow onto farms and into areas where more efficient production would take place, thus returning a greater net revenue to the peanut industry. A higher level of attainment of the other concepts of goodness should also be possible under this right action. Making the acreage allotment negotiable would permit some interfarm and interregional adjustments to take place and some resources could be reallocated to other enterprises. This would separate the price of the allotment from the actual physical value of the land in producing peanuts, resulting in a more valid assessment and tax rate structure on this land. It would also allow the production of peanuts to flow to areas of more efficient production.

Another alternative could not be adopted until existing legislation is amended or discarded. This alternative is to amend or eliminate the present law which places the minimum national acreage allotment at 1,610,000 acres. Allotted acreage should continue to be adjusted down as a result of per acre yield increases (due to new technology, etc.), if price supports and acreage allotments are to be used to keep annual production of peanuts in line with consumption at supported price levels. Through capital losses and gains, this proposal would hurt some farmers and help others. The latter possibility results from the fact that as acreage allotments are decreased, the per acre allotment value of the remaining acreage increases. Provision for sale of allotments would tend to equalize these losses and gains.

The fact that acre curbs are not the equivalent of volume limits has led to suggestions that the allotments be in terms of pounds or bushels rather than acres.[3] It also has been suggested that such quantity allotment "rights" or quotas be made negotiable and assigned to the individual farmer rather than being tied to the land. If the allotments became transferable, this would provide a way for the "production rights" to get into the hands of the more efficient producers.

If the acreage allotments or quantity marketing quotas were made negotiable, the USDA would have at least two alternative means of achieving equilibrium between supply and demand at the price support level.[4] Based on the assumption that the minimum national allotment feature of the program is modified or eliminated, USDA economists could determine the present supply needs, yield trends, carryover, etc. Then if acreage should be reduced, the government could (a) order a mandatory reduction of, say, .1 acre for every one acre of allotment or 10 percent of a quantity marketing quota owned, or (b) set up a program for buying the necessary acreage allotments to cause the needed decrease in production. Such a system could be on a sealed bid basis, with the funds presently used for CCC purchasing operations being devoted to buying up these allotments. If production were not reduced sufficiently the first

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[3]Maier, Hedrick, and Gibson, op. cit. Willard Cochrane has also proposed this alternative action in various Journal of Farm Economics articles and in other publications.

[4]Assuming Congress would authorize USDA to make changes in the current program.

year, steps could be taken to effect an additional acreage reduction the following year. This procedure should be examined in more detail.

The annual purchases of surplus peanuts by CCC during the past decade have been 200 million pounds or more. At $.05 per pound, this is an annual net cost of $10 million.[5] If the USDA could spend $10 million per year buying up allotments, it could purchase allotments on a bid basis, or alternatively, could offer a set price and purchase all allotments offered at that price, then offer a higher price and buy additional allotments. The average price should be about $500 per allotment acre. Thus, the CCC could purchase approximately 20,000 acres a year for the annual expenditure currently involved in the peanut program. However, until sufficient allotments had been purchased to bring production in line with demand, the CCC would have to continue to divert some surplus peanuts from regular market channels. Hopefully, this phase of the program would be eliminated in ten years or less.

Even assuming the allotments purchased represent land with low peanut yields, the 1951-1960 average yield of approximately 1,000 (actually 1,016) pounds per acre should still be applicable to this acreage. This is in view of the increasingly higher yields of peanuts per acre which averaged 1,200 pounds in 1961 and 1,273 pounds in 1962.

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[5]The initial cost is approximately $.10 per pound. However, CCC usually sells the nuts for crushing for oil at approximately $.05 per pound. Thus, the net loss to CCC on its price support operations is approximately $.05 per pound.

By reducing production by an average of 20 million pounds the first year (20,000 acres times 1,000 pounds per acre), 40 million pounds the second year, etc., through this USDA allotment purchase program, several objectives would be accomplished.

(1) Farmers who owned allotment franchises would be able to sell their allotments without losing their investment in the owned allotments as would happen if the allotment program were discarded.

(2) When additional production is needed to meet increasing consumption needs, the government owned allotments can be sold back to producers on a bid basis. This hopefully would allow consolidation of allotments and a more efficient farming operation in the long run.

(3) The government could have a stipulation in the purchase agreement that the producer may not plant the unused acreage, after he sells the peanut allotment to CCC, to other crops which are in excess capacity but not controlled by allotments, e.g., feed grains.

Volume controls would be more difficult to enforce than acreage allotments. Some form of certificates would be needed to prevent the producer from marketing more than his quota. Volume controls may also be impracticable for peanuts unless distinctions are made in quotas for the three varieties, based on possible shifts in demand from one type to another. Controls of any type tend to reduce flexibility and lead to lags in desirable adjustments, within the farm organization, among farms, and between regions.

It should be re-emphasized that in total, peanut producers have continued to make errors of organization and adjustment even with the government price support and acreage allotment program. Consequently,

some producers have made overproduction errors in the sense of overcommitments of labor and capital investments in land (purchase of acreage allotments) and machinery. Producers or tax payers suffer income or capital losses and low earnings are received on the labor remaining in the peanut enterprise.

As indicated previously, there are two equilibrium prices at which the supply of peanuts will clear the market. Producers will suffer no capital losses only under one of these prices, MVP = MFC, where the MFC of all resources is based on the acquisition cost (P_{acq}) of the resources. The second equilibrium price, and that which has prevailed during several production periods for many producers since 1949, is that where MVP = MFC only when MFC of the resources is based on a price less than acquisition cost (P_{acq}) but equal to or greater than the salvage value (P_{salv}). Under this condition, producers continue using these resources despite incurring capital losses.

The above situation also is likely to occur with all the above recommended actions or alternative programs discussed above. With any kind of government price support program, farmers will continue to make overcommitments of resources as long as only one factor of production is controlled. This overcommitment could be prevented if producers had perfect knowledge of all variables affecting supply and demand of peanuts or if an agency with perfect knowledge placed direct controls on the use of all resources used in producing peanuts. This means in practice that the producer organization or government would have to control investment in new irrigation facilities as well as use of

existing systems. Investment in machinery and equipment, and use of presently owned equipment would likewise need to be manipulated. Politically, such controls by government are not likely to be palatable or acceptable to the majority of peanut producers. What the situation would be for control by producer organizations is not clear.

An alternative to these controls that shows some promise is a greatly expanded and improved research program to determine further just what the effect of various resources is on production, as well as to remove as much uncertainty as possible from the use of the resources. As a corollary to this research program, additional extension effort would be needed to provide this information to farmers. Possibly through such a joint action program much of the overcommitment in these durable resources could be prevented or considerably reduced without depending as much on controls by governmental or producer organizations as is now done.

This writer would like to end this thesis with a statement made by Rudolf Fruend.[6]

> "Admittedly, this (price support) policy and the measures adopted for its achievement raise difficult problems, such as what to do with stored-up surpluses or acreages released

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[6]Rudolf Freund, Support Prices for Peanuts in 1954, AE Info. Series No. 34, Department of Agricultural Economics, North Carolina State College, Raleigh, North Carolina, October 1954, pp. 23-34.

from the production of the controlled crop. These problems may find better solutions when farmers help their leaders to think them through and when they remember that our price support and acreage allotment programs are not ends in themselves. These programs are justified only when they smooth out some of the rough turns in the road towards a more efficient agriculture and toward the greater welfare of our farmers and all of our people."

APPENDIX TABLE 1

LEVEL OF SUPPORT PRICE FOR PEANUTS AS DETERMINED BY SUPPLY

The level of support shall not be less than the following percentage of the parity price	If the supply percentage[a] as of the beginning of the marketing year for peanuts is	
	OVER	NOT OVER
90	---	108
89	108	110
88	110	112
87	112	114
86	114	116
85	116	118
84	118	120
83	120	122
82	122	124
81	124	125
80	125	126
79	126	127
78	127	128
77	128	129
76	129	130
75	130	---

Source: Henderson, Harry, Price Programs, Agricultural Information Bulletin No. 135, USDA, Washington D. C., Revised April 1957.

[a]The supply percentage for any commodity is the percentage which the estimated total supply is of the normal supply as of the beginning of the marketing year. The total supply is, generally speaking, the carryover at the beginning of the marketing year, plus the estimated production of the commodity in the United States during the calendar year in which the marketing year begins, and the estimated imports into the United States during the marketing year. The normal supply in the case of basic commodities is, generally speaking, the estimated domestic consumption, plus estimated exports, plus an allowance for carryover.

APPENDIX TABLE 2

AVERAGE PRICE SUPPORT LEVELS AND AVERAGE PRICES RECEIVED BY FARMERS FOR PEANUTS

Marketing Season (Crop of)	Level of Support		Season Average Price Received by Farmers
	Percentage of Parity	Average Support Level	
	Percent	Cents per Pound	Cents per Pound
1941	68	4.35	4.67
1942	90	6.6	6.09
1943	90	7.1	7.12
1944	90	7.3	8.05
1945	90	7.5	8.27
1946	90	8.6	9.10
1947	90	10.0	10.1
1948	90	10.8	10.5
1949	90	10.5	10.4
1950	90	10.8	10.9
1951	88	11.5	10.4
1952	90	12.0	10.9
1953	90	11.9	11.1
1954	90	12.2	12.2
1955	90	12.2	11.7
1956	86	11.4	11.2
1957	81.4	11.1	10.4
1958	80.8	10.7	10.6
1959	75	9.7	9.6
1960	78	10.1	10.0
1961	85	11.0[a]	10.9
1962	85	11.1[a]	11.1[b]
1963	80	11.2[a]	--

Sources:

Henderson, Harry, Price Programs, Agricultural Information Bulletin No. 135, USDA, Revised April 1957, Table 16, p. 97, for 1941-1948.

Fats and Oils Situations, (FOS-217), USDA, March 1963, p. 16.

[a]The $9.00 per ton deduction from grower support prices for inspection, storage, etc., has been eliminated effective with the 1961 crop. This in effect raises the grower support price another 1/2 cent per pound.

[b]Estimated.

APPENDIX TABLE 3
ANNOUNCED PRICE SUPPORTS FOR PEANUTS BY TYPE AND U. S. AVERAGE
(Cents per Pound)

Marketing year[a]	Southwestern Spanish	Southeastern Spanish	Runner	Virginia	United States
1933	3.00	3.25	2.75	3.00	3.00[c]
1934	2.95	2.95	2.50	2.80	2.80
1935	3.13	3.13	2.63	3.13	3.10
1936[b]	--	--	--	--	--
1937	3.10	3.25	2.85	3.25	3.10
1938	3.15	3.25	2.80	3.30	3.20
1939	3.15	3.25	2.80	3.30	3.20
1940	3.20	3.25	2.80	3.30	3.20
1941	4.10	4.20	3.70	4.40	4.35
1942	6.45	6.55	5.85	6.85	6.60
1943	7.00	7.00	6.50	7.00	7.00
1944	8.00	8.00	7.25	8.00	7.80
1945	8.00	8.00	7.25	8.00	7.80
1946	8.60	8.70	7.85	8.50	8.60
1947	10.05	10.15	9.25	9.80	9.98
1948	10.50	10.75	9.75	10.45	10.80
1949	10.20	10.45	9.65	9.95	10.53
1950	10.45	10.70	9.50	10.35	10.80
1951	11.25	11.45	10.30	11.30	11.53
1952	11.60	11.80	10.75	11.55	11.88
1953	11.55	11.70	10.65	11.45	11.90
1954	11.85	12.05	11.00	11.80	12.24
1955	11.85	12.05	11.00	11.80	12.24
1956	11.17	11.51	10.60	12.20	11.35
1957	10.91	11.22	10.39	11.89	11.07
1958	10.48	10.88	10.02	11.25	10.66
1959	9.49	9.90	9.03	10.27	9.68
1960	9.88	10.22	9.40	10.70	10.06
1961	10.87	11.21	10.39	11.68	11.00
1962	10.86	11.32	10.44	11.70	11.07

Source: Fats and Oils Situation Reports, USDA, and Agricultural Prices, USDA.

[a]Marketing year runs from August 1-July 31 for Southeast area; July 1-June 30 for Southwest area; and October 1-September 30 for Virginia-Carolina area.

APPENDIX TABLE 4
PRICES RECEIVED BY FARMERS FOR FARMERS' STOCK PEANUTS:
ACTUAL PRICE AND DEFLATED (REAL) PRICE[a]
(Cents per Pound)

	Virginia - Carolina		Southeastern		Southwestern		United States	
Year	Actual	Deflated	Actual	Deflated	Actual	Deflated	Actual	Deflated
1909	4.2	4.2	3.8	3.8	3.8	3.8	4.1	4.1
1910	4.0	4.1	4.1	4.2	4.0	4.1	4.0	4.1
1911	4.0	4.1	4.8	4.9	4.8	4.9	4.2	4.3
1912	4.1	4.0	5.1	5.0	4.9	4.8	4.4	4.3
1913	4.2	4.2	5.1	5.0	5.1	5.0	4.5	4.5
1914	3.7	3.6	5.1	5.0	4.8	4.7	4.2	4.1
1915	3.9	3.8	4.5	4.3	4.4	4.2	4.1	3.9
1916	4.8	4.2	4.8	4.2	5.0	4.3	4.8	4.2
1917	8.3	5.3	6.3	4.0	7.0	4.5	7.0	4.5
1918	7.6	4.2	5.8	3.2	7.0	3.9	6.5	3.6
1919	10.3	5.3	8.5	4.4	8.7	4.5	9.4	4.8
1920	4.9	2.5	4.3	2.2	6.5	3.3	4.7	2.4
1921	4.9	3.8	2.8	2.2	4.3	2.9	3.8	3.0
1922	6.2	4.9	4.6	3.6	4.9	3.9	5.4	4.3
1923	6.5	4.7	6.4	4.6	6.4	4.6	6.4	4.6
1924	6.3	4.5	5.3	3.8	6.4	4.6	5.8	4.1
1925	4.2	2.9	4.3	3.0	4.7	3.2	4.2	2.9
1926	4.8	3.4	5.3	3.8	5.6	4.0	5.0	3.5
1927	5.4	3.8	4.8	3.4	5.4	3.8	5.1	3.6
1928	5.0	3.4	4.5	3.0	5.4	3.6	4.9	3.3
1929	3.4	2.3	3.7	2.5	4.8	3.3	3.7	2.5
1930	3.3	2.4	3.5	2.6	4.3	3.2	3.5	2.6
1931	1.5	1.3	1.5	1.3	2.5	2.2	1.6	1.4
1932	1.4	1.4	1.5	1.5	1.8	1.8	1.5	1.5
1933	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8
1934	3.4	3.0	3.2	2.8	3.1	2.7	3.3	2.9
1935	3.2	2.6	3.1	2.5	3.0	2.5	3.1	2.5

TABLE 4 (Continued)

Year	Virginia - Carolina		Southeastern		Southwestern		United States	
	Actual	Deflated	Actual	Deflated	Actual	Deflated	Actual	Deflated
1936	4.2	3.4	3.5	2.9	3.3	2.7	3.7	3.0
1937	3.4	2.6	3.2	2.4	3.2	2.4	3.3	2.5
1938	3.5	2.9	3.2	2.6	2.9	2.4	3.3	2.7
1939	3.6	3.0	3.3	2.7	3.2	2.6	3.4	2.8
1940	3.5	2.8	3.2	2.6	3.3	2.7	3.3	2.6
1941	5.4	4.2	4.4	3.4	4.1	3.2	4.7	3.6
1942	7.5	5.1	6.1	4.1	4.8	3.2	6.1	4.1
1943	7.4	4.5	7.1	4.3	6.8	4.1	7.1	4.3
1944	8.8	5.1	7.8	4.5	7.5	4.3	8.0	4.6
1945	9.19	5.2	8.05	4.6	7.8	4.4	8.3	4.7
1946	10.3	5.4	8.78	4.6	8.6	4.5	9.1	4.8
1947	11.0	4.9	9.92	4.4	9.6	4.3	10.1	4.5
1948	10.9	4.4	10.5	4.2	10.3	4.1	10.5	4.2
1949	10.9	4.6	10.2	4.3	10.1	4.2	10.4	4.4
1950	12.7	5.2	10.4	4.2	10.3	4.2	10.9	4.4
1951	12.2	4.5	9.6	3.5	9.2	3.4	10.4	3.8
1952	11.3	4.1	10.4	3.8	11.4	4.2	10.9	4.0
1953	12.0	4.7	10.6	4.1	11.0	4.3	11.1	4.3
1954	13.5	5.3	11.1	4.4	11.7	4.6	12.2	4.8
1955	13.1	5.2	11.2	4.5	11.5	4.6	11.7	4.7
1956	11.9	4.8	10.7	4.3	11.2	4.5	11.2	4.5
1957	10.7	4.2	10.1	3.9	10.4	4.0	10.4	4.0
1958	10.9	4.1	10.5	4.0	10.5	4.0	10.6	4.0
1959	10.6	4.0	8.96	3.4	9.44	3.5	9.6	3.6
1960	11.0	4.2	9.4	3.5	10.0	3.8	10.0	3.8
1961	11.6	4.3	10.7	4.0	10.7	4.0	10.9	4.1
1962	11.8	4.3	10.7	3.9	10.7	3.9	11.1	4.1

[a]Price was deflated by U. S. Index of Prices Paid by Farmers for Items Used in Production (1910 - 14 = 100).

APPENDIX TABLE 5

ESTIMATED IMPACT OF CONSERVATION RESERVE PROGRAM ON ACREAGE AND PRODUCTION OF PEANUTS PICKED AND THRESHED FOR NUTS, UNITED STATES AGGREGATE

	1957	1958	1959	1960	1961	1962[c]
Acres Reduced[a]	1,000 Acres					
Whole Farms	9	18	67	90	89	86
Part Farms	30	43	46	42	42	36
All Farms	39	61	113	132	131	122
Production Reduced[b]	1,000 Pounds					
Whole Farms	6,237	16,637	62,973	100,208	97,911	82,826
Part Farms	20,814	41,031	43,608	47,220	45,767	35,184
All Farms	27,051	57,668	106,581	147,428	143,678	118,010

Source: Commodity Stabilization Service, Soil Bank Division, USDA, Washington, D. C., and personal correspondence with Mr. Kenneth Valentine, formerly with Soil Bank Division, CSS, USDA.

[a]Estimated acres which would have been devoted to peanuts if there had been no Conservation Reserve Program. Each subsequent year represents a summation of acres placed in the Conservation Reserve in previous years and the year concerned. This holds because contracts are written for several years. For example, 1958 represents acreage placed under contract for each of the years 1956, 1957, and 1958.

[b]Production reduced is estimated by multiplying peanut acreage in Conservation Reserve by estimated yield per acre for each of the years concerned, adjusted for quality and location of the land. (This could give an upward bias to the aggregative effect of the program since farms having peanut acreage placed in the Conservation Reserve may not have represented the average yield for that location. It is the opinion of this writer that peanut acreage placed in the program would be acreage representing lower than average yields per acre.)

[c]Preliminary. This estimate for the production reduced by the Program may be low since 1962 was an exceptionally good crop year for peanuts, and a record yield per acre was attained. This writer attempted to get revised 1962 figures and preliminary 1963 figures, but prospects are not very good that these will be released since the Soil Bank Division has been fragmented and the program disbanded except for fulfilling contracts already in existence.

APPENDIX TABLE 6

NUMBER OF PEANUT ALLOTMENTS AND ALLOTMENT ACREAGE PLACED UNDER WHOLE FARM CONTRACTS[a] IN CONSERVATION RESERVE, BY STATES, 1959 AND 1960[b]

State	Number of Allotments 1959	Number of Allotments 1960	Allotment Acreage 1959	Allotment Acreage 1960
Alabama	1,020	1,664	10,796	19,671.2
Arkansas	--	27	--	217.0
Florida	255	492	1,920	3,950.0
Georgia	1,586	2,735	20,277	37,759.7
Louisiana	8	11	103	118.3
Mississippi	1	1	2	1.0
New Mexico	4	4	31	30.9
North Carolina	99	110	628	789.2
Oklahoma	752	1,026	8,287	12,217.0
South Carolina	75	122	626	961.3
Tennessee	16	28	94	178.3
Texas	806	1,017	14,645	19,432.9
Virginia	74	79	374	471.3
Total	4,696	7,316	57,783	95,798.1

Source: Commodity Stabilization Service, Soil Bank Division, USDA, Washington, D. C.

[a]"Whole farm" means all eligible cropland on the farm placed in Conservation Reserve in 1959. In 1960, it means (a) placing all eligible land in the reserve, and (b) where all eligible land is not in the reserve but the contract does not permit the harvesting of any allotment crop. No statistics by states are available for part-time farms involving peanut acreage in the Conservation Reserve. However, access was obtained to the number of whole farm contracts involving farms with a peanut acreage allotment for the 1959 and 1960 crop years. The figures presented in Table 6 indicate the number of allotments and allotment acreage placed under whole farm contracts. It should be pointed out that the figures for "whole farm" participation for 1959 are not directly comparable in Tables 5 and 6. The figures shown in Table 5 have been adjusted by the Peanut and Oils Division of CSS.

[b]Similar estimates for 1961 and 1962 could not be obtained by this writer.

APPENDIX TABLE 7

ACREAGE ALLOTMENTS, ACREAGE PLANTED, ACREAGE HARVESTED YIELD PER ACRE, AND TOTAL PRODUCTION IN OKLAHOMA, 1949-1962

Year	Acreage Allotment	Acreage Planted[a]	Acreage Harvested[b]	Yield per Acre	Total Production
	(1,000 acres)	(1,000 acres)	(1,000 acres)	(pound)	(1,000 lbs)
1949	188	178	170	680	115,600
1950	184	222	212	590	125,080
1951	155	233	220	520	114,400
1952	142	128	112	425	47,600
1953	144	124	119	960	114,240
1954	139	133	100	410	41,000
1955	149	138	134	960	128,640
1956	138	135	70	725	50,750
1957	138	124	109	800	87,200
1958	138	128	124	1,075	133,300
1959	138	123	118	1,115	131,570
1960	138	112	110	1,425	156,750
1961	138	118	115	1,275	146,625
1962	138	118	115	1,415	162,725

Source: Various USDA official reports. Acreage allotment for 1949-1958 from state ASC office, Stillwater, Oklahoma. Acreage allotment for 1959-1961 estimated at same level as 1958 since there has been little change in national allotments since the minimum of 1,610,000 acres was reached in 1957 (the actual U. S. allotment is about 2,000 acres above this minimum due to new farm allotments). 1962 figures were taken from Crop Production, USDA, July 1963 issue, pp. 68-69.

[a]Acreage planted for all purposes.

[b]Picked and threshed for nuts.

APPENDIX TABLE 8

PEANUT STATISTICS FOR THE UNITED STATES:
ACRES PLANTED FOR ALL PURPOSES; ACREAGE HARVESTED FOR NUTS;
PERCENT HARVESTED FOR NUTS; YIELD PER ACRE;
AND TOTAL PRODUCTION, 1909-62

Year	Acreage Planted for All Purposes	Acreage Harvested for Nuts	Percent Harvested for Nuts	Yield Per Harvested Acre	Total Production
	1,000 Acres	1,000 Acres	Percent	Pounds	Millions of Pounds
1909	804	537	66.79	660	355.0
1910	703	464	66.00	827	383.9
1911	749	472	63.01	775	365.8
1912	795	480	60.37	753	361.6
1913	831	465	55.95	824	383.0
1914	920	526	57.17	801	421.0
1915	1,064	617	57.98	779	480.7
1916	1,400	878	62.71	758	666.0
1917	1,805	1,314	72.79	752	988.7
1918	1,892	1,326	70.08	713	946.0
1919	1,628	957	58.78	719	688.3
1920	1,715	995	58.02	699	695.8
1921	1,691	980	57.95	692	678.2
1922	1,472	821	55.77	637	523.3
1923	1,418	797	56.20	713	568.1
1924	1,809	1,084	59.92	658	712.8
1925	1,667	996	59.75	725	721.6
1926	1,520	860	56.58	770	662.2
1927	1,859	1,086	58.42	777	844.2
1928	2,039	1,213	59.49	695	843.5
1929	2,064	1,262	61.14	712	898.2
1930	1,881	1,073	57.04	650	697.4
1931	2,299	1,440	62.64	733	1,055.8
1932	2,649	1,501	56.66	627	941.2
1933	2,350	1,217	51.79	674	819.6
1934	2,627	1,514	57.63	670	1,014.4
1935	2,546	1,497	58.80	770	1,152.8
1936	2,741	1,660	60.56	759	1,260.0
1937	2,542	1,538	60.50	802	1,232.8
1938	2,803	1,692	60.36	762	1,288.7
1939	3,106	1,908	61.43	636	1,213.1

APPENDIX TABLE 8 (continued)

Year	Acreage Planted for All Purposes	Acreage Harvested for nuts	Percent Harvested for nuts	Yield Per Harvested Acre	Total Production
	1,000 Acres	1,000 Acres	Percent	Pounds	Millions of Pounds
1940	3,108	2,052	66.02	861	1,766.6
1941	2,945	1,900	64.52	776	1,475
1942	4,701	3,355	71.37	654	2,193
1943	5,150	3,528	68.50	617	2,176
1944	4,088	3,068	75.05	678	2,081
1945	4,058	3,160	77.87	646	2,042
1946	4,086	3,141	76.87	649	2,038
1947	4,282	3,377	78.86	646	2,182
1948	3,971	3,296	83.00	709	2,336
1949	2,894	2,308	79.75	808	1,865
1950	2,731	2,262	82.83	900	2,035
1951	2,606	1,982	76.06	837	1,659
1952	1,909	1,443	75.59	940	1,356
1953	1,846	1,515	82.07	1,039	1,574
1954	1,881	1,387	73.74	727	1,008
1955	1,929	1,683	87.66	928	1,548
1956	1,869	1,385	74.10	1,161	1,607
1957	1,836	1,554	84.64	969	1,436
1958	1,752	1,518	86.64	1,197	1,814
1959	1,664	1,450	87.13	1,092	1,588
1960	1,562	1,410	90.26	1,266	1,786
1961[1]	1,554	1,410	90.78	1,234	1,740
1962[1]	1,545	1,412	91.21	1,282	1,810

Source: Various USDA Publications.

[1]Revised July 1963, Crop Production, SRS, USDA, July 1963, pp. 68-69.

APPENDIX TABLE 9

PEANUTS: ALLOTMENTS, ACREAGE, YIELD, MARKETING QUOTAS AND PRODUCTION, FARMERS' STOCK BASIS, 1938-62

Crop Year	Acreage: Allotment: Actual[1]	Acreage: Allotment: Legal Minimum[2]	Acreage: Picked & Threshed: Total	Acreage: Picked & Threshed: Percentage of Allotment	Yield per Acre: Used in Determining Allotments	Yield per Acre: Actual	Announced Marketing Quota	Production	Production Less Announced Marketing Quota	Excess Acreage Peanuts Sold for Oil[3]	Acquired under Support Program: Quantity	Acquired under Support Program: Percentage of Production
	1,000 Acres	1,000 Acres	1,000 Acres	Percent	Pounds	Pounds	Million Pounds	Million Pounds	Million Pounds	Million Pounds	Million Pounds	Percent
Average 1938-41	1,448	--[4]	1,888	131[5]	--[4]	759	--[6]	1,436	--	--[7]	378	26
1942	1,610	1,610	3,355	208[8]	--[4]	654	1,256	2,193	937	409	899	41
1943	--[9]	--[4]	3,528	--	--	617	--	2,176	--	--	1,778[12]	82
1944	--	--[4]	3,068	--	--	678	--	2,081	--	--	1,745[12]	84
1945	--	--[4]	3,160	--	--	646	--	2,042	--	--	1,718[12]	84
1946	--	--[4]	3,141	--	--	649	--	2,038	--	--	55	3
1947	--	--[4]	3,377	--	--	646	--	2,182	--	--	528	24
1948	--[9]	--[4]	3,296	--	--	709	--	2,336	--	--	1,167	50
1949	2,629[10]	1,610	2,308	88	651	808	1,700[10]	1,865	165	--	763	41
1950	2,200	2,100	2,262	103	665	900	1,286	2,035	749	68	835	41
1951	1,889	1,610	1,982	105	734	837	1,300	1,659	359	194	540	32
1952	1,706	1,610	1,443	85	777	940	1,300	1,356	56	--	106	8
1953	1,679	1,610	1,515	90	790	1,039	1,326	1,574	248	--	269	17
1954	1,610[11]	1,610	1,387	86	837	727	1,348[11]	1,008	-340	--	0	0
1955	1,731	1,610	1,669	96	920	928	1,592	1,548	- 44	--	268	17
1956	1,650	1,610	1,385	84	894	1,161	1,500	1,607	107	--	334	21
1957	1,611	1,610	1,481	92	901	969	1,451	1,436	- 15	--	108	8
1958	1,612	1,610	1,516	94	1,026	1,197	1,652	1,814	162	--	383	21
1959	1,612	1,610	1,453	90	1,101	1,092	1,772	1,588	-184	--	246	15
1960	1,612	1,610	1,410	87	1,160	1,226	1,868	1,786	- 82	--	299	17
1961	1,612	1,610	1,429	89	1,205	1,220	1,940	1,743	-197	--	189	11
1962	1,613	1,610	1,423	88	1,250	1,273	2,012	1,811	-201	--	300	16

APPENDIX TABLE 9 (continued)

[1]Includes additional acreage for types of peanuts in short supply and/or required by legislation passed subsequent to establishment of the allotment.

[2]The 1941 allotment was declared the legal minimum except in 1950 when it was set at 2.1 million. The 1950 allotment was increased to 2.2 million in order to conform with subsequent legislation.

[3]In 1941, 1942, 1950 and 1951, producers could harvest without penalty peanuts from acreage in excess of their allotments if these peanuts were sold for crushing. Allowance has been made for substitution between quota and excess acreage peanuts.

[4]Not applicable.

[5]No penalties were imposed on peanuts from acreage in excess of allotments.

[6]Defined as peanuts grown on allotted acres.

[7]157 million pounds in 1941.

[8]The Department of Agriculture requested farmers to expand their acreage in order to provide peanuts for crushing.

[9]The 1943 quota and allotment were terminated because of the war and not reimposed until the 1948 crop. However, they were also terminated for the 1948 crop because of the need for oil.

[10]The law specified that the marketing quota for 1949 be equal to the 1943-1947 average production adjusted for trend and prospective demand conditions.

[11]Except for the minimum acreage required by law, the 1954 allotment would have been 1,546 thousand acres, based upon a marketing quota of 1,294 million pounds. The marketing quota was raised in order to obtain the minimum acreage allotment.

[12]The CCC was designated as the sole purchaser or farmers' stock peanuts in these years.

Source: Fats and Oils Situation, FOS-215, USDA, Washington, D. C., November 1962, p. 33.

APPENDIX TABLE 10

ESTIMATED NUMBER OF ACRES HARVESTED, NUMBER OF PEANUT COMBINES, NUMBER OF ACRES PER COMBINE AND PERCENTAGE OF TOTAL CROP HARVESTED BY COMBINE IN NORTH CAROLINA AND VIRGINIA

	North Carolina				Virginia			
Year	Number of Acres Harvested	Number of Combines	Acres per Combine	Percentage of Crop Harvested by Combine	Number of Acres Harvested	Number of Combines	Acres per Combine	Percentage of Crop Harvested by Combine
				Percent				Percent
1954	173,000	1	173,000	--	106,000	0	--	--
1955	188,000	3	62,667	--	116,000	0	--	--
1956	198,000	12	16,500	--	118,000	0	--	--
1957	180,000	30	6,000	--	106,000	7	15,143	1/2
1958	178,000	50	3,560	3	105,000	18	5,833	2
1959	178,000	100	1,780	6	104,000	29	3,586	5
1960	176,000	300	587	20	104,000	125	832	12
1961	176,000	450	391	30	104,000	240	433	25
1962	176,000	600	293	40	104,000	450	231	45
1963[a]	176,000	700	251	44	104,000	550	189	50
1965[a]	176,000	900	196	50	104,000	750	139	80
1970[a]	176,000	1,500	117	80	104,000	800	130	85

[a]It should be emphasized that the 1963-70 figures in all columns are only estimates and may not be accurate as outside conditions may speed up or slow down the combine adoption trend. However, assuming the continuance of the government acreage allotment program, the number of acres harvested should not vary much in Virginia and North Carolina from the figures of recent years (1960-62).

Source: Number of Combines and Percentage of Crop Harvested by Combine in North Carolina and Virginia obtained from Mr. Astor Perry, North Carolina Extension Service, Raleigh, North Carolina, and Mr. George Duke, Tidewater Research Station, Holland, Virginia. Acres of Peanuts Harvested obtained from Crop Production, Annual Summaries for 1954-62, USDA, Washington 25, D. C.

APPENDIX TABLE 11

MANUFACTURERS' SHIPMENTS OF PEANUT PICKERS AND THRESHERS, STATIONARY THRESHERS, CROP DRYING AND AERATION FANS AND INDUSTRY PRODUCTION OF PEANUT COMBINES AND PEANUT DIGGERS, SHAKERS, AND WINDROWERS: SELECTED YEARS

Year	(1) Peanut Pickers and Threshers	(2) Stationary Threshers	(3) Peanut Combines	(4) Peanut Diggers[b]	(5) Crop Drying and Aeration Fans[c]
	Thousands	Thousands			Thousands
1950	1.2	.3	N.A.	N.A.	.9
1951	1.3	.3	N.A.	N.A.	1.8
1952	.8	.2	N.A.	N.A.	2.7
1953	.7	.1	N.A.	N.A.	2.4
1954	1.0	.1	N.A.	N.A.	1.3
1955	.6	.3	860	959	4.2
1956	.4	.2	670	2,103	4.0
1957	.3	.1	N.A.	1,837	3.1
1958	.4[a] (368)	.4[a]	1,933	1,493	5.2
1959	.3	—[d]	N.A.	1,872	4.1
1960	N.A.	—[d]	1,363	1,284	3.8
1961	.02	—[d]	1,822	1,855	7.4
Averages					
1935-39	.8	5.3	--	--	--
1940-44	1.3	2.1	--	--	--
1945-49	1.7	1.2	--	--	--

Source: Columns (1), (2), (5) are for 1950-58 and three averages; Strickler, Paul E., and Hines, Charles A., Numbers of Selected Machines and Equipment on Farms, with related Data, Stat. Bulletin No. 258, USDA, ARS, Washington 25, D. C., p. 28, 1959-61 from following source.

Columns (3) and (4); Facts for Industry Series, Bureau of Census, Dept. of Commerce, Washington, D. C.

[a]The figure .4 is the combined figure for both Pickers and Threshers and Stationary Threshers. The Facts for Industry Series estimates 1958 industry production to be 368 for both pickers and stationary threshers, and that of these 368 units, only 270 were stationary threshers.

[b]Also includes shakers and windrowers.

[c]Includes both the stationary and portable type. This is the figure for total domestic use and not the number of dryers used in peanut production.

[d]This figure for 1959-61 combined with Peanut Pickers and Threshers in Column (1).

NOTE: N.A. indicates the figures are not available for release to the public since doing so would identify the production with the manufacturer in certain years of small production.

APPENDIX TABLE 12

NUMBER OF PEANUT FARMS, ACRES OF PEANUTS HARVESTED AND AVERAGE SIZE ALLOTMENT FOR SEVEN MAJOR PEANUT PRODUCING COUNTIES IN VIRGINIA, 1954 AND 1959

County	Number of Peanut Farms		Acres of Peanuts Harvested		Average Size of Peanut Allotment Per Farm	
	1959	1954	1959	1954	1959	1954
					Acres	Acres
Isle of Wight	587	808	13,588	15,378	23.15	19.03
Greenville	614	876	9,780	9,330	15.93	10.65
Nansemond	761	1,088	13,645	14,209	17.93	13.05
Prince George	247	348	3,882	3,860	15.72	11.09
Southampton	1,148	1,700	31,387	29,604	27.34	17.41
Surry	457	553	8,095	8,222	17.71	14.87
Sussex	649	897	14,058	14,303	21.66	15.95
Total	4,463	6,270	94,435	94,906	21.16	15.14

Source: Obtained from various tables in 1954 and 1959 Censuses of Agriculture. The average size of peanut allotment per farm was computed by this writer.

APPENDIX TABLE 13

PRICES PAID BY FARMERS FOR MOTOR VEHICLES, MACHINERY, AND LABOR AND PRICES RECEIVED FOR FARM PRODUCTS AND PEANUTS
(Index Numbers Based on 1910-14=100)

Year	Prices Paid by Farmers for Motor Vehicles	Prices Paid by Farmers for Farm Machinery	Prices Received by Farmers--All Farm Products	Prices Received by Farmers for Peanuts	Wage Rates for Hired Farm Labor
1910	--	100	104	94	96
1911	--	100	94	99	98
1912	--	100	99	103	101
1913	--	100	102	106	104
1914	--	100	101	99	101
1915	--	103	99	96	101
1916	--	108	119	113	112
1917	--	123	178	164	141
1918	--	155	206	153	177
1919	--	160	217	221	206
1920	--	166	211	110	241
1921	--	160	124	89	156
1922	--	143	131	127	154
1923	--	148	142	153	172
1924	141	155	143	136	182
1925	143	154	156	101	181
1926	140	154	145	117	183
1927	143	155	140	122	184
1928	145	154	148	115	184
1929	148	153	148	87	186
1930	144	152	125	82	177
1931	143	150	87	38	139
1932	141	142	65	35	104
1933	140	138	70	66	88
1934	148	144	90	77	99
1935	150	148	109	73	107
1936	157	150	114	87	114
1937	162	153	122	77	129
1938	172	158	97	77	130
1939	165	155	95	80	127

APPENDIX TABLE 13 (cont)

Year	Prices Paid by Farmers for Motor Vehicles	Prices Paid by Farmers for Farm Machinery	Prices Received by Farmers--All Farm Products	Prices Received by Farmers for Peanuts	Wage Rates for Hired Farm Labor
1940	163	153	100	77	129
1941	172	155	124	110	151
1942	186	164	159	143	197
1943	195	170	193	167	262
1944	211	174	197	188	318
1945	218	176	207	195	359
1946	224	182	236	214	387
1947	260	206	276	237	419
1948	291	240	287	246	442
1949	320	270	250	244	430
1950	320	277	258	256	425
1951	342	298	302	244	470
1952	358	308	288	256	503
1953	355	311	255	261	513
1954	355	312	246	286	510
1955	358	312	232	275	516
1956	367	326	230	263	536
1957	395	342	235	242	558
1958	412	357	250	249	574
1959	425	372	240	225	610
1960	420	382	237	235	634
1961	416	391	240	256	639
1962	433	398	242	261	662

Source: Strickler, Paul E., and Hines, Charles A., Numbers of Selected Machines and Equipment on Farms, with Related Data, Stat. Bul. No. 258, ARS and AMS, USDA, Washington, D. C., February 1960, p. 30, (for all columns except prices received by farmers for peanuts which was computed by thesis author based on USDA data). Figures for 1958-1962 were obtained from Agricultural Prices, AMS, USDA, Washington, D. C.

APPENDIX TABLE 14

SELECTED ITEMS OF FARM MACHINERY ON FARMS FOR THE MAJOR PEANUT PRODUCING STATES, VARIOUS YEARS[a]

	Va.	N.C.	Tenn.	S.C.	Ga.	Fla.	Ala.	Miss.	Ark.	Okla.	Tex.	N. Mex.
Tractors[b] (1,000)												
1945	21.8	30.7	23.5	12.1	24.0	11.4	16.8	20.5	26.3	69.5	161.2	10.6
1950	41.8	70.9	56.9	29.1	58.5	20.1	44.0	50.5	58.0	89.8	226.5	15.2
1954	64.7	120.2	84.9	44.7	85.1	31.8	62.5	79.6	79.8	102.1	268.5	16.8
1958	70.5	132.0	98.0	52.5	95.5	36.0	72.0	91.0	90.0	107.0	281.0	18.4
1959	72.0	133.0	99.0	53.0	96.5	36.7	72.8	92.0	91.0	109.0	284.0	19.0
Trucks (1,000)												
1945	32.0	32.9	26.3	15.3	34.7	21.6	23.9	28.3	33.1	44.4	89.3	11.9
1950	49.1	60.4	60.3	29.7	62.9	29.4	52.7	56.2	63.4	68.9	146.5	15.1
1954	58.9	86.3	73.0	40.4	77.5	37.2	65.4	77.6	77.4	86.5	189.7	19.9
1958	64.0	99.0	83.0	45.8	86.0	40.7	74.0	86.0	86.0	95.0	208.0	22.5
1959	65.0	101.5	85.5	46.5	87.5	41.5	75.5	89.0	88.0	98.0	214.0	23.5

[a]The estimated inventory for the various years is for January 1, except for the year 1954, when the estimate is for November.

[b]These figures do not include garden tractors.

Source: Strickler, Paul E., and Hines, Charles A., Numbers of Selected Machines and Equipment on Farms, with Related Data, Stat. Bul. No. 258, ARS and AMS, USDA, Washington 25, D.C., February, 1960, pp. 13, 15.

APPENDIX TABLE 15

YIELDS PER ACRE FOR RUNNER AND BUNCH TYPE PEANUTS FROM TWO DIFFERENT METHODS OF HARVESTING, 1957-1959

Year	Runner		Bunch	
	Stacked	Combined	Stacked	Combined
1957	3,032	3,064	3,385	3,242
1958	3,253	3,203	3,442	3,676
1959	2,343	2,649	2,539	2,766
Average	2,876	2,972	3,122	3,228
Difference		+96		+106

Source: Obtained from George Duke, USDA, ARS, Agricultural Engineer, Tidewater Research Station, Holland, Virginia, August 25, 1960.

APPENDIX TABLE 16

MAN-HOURS PER UNIT OF PRODUCTION AND RELATED FACTORS - U. S. AVERAGE BY FIVE YEARS PERIOD[a] [b]

	Peanuts			Tobacco			Cotton			Soybeans		
Years	Man-Hours Per Acre	Yield Pounds	Man-Hours Per 100 Pounds	Man-Hours Per Acre	Yield Pounds	Man-Hours Per 100 Pounds	Man-Hours Per Acre	Yield Pounds	Man-Hours Per Bale	Man-Hours Per Acre	Yield Bushels	Man-Hours Per 100 Bushels
1910-14	69.1	796	8.7	356	816	44	116	200.8	276	--	--	--
1915-19	68.0	741	9.2	353	803	44	105	167.8	299	--	--	--
1920-24	66.8	680	9.8	353	773	46	96	154.9	296	--	--	--
1925-29	67.1	733	9.2	370	772	48	96	171.1	268	15.9	12.6	126
1930-34	65.6	671	9.8	370	784	47	97	184.0	252	12.9	14.3	90
1935-39	66.4	741	9.0	415	886	47	99	226.1	209	11.8	18.5	64
1940-44	58.6	699	8.4	442	1,026	43	99	260.0	182	10.4	18.3	57
1945-49	44.4	685	6.5	460	1,176	39	83	273.1	146	8.0	19.6	41
1950-54	36.5	889	4.1	414	1,292	32	66	295.7	107	5.4	20.2	27
1955-58	29.4	1,075	2.7	378	1,359	28	67	418.6	77	4.7	22.4	21

	Grain Sorghum			Corn		
Years	Man-Hours Per Acre	Yield Bushels	Man-Hours Per 100 Bushels	Man-Hours Per Acre	Yield Bushels	Man-Hours Per 100 Bushels
1910-14	--	--	--	35.2	26.0	135
1915-19	--	--	--	34.1	25.9	132
1920-24	18.2	17.6	103	32.5	27.3	119
1925-29	17.5	16.8	104	30.1	26.4	114
1930-34	13.6	13.1	104	28.1	22.1	127
1935-39	12.9	12.8	101	27.9	25.0	122
1940-44	11.8	17.7	67	25.4	32.0	79
1945-49	8.2	17.8	40	19.3	35.7	54
1950-54	5.8	19.9	29	13.5	38.5	35
1955-58	5.3	27.8	19	10.5	46.2	23

[a]Man-hours per acre harvested, including preharvest work on acreages abandoned, grazed and turned under.

[b]Per acre planted and harvested. Units for the various crops are as follows: Cotton, 500# = 1 bale; Grain Sorghum, 56# = 1 bushel; Corn, 56# = 1 bushel shelled; and soybeans, 60# = 1 bushel.

Source: Data for early periods chiefly from Hecht, Reuben W., and Vice, Keith, R., Labor Used for Field Crops, Stat. Bul. No. 144, ARS, USDA, Washington 25, D. C., June, 1954, pp. 4-5. Data for recent periods are unpublished estimates of FERD, ARS.

APPENDIX TABLE 17

AVERAGE FARM WAGE RATES PER HOUR, WITHOUT BOARD OR ROOM, FOR SELECTED PEANUT STATES AND UNITED STATES, AND AVERAGE HOURLY EARNINGS OF FACTORY WORKERS IN THE UNITED STATES[a] [b]
(Measured in Dollars per Hour)

	Farm Wage Rate													Factory Hourly
Year	Va.	N.C.	S.C.	Ga.	Fla.	Tenn.	Ala.	Miss.	Ark.	Okla.	Tex.	N. Mex.	U.S.	Earnings: U.S.
1940	.15	.12	.09	.09	.13	.10	.09	.10	.11	.14	.13	.17	.16	.655
1941	.18	.14	.10	.10	.14	.12	.11	.11	.13	.18	.17	.20	.20	.726
1942	.22	.18	.12	.13	.19	.16	.14	.14	.18	.24	.22	.26	.26	.851
1943	.27	.23	.16	.17	.26	.20	.19	.19	.23	.32	.30	.34	.33	.957
1944	.32	.28	.19	.22	.34	.23	.23	.25	.28	.40	.38	.42	.40	1.011
1945	.35	.33	.22	.25	.40	.26	.26	.27	.31	.47	.42	.46	.44	1.016
1946	.41	.37	.27	.30	.42	.29	.29	.30	.36	.48	.44	.46	.48	1.075
1947	.44	.41	.29	.32	.44	.32	.32	.33	.39	.51	.47	.53	.51	1.217
1948	.57	.54	.46	.49	.55	.50	.47	.48	.52	.71	.59	.70	.73	1.328
1949	.55	.48	.38	.42	.54	.44	.40	.42	.47	.69	.59	.67	.68	1.378
1950	.56	.49	.38	.46	.57	.45	.44	.43	.47	.68	.60	.66	.69	1.440
1951	.62	.54	.43	.51	.63	.51	.50	.50	.53	.77	.66	.73	.77	1.560
1952	.68	.58	.45	.53	.67	.53	.51	.51	.57	.80	.73	.76	.81	1.650
1953	.67	.59	.46	.54	.71	.52	.53	.53	.57	.82	.70	.79	.82	1.740
1954	.66	.59	.45	.53	.72	.50	.50	.47	.56	.81	.68	.72	.81	1.780
1955	.68	.60	.47	.56	.71	.52	.53	.52	.57	.81	.72	.77	.82	1.860
1956	.73	.66	.48	.61	.76	.56	.59	.54	.64	.86	.72	.79	.86	1.950
1957	.76	.68	.49	.61	.77	.59	.55	.55	.66	.88	.75	.82	.88	2.050
1958	.77	.65	.48	.61	.77	.60	.57	.56	.66	.91	.77	.80	.92	2.110
1959	.79	.70	.50	.63	.78	.63	.60	.55	.71	.94	.80	.81	.95	2.190
1960	.81	.70	.51	.66	.81	.63	.60	.52	.73	.97	.78	.85	.97	2.260
1961	.84	.72	.53	.67	.86	.65	.61	.53	.73	1.01	.80	.87	.99	2.330
1962	.85	.75	.55	.69	.85	.67	.63	.59	.77	1.02	.83	.89	1.01	2.380

[a]These data are not deflated.

[b]Annual summaries by State for Wage Rates Per Hour were <u>not</u> published prior to 1948. I have taken daily wage rates for the years 1940-47 and divided by 10 hours per day. Thus, the two series of data 1940-47 and 1948-62 are not compatible since a 10-hour day was not necessarily the base for the earlier period.

Source: For wage rates, <u>Farm Labor</u> (Annual Summaries usually in January issue each year), USDA, Washington 25, D. C.

Source: For Factory Hourly Earnings, U. S. data from <u>Farm Income Situation</u>, AMS, USDA, Washington, D. C., July, 1962.

APPENDIX TABLE 18

VIRGINIA NON-AGRICULTURAL EMPLOYMENT, 1939-1962 (1,000 EMPLOYEES), ANNUAL AVERAGE AND MONTHLY AVERAGE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Averages
1939	508.2	510.9	518.5	503.9	510.9	527.8	529.8	542.6	561.3	566.3	561.4	557.0	533.3
1940	533.0	537.8	545.0	543.0	541.8	555.5	553.1	569.4	587.7	605.2	610.2	621.5	567.0
1941	625.6	635.2	631.6	626.4	648.6	661.0	676.0	691.3	707.1	717.0	711.9	709.6	670.2
1942	701.0	717.7	737.6	759.9	774.8	785.1	793.8	805.4	819.6	819.2	814.0	805.4	777.8
1943	788.5	795.7	799.3	797.6	790.4	781.5	779.4	775.4	773.3	767.4	760.9	758.7	780.7
1944	743.6	746.2	744.7	739.9	736.1	738.7	742.9	744.0	745.8	739.4	735.4	740.7	741.6
1945	726.7	731.6	737.7	733.6	729.8	727.8	724.8	716.9	706.7	698.5	702.0	714.1	720.8
1946	710.3	712.4	726.6	716.9	723.8	733.7	733.1	745.0	757.7	757.0	762.6	768.9	737.4
1947	758.6	753.9	758.1	746.3	760.9	761.4	754.9	760.6	772.1	775.1	780.9	786.9	764.1
1948	764.7	757.1	768.3	758.3	767.6	773.0	776.6	781.0	794.3	795.7	794.3	798.6	777.6
1949	767.0	760.1	759.7	765.5	759.9	762.0	754.7	761.3	778.7	759.7	776.0	788.4	766.1
1950	759.0	739.3	759.2	778.2	781.1	790.3	793.9	807.5	822.7	832.8	832.4	850.2	795.6
1951	826.8	831.9	843.2	840.3	847.4	858.4	856.3	865.2	877.0	881.9	883.6	894.2	858.9
1952	865.7	864.8	868.0	877.8	878.2	882.5	881.7	892.5	894.5	895.1	898.7	915.0	884.5
1953	879.0	876.3	881.3	884.5	883.5	889.7	887.1	889.7	896.8	895.1	888.4	896.1	887.3
1954	858.2	853.4	852.7	855.9	855.3	859.4	856.7	861.0	871.0	876.4	877.0	888.2	863.8
1955	860.9	860.4	869.9	882.2	885.5	896.2	895.7	901.0	918.2	920.9	922.3	930.6	895.3
1956	906.5	909.6	914.9	929.5	939.7	945.9	941.6	947.2	958.7	958.0	956.7	964.4	939.4
1957	935.9	932.4	941.4	954.0	957.7	962.9	957.7	965.4	971.4	971.1	968.6	974.2	957.7
1958	942.5	930.0	937.3	942.9	947.1	953.2	948.9	956.8	971.9	980.5	977.2	983.2	956.0
1959	956.2	958.9	968.5	979.7	986.1	995.8	991.4	996.9	1009.8	1013.8	1013.6	1021.5	991.0
1960	1030.0	995.9	988.9	1015.8	1018.6	1021.4	1014.0	1014.2	1021.7	1032.3	1031.9	1030.9	1019.6
1961	1000.6	986.7	1001.6	1015.1	1022.8	1033.1	1027.7	1037.4	1054.1	1068.6	1071.8	1076.9	1033.0
1962	1034.6	1032.9	1037.4	1053.1	1060.6	1069.9	1062.3	1074.9	1103.3	1106.9	1106.7	1109.0	1071.0

Source: Virginia Trends in Employment, Virginia State Department of Labor and Industry, Richmond, Virginia.

APPENDIX TABLE 19

WORKERS ON FARMS, SELECTED PEANUT STATES, BY HIRED AND FAMILY WORKERS, 1950-62
(Annual Averages of 12 Monthly Survey Weeks)

Year	Va.	N.C.	S.C.	Ga.	Ala.	Fla.	Miss.	Okla.	Tex.	N. Mex.	Total
						Hired Workers 1,000					
1950	69	105	75	69	41	43	78	50	191	27	748
1951	64	103	73	66	40	46	70	46	179	24	711
1952	63	100	69	66	40	48	71	43	159	27	686
1953	59	100	66	62	42	51	73	42	161	23	679
1954	60	106	59	59	41	63	70	36	165	19	678
1955	58	105	66	58	42	64	67	37	168	21	686
1956	55	106	67	57	38	63	66	33	152	20	657
1957	54	107	66	52	34	74	63	28	163	19	660
1958	59	109	67	52	35	76	63	35	154	20	668
1959	56	108	66	54	39	77	70	33	162	20	685
1960	54	103	63	49	37	75	64	31	165	18	659
1961	54	108	67	48	36	75	70	33	177	16	684
1962	50	102	61	45	35	78	65	30	172	15	653
						Family Workers 1,000					
1950	214	485	216	251	236	64	381	205	392	29	2473
1951	200	477	204	233	213	59	354	201	388	32	2361
1952	195	458	189	215	196	58	318	192	356	29	2206
1953	183	432	182	198	182	57	300	189	348	29	2100
1954	180	424	171	189	170	56	284	171	339	28	2012
1955	174	414	169	176	158	55	273	161	323	26	1929
1956	161	370	155	155	138	55	257	150	293	27	1761
1957	156	348	150	156	133	56	231	138	281	24	1673
1958	146	329	137	145	129	96	211	134	275	24	1526
1959	133	328	135	143	126	50	196	132	269	22	1534
1960	134	315	125	134	117	46	175	125	258	22	1451
1961	134	307	123	125	110	46	159	123	247	21	1395
1962	127	295	117	115	103	44	160	119	243	21	1344

Sources: 1950-1953 USDA Statistical Bul. 236, Farm Employment, Tables 30, 31.
1954-1958 Revised Estimates - publication pending.
1959-1962 Farm Labor, March 11, 1963.

These data were provided to this writer by the Agricultural Estimates Division, Statistical Reporting Service, USDA, on April 3, 1963.

APPENDIX TABLE 20

LABOR USED ON FARMS, UNITED STATES, 1940-1962

Year	Farm Employment			Percentage Hired
	Total[a]	Family[a]	Hired	
	Thousands	Thousands	Thousands	Percent
1940	10,979	8,300	2,679	24.4
1941	10,669	8,017	2,652	24.8
1942	10,504	7,949	2,555	24.3
1943	10,446	8,010	2,436	23.3
1944	10,219	7,988	2,231	21.8
1945	10,000	7,881	2,119	21.2
1946	10,295	8,106	2,189	21.3
1947	10,382	8,115	2,267	21.8
1948	10,363	8,026	2,337	22.6
1949	9,964	7,712	2,252	22.6
1950	9,926	7,597	2,329	23.5
1951	9,546	7,310	2,236	23.4
1952	9,149	7,005	2,144	23.4
1953	8,864	6,775	2,089	23.6
1954	8,639	6,579	2,060	23.8
1955	8,364	6,347	2,017	24.1
1956	7,820	5,899	1,921	24.6
1957	7,577	5,682	1,895	25.0
1958	7,525	5,570	1,955	26.0
1959	7,356	5,390	1,966	26.7
1960	7,069	5,172	1,897	26.8
1961	6,928	5,029	1,899	27.4
1962	6,707	4,873	1,834	27.3

Source: The Farm Cost Situation, ERS, USDA, Washington 25, D. C., November 1961, p. 8 for 1940-1958. Farm Labor, SRS, USDA, Washington 25, D.C., February 11, 1963, for 1959-1962. The percentage that hired is of the total was computed by this writer.

[a]Includes farm operators and members of their families.

APPENDIX TABLE 21

TOTAL ACRES OF PEANUTS HARVESTED FOR NUTS, PERCENT OF TOTAL ACRES HARVESTED BY COMBINE, AND ACREAGE HARVESTED BY COMBINE IN THE PEANUT STATES, 1962

State	Total Acres Harvested	Percent Harvested by Combine	Acres Harvested by Combine
Virginia	104,000	45	46,800
North Carolina	176,000	40	70,400
South Carolina	11,000	50	5,500
Georgia	472,000	99	467,280
Florida	48,000	90	43,200
Alabama	195,000	60	117,000
Mississippi	5,000	50	2,500
Oklahoma	115,000	100	115,000
Texas	278,000	100	278,000
New Mexico	7,500	100	7,500
Total	1,411,500	82	1,153,180

Source: Acreage harvested figures from Crop Production, July, 1963, Statistical Reporting Service, USDA, Washington 25, D. C., p. 69. Estimates of combined acreages for Va., N. C., Ga., Okla., and Texas are estimates by informed observers in these states. Estimates for S. C., Fla., Ala., Miss., and New Mexico are my estimates and may not be highly accurate. However, these latter states have small acreages so any errors will not affect the analysis to any extent.

APPENDIX TABLE 22

Department of Agriculture
Washington, D. C.
February 12, 1934

Hon. Harry F. Byrd
United States Senate

Dear Senator Byrd:

This will acknowledge your letter of February 3 with reference to the question of handling peanuts as a basic commodity in the Agricultural Adjustment Act.

As you know, we have in operation at the present time a marketing agreement for peanut millers under the management of a control board consisting of 5 peanut growers and 5 peanut millers. This board met in Washington on February 5 of this week, and passed a resolution requesting that peanuts be designated as a basic commodity in order that Agricultural Adjustment Administration may have broad powers in dealing with the problem of controlling peanut production in 1934.

In view of the rather large areas suitable for peanut production, and in view of the reduction in cotton and tobacco acreage now being effected in the present peanut-producing areas, we recognize that it will be necessary to take definite steps to discourage undue expansion in peanut acreage in 1934. We believe also that the designation of peanuts as a basic agricultural commodity will give the Agricultural Adjustment Administration more latitude in dealing adequately with this problem.

If you feel, therefore, that the peanut producers are prepared to support a program of production control, I can assure you that the Agricultural Adjustment Administration will make every effort to utilize its facilities in the administration of a program designed to control peanut production and improve the income of peanut producers.

Sincerely,

H. A. Wallace
Secretary

(Quoted from Congressional Record-Senate, March 8, 1934, pp. 3972-3973, 73rd Congress, 2nd Session.)

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