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THE BEHAVIOR OF PRODUCTION, PRICES AND PRODUCTIVITY IN PHILIPPINE AGRICULTURE 1949-1964

by

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INTRODUCTION

This paper is an effort to assemble and analyze the production data of Philippine agriculture, principally for the post-World War II period. The major body of data presented here consists of estimates of agricultural production valued in both current and constant (1955) prices. These production data have been put together in a form which is useful for a wide variety of analyses. Since they constitute a record not elsewhere available for the Philippines, they are presented separately in Part I with considerable detail and explanation of the methods used in their construction. In Part II, the development of Philippine agriculture in the post-war period is analyzed. In this part data on land and labor are utilized with the production data to examine the behavior of agricultural productivity. Price behavior is also examined.

I. PHILIPPINE AGRICULTURAL PRODUCTION IN A DUALISTIC NATIONAL INCOME ACCOUNTING FRAMEWORK

The work on which this paper is based was an outgrowth of the need for certain data on agriculture to be used in a broader study of the Philippine economy undertaken by the Center for Development Planning. This broad study has been conducted within a national income accounting framework for open,

dualistic economies which has been developed by Douglas Paauw and John C. H. Fei.[1] Since the accounting framework defines the data needs for which much of the work of this paper was performed, it will be helpful to begin with a discussion of the role of agriculture in the framework.[2]

Within the national income accounting framework, all productive activities of the economy, excluding the government, are classified as agriculture or industry. Thus, for the framework the terms agriculture and industry are used very broadly. The dividing line between the two sectors has been drawn in terms of the nature of the product. All products which are organic products of the natural resources of the country and which have not had their organic nature materially changed are considered agricultural products. The activities required

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[1]The national income accounting framework has been described in several recent papers. Most relevant to the discussion here are Douglas S. Paauw, "A National Income Accounting Framework for the Open Dualistic Economy," (Field Work Report #1; Washington: National Planning Association, Center for Development Planning, June 1966); and John C. H. Fei and Douglas S. Paauw, "Analysis of the Open Dualistic Economy: An Application to the Philippines," (Field Work Report #9; Washington: National Planning Association, Center for Development Planning, August 1966).

[2]Much of the discussion which follows was taken from Douglas S. Paauw and Joseph L. Tryon, "Agriculture--Industry Interrelationships in an Open Dualistic Economy: The Philippines," in Growth of Output in the Philippines, papers presented at a conference at the International Rice Research Institute, Los Banos, Philippines, December 9-10, 1966.

to produce them are classified as agricultural activities. All other non-governmental activities are classified as industrial.

The phrase organic product is used here to mean anything derived from living organisms, animal or plant. Agriculture defined to include the production of all such products thus includes not only the growing of crops, raising of livestock, and similar farming activities, but also forestry, hunting and trapping, and fishing. The definition of agriculture is, therefore, essentially the same as that in Division O of the ISIC, Agriculture, Forestry, Hunting and Fishing.[3] Industry includes everything else except government, and in ISIC terms would be the remaining major divisions, 1 through 9, excluding government activities.

The criterion used to divide agriculture from industry leads to one consequence which can be important for some types of analysis. The division depends on the state of organic products and not their location. There are some processing operations which significantly change the nature of agricultural products, but which take place in rural areas. These activities are industrial and not agricultural even though they are physically performed in the rural sector. Sugarcane milling is a good example of such a process. Despite the close proximity of milling to cane growing, and the technical need to organize the cutting, crushing, and milling as a continuous process, the industrial processing is

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[3]United Nations, Statistical Office of the United Nations, International Standard Industrial Classification of All Economic Activities (New York: United Nations, 1958).

considered to start at the point when the cane is delivered to the sugar mill.

Unfortunately, determining the line between agriculture and industry is not always as easy as in the sugar case, and arbitrary choices must be made. For example, rice milling is classified as industrial, while hand pounding of rice, which is essentially for the same purpose, is classified as agricultural.

Figure 1 shows the agricultural production sector as it appears in the accounting framework.[4] The diagram is part of a circular flow system for a complete economy. As in any circular flow system, money payments flow in one direction and real goods, services, and factor inputs flow in the opposite direction. In Figure 1, the arrows point in the direction of money payments.

As a general proposition, the output of any sector must be equal to the sum of its inputs, including goods and services purchased outside the sector. Thus, in Figure 1, the payments at the top, representing inputs, must equal the payments at the bottom, representing outputs, and both the sum of inputs and the sum of outputs are equal to the gross value of agricultural output.

Only two kinds of inputs to agriculture have been distinguished in this study. They are shown as outpayments from the top of the juncture in Figure 1. From left to right, the two outpayments are:

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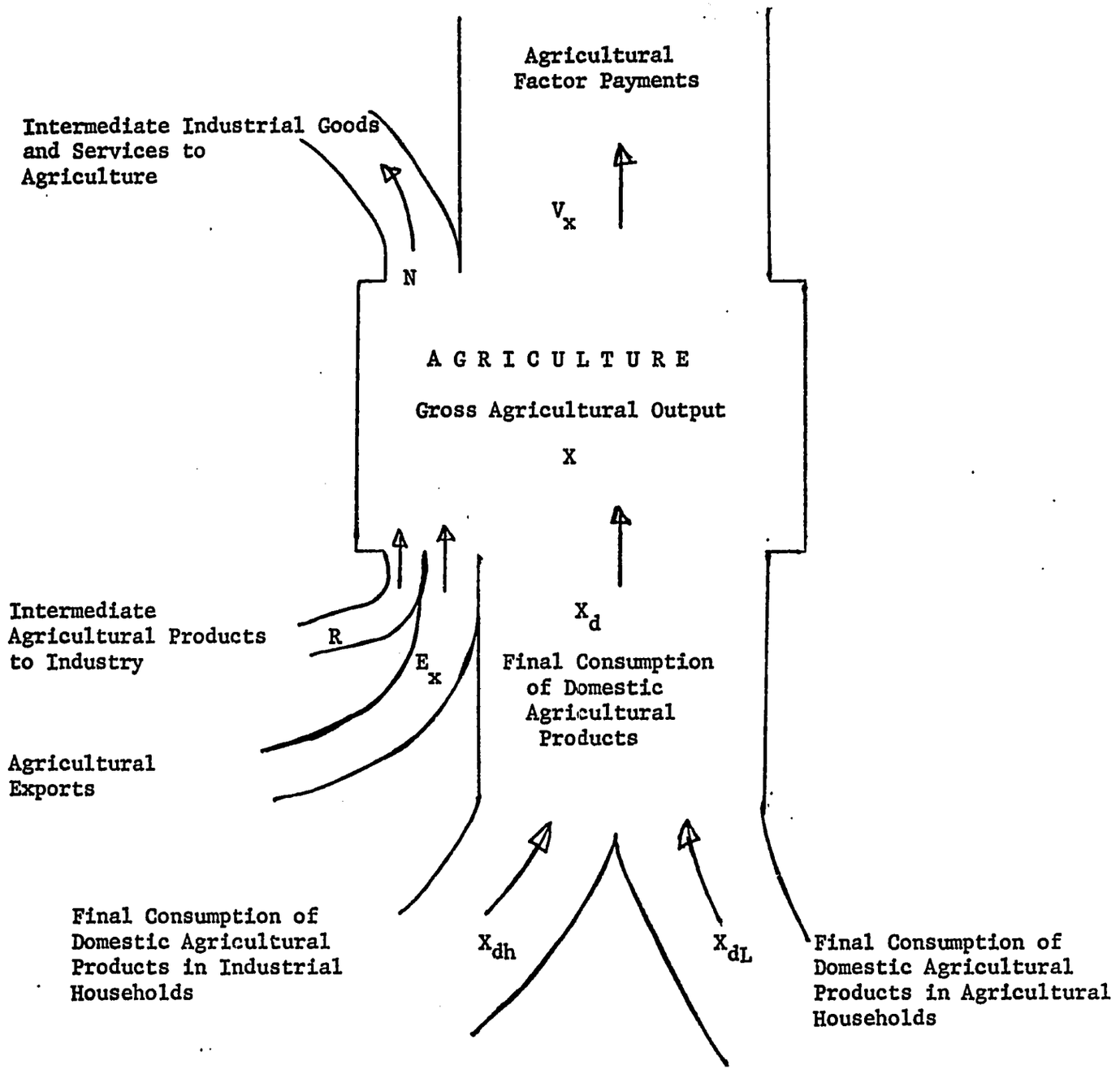
[4]The letter symbols used here to identify the flows are the same as those of the framework.

FIGURE 1

The Agricultural Production Sector



Note: Arrows point in the direction of money payments; real flows are in the direction opposite to arrows.

(1) N: Intermediate industrial goods and services purchased by agriculture. N has two components: goods used as current inputs to agriculture, and the minor processing, storage, transportation, and marketing costs of agricultural products moved off the farm (or other point of origin).

(2) V_X: The payments to factors of production used in agriculture, representing the value added within the sector. For some purposes, it is desirable to break this flow into wages, profits, depreciation, etc., but in the present study value added is left as a single flow.

The industrial goods used as inputs into agriculture consist almost entirely of fertilizers and chemicals for disease and pest control. Other industrial inputs that are used within agriculture are principally fuel, electricity, and supplies such as sacks, twine, etc. Potentially, these items may be important, but at present they are very small relative to the agro-chemical inputs. The agriculture sector also purchases farm machinery and other equipment from industry, but these are investment goods and belong elsewhere in the framework. They do not belong here as a separate flow because the depreciation which covers their cost in current production is included in V_X, payments to factors of production.

Disposition of agricultural output has been divided into four flows, shown entering the lower part of the juncture in Figure 1. Reading again from left to right in the diagram, the four inpayments are:

(1) R: Payments for agricultural goods flowing to industry as raw

materials, i.e., as intermediate goods from agriculture to industry. R includes such products as logs for domestically produced plywood and veneer, and the share of corn going to starch mills.

(2) E_x: Payments for exports of agricultural goods requiring only limited processing before export. E_x includes products like logs, copra, abaca, and ramie which are exported without further processing. It will exclude the raw materials which go into industry for processing before export such as the share of copra output used to produce exported coconut oil, and logs used to produce exported plywood. These latter are part of R and are subsequently included in the value of exports of the industrial sector.

(3) and (4) X_{dh} and X_{dL}: Payments for the parts of agricultural output going respectively to industrial households and agricultural households as final consumption. These two add up to X_d, final consumption of domestically produced agricultural products. Both X_{dh} and X_{dL} are principally food products. Most of the non-food agricultural products require enough processing to change their classification to industrial products in their final form, and hence, they leave agriculture as intermediate goods flows to industry rather than as final consumption.

Three other dispositions of agricultural output are possible, but they are not estimated explicitly in this study. They are (1) the increase in stocks of agricultural products, (2) the purchase of agricultural products by the government,

and (3) the use of agricultural products as an input to agriculture itself.

Separate estimates of stock changes are currently not possible because of lack of data. The would be highly desirable because it is clear that for some products stock changes were a significant use of production. Furthermore, in some years, drawdowns of stocks made actual consumption of some products larger than observed production.

An investigation of government purchases of agricultural products showed that most of such products require enough processing to make them properly classified as industrial when they are purchased by the government sector. The remainder would be impossible to estimate with currently available data. Fortunately, this remainder is neglibible.

Finally, the use of agricultural products as inputs to agriculture was also found to be negligible. The principal component of this flow is seed and for most crops the seed comprises roughly 1 percent of total cost. Given its small magnitude, this flow was omitted from this study.

With the agricultural sector having been defined for purposes of the accounting framework, a comment on the notion of agricultural output is in order. At least three useful definitions of agricultural output can be proposed, and the one which an analyst chooses will, of course, depend on the problem at hand. The first is simply value added in agriculture, i.e., V_x in Figure 1. The second is the gross value of agricultural products at the point of production. This would

be value added in agriculture plus purchased inputs used at the point of production. In Figure 1 it would be equal to V_x plus that part of N, inputs purchased from industry, that is utilized at the point of production. In the case of the Philippines, the industrial inputs utilized on the farm are principally fertilizer and insecticides. The third definition would be gross value of agricultural products in the hands of the user. This would be value added in agriculture, plus purchased inputs utilized at the point of production, plus inputs utilized to process and market the product. In the diagram this third definition would correspond to V_x plus all of N.

For purposes of the accounting framework, the third definition of output is the appropriate one. The framework is designed in part to account for the disposition of products classified either as industrial or agricultural. From the user's viewpoint, when he purchases a product, he buys the processing and marketing as part of the purchase. If the second definition (value at point of production) were used, a user's purchase of a product would imply a separate purchase of the processing and marketing. In terms of the framework a separate flow of processing and marketing services from the industry sector to each user would be required. The third definition, the one used here, implies that agricultural producers purchase the processing and marketing services and utilize them to distribute their product. Obviously this treatment is not literally correct either. However, alternatives that might be more realistic, such as having a separate processing and marketing sector, would only unnecessarily complicate the framework.

The third definition, of the three which might have been used for the framework, seems most closely to represent the actual working of the economy and was therefore chosen. If the reader would like to use either of the other definitions of production, the data are presented so that he may easily do so.

The Estimates of Agricultural Inputs and Outputs

Before presenting the estimates of the flows depicted in Figure 1, a brief description of the way in which these estimates were obtained will be helpful.

For each of 40 agricultural products, the following steps were carried out:[5] (1) The value of output in both current and 1955 prices was estimated at point of production. Point of production in this context means on the farm for crops, livestock, and poultry; in the forest for logs; and at point of landing for fish. (2) The output was allocated among four uses: for use by industry as raw materials, for export with only minor processing, for final consumption in industry households, and for final consumption in agricultural households. These four catagories match the four flows at the bottom of Figure 1. (3) Estimates were made of

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[5] The methods of estimation were not identical for all 40 series. The summary given in the text simply shows the general strategy used. Detailed descriptions of the method used for each product and a discussion of the problems encountered are given in the appendix. The 40 products include all agricultural products of any importance except tobacco. As explained in the appendix, tobacco presented a number of problems which made it desirable to omit it from the study entirely. The original data which are available for tobacco are included in the tables of Appendix B.

marketing and processing costs for each end use of each product. These costs represent the difference between value at the point of production and at point of use. They will be referred to here as the marketing-processing margin. Addition of the appropriate marketing-processing margin to the various output series at point of production gives production valued at point of use.

Given the estimates of production and marketing-processing margins for individual products, the following flows were obtained directly by aggregation: Value of agricultural output at point of production; value of output at point of use (X); agricultural products used as raw materials by industry (E); agricultural products exported with only minor processing (E_x); agricultural products consumed by industrial households (X_{dh}); and agricultural products consumed by agricultural households (X_{dI}).

On the input side, as noted above, the processing-marketing input was estimated for each product. To the aggregate of these processing-marketing margins was added an estimate of industrial inputs utilized at point of production,[6] giving total intermediate inputs from industry (N). The payments to agricultural

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[6]The principal industrial inputs used in agricultural production are fertilizer and insecticides. No way of allocating the use of these inputs to individual crops is available for the entire period of the study. Estimates of fertilizer use for individual crops are available for the year 1964. See Esso Standard Fertilizer and Agricultural Chemical Co. (Philippines), "Fertilizer: Its Importance in the Development of Philippine Agriculture," (Manila, 1965).

factors of production, i.e., value added in agriculture, V_X, can then be found by subtraction of N from X.

It should be noted that while some estimates which are presented here are conceptually the same as official series published by various Philippine Government agencies, there are significant differences between several of the series presented in this paper and the official ones. This is particularly true of the value added in agriculture as calculated here and in the official national income accounts. Value added in agriculture is generally lower in the estimates presented here than in the national income accounts, but the growth rate is significantly higher. These differences can be of considerable importance for some purposes. For this reason, following the presentation of the basic data tables of this study, a section of the paper is devoted to comparison of certain of the estimates presented in this study and their official counterparts. For the value added series a fairly complete reconciliation is given. This is accompanied by an alternative set of estimates of certain of the flows depicted in Figure 1 which are consistent with the official national income accounts.

Tables 1 through 8 are presented at this point. These tables include the various flows which have been described above, both in current prices and 1955 prices. In addition to the flows for the agricultural sector, in Tables 1 through 6, the individual production series are presented in Tables 7 and 8.

TABLE 1

Output of Agricultural Products in Current Prices*
(million pesos)

Crop Year	Value at Point of Production									Marketing and Processing	Total Valued at Point of Use(X)
	Crops		Fisheries		Forestry		Livestock & Poultry		Total		
	(1)		(2)		(3)		(4)		(5)	(6)	(7)
	₱	%	₱	%	₱	%	₱	%	₱	₱	₱
1949	1377	71.2	297	15.4	116	6.0	144	7.4	1933	666	2530
1950	1498	74.9	215	10.8	122	6.1	165	8.2	1999	675	2674
1951	1583	72.5	283	13.0	122	5.6	194	8.9	2183	778	2960
1952	1528	69.8	298	13.6	126	5.8	237	10.8	2188	773	2961
1953	1499	68.6	295	13.5	136	6.2	256	11.7	2185	798	2984
1954	1422	69.3	299	14.5	140	6.8	192	9.4	2052	768	2820
1955	1374	67.4	322	15.8	133	6.5	210	10.3	2039	745	2785
1956	1469	66.3	349	15.7	153	6.9	245	11.1	2216	839	3054
1957	1536	65.6	366	15.6	188	8.0	252	10.8	2341	932	3274
1958	1635	63.3	406	16.2	194	7.7	269	10.8	2504	999	3503
1959	1774	65.6	451	16.7	220	8.1	261	9.6	2705	1051	3756
1960	1839	65.0	464	16.4	247	8.7	279	9.9	2830	1051	3881
1961	2030	66.2	471	15.4	253	8.2	312	10.2	3066	1103	4168
1962	2339	66.7	541	15.4	323	9.2	304	8.7	3508	1329	4836
1963	2754	64.2	665	15.5	547	12.7	325	7.6	4291	1627	5917
1964	3072	64.3	785	16.4	581	12.2	341	7.1	4779	1819	6598

*Detail may not add to total due to rounding.

TABLE 2

Output of Agricultural Products in 1955 Prices*
(million pesos)

Crop Year	Valued at Point of Production									Marketing and Processing	Total Valued at Point of Use(X)
	Crops		Fisheries		Forestry		Livestock & Poultry		Total		
	(1)		(2)		(3)		(4)		(5)	(6)	(7)
	₱	%	₱	%	₱	%	₱	%	₱	₱	₱
1949	948	67.6	215	15.3	111	7.9	128	9.1	1402	476	1878
1950	1028	69.1	201	13.5	118	7.9	142	9.5	1488	510	1998
1951	1104	67.2	267	16.2	121	7.4	153	9.3	1644	563	2207
1952	1181	67.2	282	16.1	125	7.1	168	9.6	1757	620	2377
1953	1264	68.2	276	14.9	128	6.9	186	10.0	1854	677	2531
1954	1356	68.2	305	15.3	134	6.7	194	9.8	1989	734	2723
1955	1374	67.3	322	15.8	134	6.6	212	10.4	2042	747	2789
1956	1453	66.6	351	16.1	142	6.5	237	10.8	2183	806	2989
1957	1467	65.3	349	15.5	181	8.0	252	11.2	2248	842	3090
1958	1438	63.1	387	17.0	194	8.5	260	11.4	2279	868	3146
1959	1523	63.6	395	16.5	220	9.2	258	10.8	2396	919	3315
1960	1611	64.4	402	16.1	220	8.8	266	10.6	2500	947	3448
1961	1601	64.7	411	16.6	217	8.8	245	9.9	2474	890	3364
1962	1771	66.0	433	16.1	238	8.9	244	9.1	2685	984	3669
1963	1863	64.8	478	16.6	292	10.2	240	8.4	2874	1083	3957
1964	1882	63.9	519	17.6	297	10.1	246	8.4	2945	1078	4022

*Detail may not add to total due to rounding.

TABLE 3

Gross Agricultural Output (X) in Current Prices, by Demand Use
(in million pesos and percent of total)

Year	Exports (E_x) (1)		Intermediate goods to Industry (R) (2)		Final Consumption in Agriculture (X_{dL}) (3)		Final Consumption in Industry (X_{dh}) (4)		Total (5)
	₱	%	₱	%	₱	%	₱	%	₱
1949	447	17.2	249	9.6	1139	43.9	759	29.3	2594
1950	576	21.4	252	9.4	1086	40.3	777	28.9	2691
1951	705	23.8	239	8.1	1170	39.6	843	28.5	2957
1952	565	19.1	252	8.5	1220	41.1	927	31.3	2964
1953	654	21.9	262	8.8	1150	38.5	921	30.8	2987
1954	627	22.3	244	8.7	1092	38.8	850	30.2	2813
1955	600	21.5	233	8.4	1096	39.3	859	30.8	2788
1956	704	23.0	269	8.8	1159	37.8	933	30.4	3065
1957	749	24.4	320	10.4	1213	39.6	996	32.5	3278
1958	831	23.9	355	10.2	1249	35.9	1043	30.0	3478
1959	868	23.1	368	9.8	1379	36.8	1137	30.3	3752
1960	930	23.9	364	9.4	1416	36.5	1173	30.2	3883
1961	918	22.1	399	9.6	1575	38.0	1255	30.3	4147
1962	1245	25.8	480	10.0	1717	35.6	1379	28.6	4821
1963	1844	31.1	610	10.3	1917	32.4	1550	26.2	5921
1964	1894	28.8	731	11.1	2235	33.9	1725	26.2	6585

TABLE 4

Gross Agricultural Output (X) in Constant (1955) Prices,
by Demand Use
(in million pesos and percent of total)

Year	Exports (E_x) (1)		Intermediate goods to Industry (R) (2)		Final Consumption in Agriculture (X_{dL}) (3)		Final Consumption in Industry (X_{dh}) (4)		Total (5)
	₱	%	₱	%	₱	%	₱	%	₱
1949	337	18.0	224	12.0	775	41.4	535	28.6	1871
1950	426	21.3	230	11.5	785	39.2	560	28.0	2001
1951	502	22.8	213	9.7	873	39.7	611	27.8	2199
1952	508	23.1	237	10.8	945	42.9	687	31.2	2377
1953	504	22.9	220	10.0	1017	46.2	788	35.9	2529
1954	558	20.6	232	8.5	1085	40.0	840	30.9	2715
1955	602	21.6	233	8.3	1097	39.3	860	30.8	2792
1956	684	24.5	252	9.0	1147	41.1	916	32.8	2999
1957	664	21.5	291	9.4	1169	37.9	959	31.1	3083
1958	648	20.8	308	9.9	1178	37.8	984	31.6	3118
1959	644	19.5	299	9.1	1283	38.9	1074	32.5	3300
1960	722	21.0	295	8.6	1314	38.2	1110	32.2	3441
1961	667	19.9	311	9.3	1317	39.4	1049	31.4	3344
1962	766	20.9	333	9.1	1414	38.6	1147	31.4	3660
1963	930	23.4	378	9.5	1464	36.8	1204	30.3	3976
1964	921	22.8	409	10.2	1513	37.5	1191	29.5	4034

TABLE 5

Intermediate Goods and Services from Industry to Agriculture (N) in Current Prices (millions of pesos)

Crop Year	Agricultural Chemicals	Marketing and Processing Services	Total (N)
1949	27	666	693
1950	36	675	711
1951	46	778	824
1952	44	773	817
1953	28	798	826
1954	18	768	786
1955	19	745	764
1956	26	839	865
1957	39	932	971
1958	57	999	1056
1959	64	1051	1115
1960	62	1051	1113
1961	82	1103	1185
1962	112	1329	1441
1963	99	1627	1726
1964	107	1819	1926

TABLE 6

Intermediate Goods and Services from Industry to Agriculture (N) in Constant (1955) Prices (millions of pesos)

Crop Year	Agricultural Chemicals	Marketing and Processing Services	Total (N)
1949	13	476	489
1950	21	510	531
1951	27	563	590
1952	28	620	648
1953	23	677	700
1954	18	734	752
1955	19	747	766
1956	23	806	829
1957	35	942	877
1958	50	868	918
1959	56	919	975
1960	54	947	1001
1961	68	890	958
1962	83	984	1067
1963	71	1083	1154
1964	73	1078	1151

TABLE 7

Principal Agriculture Products, Current Prices, Valued at Point of Production

(millions of pesos)

	1949	1950	1951	1952	1953	1954	1955	1956	1957
Grand Total	1933.3	1999.3	2182.6	2188.3	2185.3	2052.3	2039.1	2215.8	2341.4
I. Crops	1377.0	1497.9	1583.1	1527.5	1498.9	1421.6	1373.8	1468.8	1536.3
Principally For Domestic Utilization	968.4	1011.8	1013.7	1076.4	967.5	907.6	912.4	962.1	984.9
Rice	735.5	768.5	694.5	695.3	678.1	599.5	612.2	609.3	621.3
Corn	106.9	89.4	107.7	127.9	98.7	107.6	106.0	116.1	114.5
Fruit & Nuts (except Pineapple)	60.7	74.6	87.5	95.0	64.7	72.1	73.5	77.4	81.1
Rootcrops	38.1	47.0	63.4	77.8	46.2	48.9	49.6	77.8	80.4
Vegetables	7.6	9.5	16.0	23.0	30.2	31.2	28.1	33.4	35.6
Onions	1.7	2.2	5.1	5.0	4.7	2.8	2.5	3.4	3.2
Potatoes	.7	1.1	1.9	3.1	5.2	5.1	1.5	3.1	3.7
Beans & Peas	6.8	7.4	14.7	24.3	17.6	19.2	16.4	20.1	20.6
Coffee	4.4	4.8	11.7	12.7	9.5	9.4	10.6	9.5	11.1
Cacao	1.4	1.5	3.0	4.9	3.9	4.2	4.4	4.1	4.6
Peanuts	3.1	4.1	5.7	5.4	6.4	5.8	5.4	5.7	5.9
Rubber	.5	.5	1.3	1.0	1.3	.6	.7	1.0	1.1
Maguey, Lapok, Cotton	1.1	1.1	1.3	.9	1.1	1.2	1.5	1.3	2.0

TABLE 7 (continued)

Principal Agricultural Products, Current Prices, Valued at Point of Production

(millions of pesos)

	1958	1959	1960	1961	1962	1963	1964	1965
Grand Total	2504.0	2705.2	2829.5	3065.9	3507.5	4290.7	4778.6	
I. Crops	1634.9	1774.0	1839.1	2029.5	2339.3	2754.1	3072.3	3317.2
Principally for Domestic Utilization	994.0	1085.6	1150.9	1343.4	1414.9	1514.0	1815.6	1935.2
Rice	635.1	705.5	712.1	838.3	902.2	948.8	1148.2	1227.5
Corn	106.6	132.5	149.7	187.9	171.3	188.4	262.8	272.8
Fruit & Nuts (except Pineapple)	84.3	83.9	80.0	90.6	101.1	123.2	116.9	130.5
Rootcrops	74.1	68.1	84.4	113.9	111.8	121.1	143.7	149.5
Vegetables	35.5	35.4	37.4	34.8	44.1	39.3	42.8	49.8
Onions	3.2	3.8	5.5	6.4	6.9	5.1	4.4	4.9
Potatoes	4.1	3.4	2.7	4.0	4.0	5.9	7.0	6.3
Beans & Peas	23.0	23.4	23.3	19.1	17.8	16.4	14.8	14.0
Coffee	13.5	16.2	38.1	28.7	38.5	47.5	54.6	58.6
Cacao	5.0	5.0	9.0	11.6	9.5	9.9	9.7	11.3
Peanuts	6.1	5.1	5.2	4.7	4.2	4.5	6.2	5.6
Rubber	1.5	1.1	1.7	2.1	2.4	2.9	3.4	3.3
Maguey, Kapok, Cotton	2.0	2.2	1.8	1.3	1.2	1.0	1.0	1.2

TABLE 7 (continued)

Principal Agriculture Products, Current Prices, Valued at Point of Production
(millions of pesos)

	1949	1950	1951	1952	1953	1954	1955	1956	1957
Principally for Export	408.6	486.1	569.4	451.1	531.4	514.0	461.4	506.7	551.4
Coconut	227.9	316.4	330.4	211.7	285.9	284.7	265.4	299.8	308.0
Sugarcane	125.5	104.2	144.0	153.9	168.8	175.8	146.9	154.8	188.5
Abaco	48.1	52.6	79.8	68.7	60.8	38.9	35.2	35.4	37.9
Ramie	-	-	-	.1	.4	.9	1.1	1.7	1.9
Pineapple	7.2	12.9	15.2	16.7	15.5	13.7	12.7	14.9	15.1
II. Fisheries	296.9	215.2	283.2	298.1	294.5	298.8	322.4	349.1	365.5
Commercial Fishing Vessels	50.3	44.1	49.1	53.5	55.7	70.2	75.0	70.8	68.6
Fishponds	39.7	33.1	38.6	40.0	43.5	43.8	45.9	49.6	63.5
Municipal & Sustenance	206.9	138.0	195.4	204.5	195.3	184.8	201.5	228.6	233.5

TABLE 7 (continued)

Principal Agricultural Products, Current Prices, Valued at Point of Production

(millions of pesos)

	1958	1959	1960	1961	1962	1963	1964	1965
Principally for Export	640.9	688.4	688.2	686.1	924.4	1240.1	1256.7	1382.0
Coconut	368.4	421.1	404.3	338.2	537.0	779.9	763.0	861.3
Sugarcane	215.5	210.8	204.6	264.2	304.0	373.9	389.3	413.8
Abaca	38.7	39.4	58.8	65.3	61.4	61.4	78.9	78.6
Ramie	1.9	1.6	1.1	1.5	2.6	3.2	3.2	2.9
Pineapple	16.4	15.5	19.5	17.0	19.5	21.7	22.3	25.3
II. Fisheries	406.0	450.9	464.4	470.8	541.0	664.6	785.0	
Commercial Fishing Vessels	78.3	87.0	93.6	100.5	138.0	277.5	389.7	
Fishponds	91.0	92.9	96.2	99.1	103.2	103.6	104.1	
Municipal & Sustenance	236.6	271.0	274.6	271.1	299.7	283.5	291.2	

TABLE 7 (continued)

Principal Agriculture Products, Current Prices, Valued at Point of Production
(millions of pesos)

	1949	1950	1951	1952	1953	1954	1955	1956	1957
III. Forestry Logs	115.9	121.7	121.9	125.5	135.6	140.3	132.5	152.8	187.6
Plywood & Veneer	1.3	1.4	1.8	3.1	5.9	5.3	6.3	10.2	11.8
Domestic Lumber	107.9	110.3	89.0	94.9	88.1	79.0	70.2	80.0	102.0
Lumber Exports	5.3	7.4	18.3	11.9	17.5	12.6	12.3	12.5	14.0
Export	1.4	2.6	12.8	15.6	24.1	43.4	43.7	50.1	59.8
IV. Livestock & Poultry	143.5	164.5	194.4	237.2	256.3	191.6	210.4	245.1	252.0
Livestock	99.4	108.8	130.4	148.0	156.2	100.0	104.7	118.9	125.6
Carabaos	2.4	2.5	3.3	3.4	3.5	3.0	2.6	4.5	6.6
Cattle	22.7	24.1	33.4	37.7	38.5	33.3	35.3	38.4	38.6
Hogs	71.7	79.4	90.8	104.0	111.3	60.9	64.1	72.7	76.7
Goats, Sheep, Horses	2.6	2.8	2.8	2.9	2.9	2.7	2.6	3.2	3.6
Poultry	44.0	55.7	63.9	89.2	100.0	91.6	105.7	126.3	126.4
Chickens	15.8	18.2	19.8	25.7	28.8	26.1	28.1	31.2	32.0
Ducks, Geese, Turkey	.2	.3	.3	.5	.5	.6	.7	.9	.9
Eggs	28.0	37.2	43.8	63.0	70.7	64.9	76.9	94.2	93.5

Total Excludes Tobacco - Details may not add to total due to rounding.

TABLE 7 (continued)

Principal Agricultural Products, Current Prices, Valued at Point of Production
(millions of pesos)

	1958	1959	1960	1961	1962	1963	1964	1965
III. Forestry Logs	194.4	219.5	246.6	253.3	323.0	546.8	580.8	532.2
Plywood & Veneer	14.8	27.0	28.6	24.2	35.4	55.0	63.9	81.0
Domestic Lumber	104.2	95.9	92.2	111.1	113.1	156.1	179.7	197.7
Lumber Exports	14.7	16.0	13.1	11.6	12.7	13.5	15.2	13.8
Export	60.7	80.6	112.7	106.4	161.8	322.2	322.0	239.7
IV. Livestock & Poultry	268.7	260.8	279.4	312.3	304.2	325.2	340.5	
Livestock	129.8	124.0	147.7	178.9	180.2	184.9	180.6	179.1
Carabaos	7.9	8.8	10.6	12.6	15.0	16.3	9.8	5.0
Cattle	40.0	35.0	36.3	23.5	28.5	29.6	33.5	30.4
Hogs	78.7	77.6	97.6	140.9	134.9	137.0	135.0	141.6
Goats, Sheep, Horses	3.3	2.6	3.2	2.0	1.8	2.1	2.3	2.1
Poultry	138.8	136.8	131.8	133.3	123.9	140.3	160.0	
Chickens	35.1	33.2	36.3	39.4	28.6	39.6	47.2	
Ducks, Geese, Turkeys	.9	.8	1.0	1.4	1.3	1.7	1.5	
Eggs	102.8	102.8	94.5	92.5	94.0	99.0	111.3	127.7

Total Excludes Tobacco - Details may not add to total due to rounding

Table 8

Principal Agricultural Products, 1955 Constant Prices, Valued at Point of Production

(millions of pesos)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Grand Total		1401.7	1483.4	1644.1	1756.6	1854.3	1988.9	2042.2	2183.2	2247.8
I. Crops		947.7	1028.3	1103.8	1181.2	1263.7	1356.0	1373.8	1453.3	1467.0
Principally for Domestic Utilization		638.3	676.1	694.9	781.2	876.3	902.2	912.4	952.8	973.3
Rice		476.1	498.0	499.9	541.1	600.8	608.0	612.2	625.5	639.5
Corn		73.1	79.0	83.1	104.9	97.7	107.5	106.0	124.9	123.3
Fruits & Nuts (except pineapple)		40.3	41.4	43.6	47.1	65.3	70.6	73.5	76.4	79.1
Rootcrops		21.5	27.5	29.0	33.8	48.0	48.8	49.6	52.1	53.4
Vegetables		6.9	8.4	11.2	16.3	25.1	26.9	28.1	29.4	29.7
Onions		.9	1.1	2.0	2.0	3.0	1.8	2.5	2.2	1.9
Potatoes		.4	.8	1.1	1.4	1.7	1.7	1.5	1.9	2.2
Beans & Peas		5.9	6.3	8.8	16.6	14.7	16.0	16.4	17.2	18.0
Coffee		5.7	6.0	7.0	7.5	8.7	9.2	10.6	10.7	12.6
Cacao		1.9	2.1	2.2	3.7	3.8	4.1	4.4	4.4	4.8
Peanuts		2.9	3.7	4.9	4.7	5.2	5.3	5.4	5.5	5.5
Rubber		.6	.7	.8	.9	1.0	.6	.7	1.1	1.2
Maguey, Kapok, Cotton		1.5	1.1	1.4	1.1	1.3	1.7	1.5	1.5	2.2

Table 8 (continued)
Agriculture Crops--Constant 1955 Prices
(million pesos)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Grand Total	2278.9	2395.9	2500.1	2473.8	2685.1	2873.6	2944.5		
I. Crops	1438.2	1523.4	1611.1	1601.4	1770.5	1863.2	1882.4	1962.9	
Principally for Domestic Utilization	952.5	1006.5	1127.8	1144.0	1229.9	1233.7	1249.1	1305.4	
Rice	612.2	704.2	714.7	708.0	747.2	758.2	734.4	763.0	
Corn	117.3	139.9	160.4	166.5	174.4	175.3	178.0	180.7	
Fruit & Nuts (except pineapple)	83.9	82.0	85.9	92.4	116.0	126.6	141.2	154.0	
Rootcrops	55.0	55.1	57.0	58.1	53.6	55.0	62.0	60.8	
Vegetables	31.2	31.0	30.4	31.6	36.4	32.7	36.1	41.5	
Onions	2.1	2.6	3.4	3.6	4.0	3.1	2.7	3.1	
Potatoes	2.4	1.6	1.5	2.3	2.4	3.5	4.1	3.7	
Beans & Peas	19.5	20.2	17.6	14.2	14.0	12.3	11.5	10.8	
Coffee	14.5	16.1	39.1	48.9	65.2	49.8	59.5	66.8	
Cacao	5.0	5.1	9.0	10.6	9.5	9.9	10.3	12.3	
Peanuts	5.7	5.0	4.7	3.9	3.3	3.4	4.4	4.0	
Rubber	1.4	1.0	1.6	2.0	2.4	2.8	2.8	3.2	
Maguey, Kapok, Cotton	2.4	2.6	2.3	1.7	1.4	1.2	2.1	1.6	

TABLE 8 (continued)

Principal Agriculture Products, 1955 Constant Prices, Valued at Point of Production

(millions of pesos)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Principally for Export		309.4	352.2	408.9	400.0	387.4	453.8	461.4	500.5	493.7
Coconut		198.3	238.4	248.1	232.9	211.7	251.7	265.4	312.2	308.7
Sugarcane		78.1	73.8	105.1	115.2	122.6	152.0	146.9	131.2	124.6
Abaca		25.2	27.7	44.0	38.6	38.0	35.8	35.2	40.6	43.3
Ramie		-	-	-	.1	.5	1.1	1.1	1.3	1.7
Pineapple		7.8	12.2	11.7	13.2	14.7	13.2	12.7	15.2	15.4
II. Fisheries		215.0	200.5	267.0	282.1	276.3	305.0	322.4	351.4	348.5
Commercial Fishing Vessels		38.4	33.5	48.3	51.3	51.0	72.2	75.0	74.7	65.7
Fishponds		30.6	31.9	37.1	38.8	41.9	43.8	45.9	48.1	49.3
Municipal & Sustenance		146.0	135.1	181.6	192.0	183.4	189.0	201.5	228.6	233.5

Table 8 (con inued)
Agricul ure Crops - Constan 1955 Prices
(million pesos)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Principally for Expor	485.7	4?6.9	483.3	457.4	540.6	629.5	633.3	657.5	
Coconu	276.8	239.2	268.2	236.0	307.8	379.9	370.9	357.3	
Sugarcane	148.6	163.1	162.6	153.0	170.1	180.7	190.7	226.2	
Abaca	42.0	37.6	31.9	48.8	39.2	43.1	45.3	45.2	
Ramie	1.9	1.9	1.7	3.2	3.6	4.3	4.3	3.8	
Pineapple	16.4	1?.2	19.0	16.4	19.8	21.5	22.1	25.0	
II. Fisheries	386.9	394.9	402.4	410.8	432.5	477.8	519.2		
Commercial Fishing Vessels	78.3	82.5	84.0	87.9	105.0	145.8	180.7		
Fishponds	72.0	72.6	75.1	76.0	76.8	77.5	78.4		
Municipal & Sustenance	236.6	239.8	243.3	246.9	250.7	254.5	260.1		

TABLE 8 (continued)

Principal Agriculture Products, 1955 Constant Prices, Valued at Point of Production

(millions of pesos)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
III. Forestry Logs		111.2	117.7	120.6	125.3	128.1	134.3	134.1	142.0	180.8
Plywood & Veneer		1.4	1.5	1.9	3.3	5.6	5.5	6.3	8.6	10.4
Domestic Lumber		103.2	106.4	87.4	94.9	78.8	76.2	70.2	72.1	92.7
Lumber Exports		5.1	7.2	18.0	11.9	15.6	12.2	12.3	11.3	12.7
Exports		1.5	2.6	13.3	15.2	28.1	40.4	45.3	50.0	65.0
IV. Livestock & Poultry		127.8	141.9	152.7	168.0	186.2	193.6	211.9	236.5	251.5
Livestock	81.3	76.4	82.9	87.3	92.0	97.5	98.8	105.2	117.0	127.1
Carabaos	2.4	1.8	1.9	2.4	2.5	2.5	3.0	2.6	4.5	6.7
Cattle	26.5	28.9	30.7	31.5	32.5	33.5	33.6	35.9	38.4	39.0
Hogs	49.5	43.2	47.7	50.8	54.3	58.6	59.5	64.1	70.9	77.7
Goats, Sheep, Horses	2.8	2.5	2.6	2.7	2.7	2.8	2.8	2.6	3.2	3.7
Poultry		51.4	59.0	65.4	76.0	88.7	94.8	106.7	119.5	124.4
Chickens	16.6	14.0	16.1	17.9	20.5	23.9	25.5	28.1	30.2	32.3
Ducks, Geese, Turkeys	.3	.3	.3	.3	.4	.5	.5	.7	.8	.9
Eggs		37.1	42.6	47.2	55.1	64.3	68.8	77.9	88.5	91.2

Total Excludes Tobacco - Detail may not add to total due to rounding

Table 8 (continued)
Agriculture Crops - Constant 1955 Prices
(million pesos)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
III. Forestry Logs	193.8	219.7	220.4	216.5	238.2	292.4	297.0	277.5	
Plywood & Veneer	13.5	22.9	21.9	18.0	23.3	32.4	34.8	43.8	
Domestic Lumber	96.3	81.8	74.0	87.9	80.3	97.6	101.4	109.3	
Lumber Exports	13.6	13.6	10.5	9.2	9.0	8.5	8.6	7.6	
Exports	70.4	101.4	114.0	101.4	125.6	153.9	152.2	116.8	
IV. Livestock, Poultry and Eggs.	260.0	257.9	266.2	245.1	243.9	240.2	245.9		
Livestock	131.9	126.3	137.5	124.5	125.5	123.9	119.8	106.8	
Carabaos	8.3	9.3	9.9	9.0	10.8	10.7	6.4	2.8	
Cattle	41.9	36.9	41.7	20.4	26.3	23.8	26.2	18.1	
Hogs	78.2	77.5	82.7	93.2	86.5	87.5	85.2	84.4	
Goats, Sheep, Horses	3.4	2.7	3.3	2.0	1.8	1.9	2.1	1.5	
Poultry	128.1	131.6	128.7	120.6	118.4	116.3	126.1		
Chickens	34.9	32.9	34.8	32.6	27.5	31.4	36.7		
Ducks, Geese, Turkeys	.8	.8	1.0	1.3	1.3	1.4	1.3		
Eggs	92.4	97.9	92.9	86.7	89.6	83.5	88.1	95.4	

Total Excludes Tobacco - Detail may not add to total due to rounding.

Reconciliation of Estimates of this Study with National Income Data

As noted earlier, an estimate of value added in agriculture can be obtained from the data presented here by subtracting inputs from industry to agriculture from gross agricultural output. In terms of the symbols of the accounting framework this procedure would be $V_x = X - N$. Conceptually this is the same as gross value added (i.e., including depreciation) in agriculture in the official national income accounts. A comparison of the two sets of data is therefore a natural step. Table 9 presents such a comparison, using the 1955 price estimates of output and value added of this study, and the value added estimates of the National Economic Council.

Examination of Table 9 immediately reveals two substantial differences between the two sets of value added data. First, the level of value added from this study is significantly below the NEC estimates. Second, as the indexes show most clearly, our series show a much more rapid growth than the NEC series. This section shows why the series differ and why, at least as a representation of the production pattern of Philippine agriculture, the series of this study should be a significant improvement over the NEC data.

The basis for the reconciliation of these series is a publication of the NEC that gives an item by item account of the calculation of the agricultural

Table 9

Comparison of Value Added and Output in Agriculture 1949-1964
(million pesos, 1955 prices)

Year	Gross Output of Major Agricultural Products (X) (this study)		Value Added in Major Agricultural Products (V_x) (this study)		Value Added in Agriculture (NEC)*	
	₱	Index	₱	Index	₱	Index
1949	1402	69	1389	69	2078	64
1950	1488	73	1467	73	2285	70
1951	1644	81	1617	80	2522	77
1952	1717	86	1729	85	2657	82
1953	1854	91	1831	91	2971	91
1954	1989	97	1971	97	3146	97
1955	2042	100	2023	100	3258	100
1956	2183	107	2160	107	3295	101
1957	2248	110	2213	109	3349	103
1958	2279	112	2229	110	3496	107
1959	2396	117	2340	116	3324	102
1960	2500	122	2446	121	3192	98
1961	2474	121	2406	119	3378	104
1962	2685	131	2602	129	3469	106
1963	2874	141	2803	139	3639	112
1964	2945	144	2872	142	3533	108

* National Economic Council, revised 1967 data, including depreciation.

sector accounts for 1960.[7] Using this publication, it was possible to pinpoint practically all the significant differences between the two sets of estimates.

The reconciliation was not performed on value added directly but rather on the gross value of output. The NEC estimate of value added for an individual agricultural product is based on its gross value of output times an appropriate value added ratio. Gross value of output is conceptually identical in this study and the NEC data, and it is available for individual products for both. No individual product estimates of value added were made in this study. Hence, a product by product examination of differences was more easily made on gross value of output. Since most of gross value of output in agriculture is value added, there is little practical difference in working with gross value rather than value added.

Before proceeding to an examination of the sources of difference between the two sets of data, it would be well to note one possibility which is not applicable in this particular case. The difference is not due simply to different sources of data. The basic output data for individual products were the same in both sets of estimates. The differences arose for the most part because of differences in manipulation of the basic series.

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[7]Office of Statistical Coordination and Standards, National Economic Council, "Methodology of Agricultural Sector Accounts and Related Statistics in the Philippines," (Manila, July 1963), mimeographed.

Table 10 summarizes the results of the product by product comparison of sources and methods between the two estimates. In 1960, the total gross value of agricultural output was ₱ 1,183, or 29.5 percent less in this study than in the NEC data. Five sources of difference between the two were identified. These were (1) omission in this study of undercoverage allowance, used to raise the NEC output estimates to levels reported in the 1948 Census; (2) omission of three products from this study; (3) use of an averaging procedure by the NEC to shift crop data from crop year to calendar year; (4) use of different estimation procedures; and (5) use of different prices to value output at the point of production.

Omission of undercover allowance. A standard step in the NEC estimation procedures is to adjust the level of each product series so that its 1948 quantity will match the corresponding Census estimate for 1948. The adjustment is a constant percent applied every year to each product.[8] In all cases this was an upward adjustment. Hence the effect is to raise the NEC series. The adjustment is not a constant percentage from year to year because the individual series grow at different rates and the overall product mix changes. The significant effect of the undercoverage allowance is to raise the level of the series. Since the allowance changes the relative weights of individual series,

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[8]Crops were adjusted as a whole rather than individually.

Table 10

Reconciliation of Estimates of Gross Value of Output of This Study and of the National Economic Council for the Year 1960

Product	Gross Value of Output (₱ Million)			Difference between this Study and NEC Data (₱ Millions)						(Percent)
	This Study	NEC Data	Total	NEC Allowance For Undercoverage	Omission From This Study	NEC Crop Year Average	Different Estimation Methods	Difference Price Used to Value Output	% (3) is of Total Difference	% is Gro Val
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10
Food Crops	1167	1309[a]	142	45		96			12.0[a]	3.
Palay	712	775[a]	63[a]	a		63			5.3[a]	1.
Corn	150	169[a]	19[a]	a		19			1.6	.
All Other	305	320[a]	15[a]	a		15			1.3[a]	.
Commercial Crops	672	774	102[a]	27	69	3	2		8.6[a]	2.
Coconut	404	386[a]	-19[a]	a			-19		-1.6[a]	-.
Sugar	201	215[a]	14[a]	a			-14		1.2[a]	.
Tobacco	--	69[a]	69[a]	a	69				5.8[a]	1.
All Other	67	77[a]	11	a		3	6		1.0	.

[a] The undercoverage allowance for crops was calculated only for food crops and commercial crops as groups. Items marked with "a" exclude any share of the undercoverage allowance for the group.

Table 10
Reconciliation of Estimates of Gross Value of Output of This Study and of the National Economic Council For the Year 1960

Product	Gross Value of Output (₱ Million)		Difference between this Study and NEC Data (₱ Millions)						(Percent)	
	This Study	NEC Data	Total	NEC Allowance For Under-Coverage	Omission From This Study	NEC Crop Year Average	Different Estimation Methods	Different Price Used to Value Output	% (#) is of Total Difference	% (3) is NEC Gross Value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Meat and Poultry	279	899	620	183	10		383	44	52.4	15.5
Meat and Poultry Consumption	184	631	447	117			330		37.8	11.2
Eggs	95	258	163	66			53	44	13.8	4.0
Hides and Milk	---	10	10		10				.8	.3
Forestry	247	565	318				55	263	26.9	7.9
Fisheries	464	464	0							
Total	2829	4012	1183	255	79	99	441	307	100.0	29.5
Column Totals as: % Total Difference			100.0	21.5	6.7	8.3	37.3	25.9		
% NEC Gross Value	70.5	100.0	29.5	6.3	2.0	2.5	11.0	7.7		

Note: Sums of individual items may differ from totals due to rounding.

the growth rate will also be affected, but this seems likely to be of secondary importance.

Omission of products from this study. The only outright omissions from this study were tobacco, hides, and milk. The latter two products have been negligible in production and their omission had very little effect on the series of this study. The omission of tobacco, however, is significant. It alone accounts for 6 percent of the difference between the two series in 1960. Native tobacco production was in the ₱ 10 to ₱ 20 million range over the first few years of this study. In 1953, the production of Virginia tobacco was begun and it increased very rapidly. By 1955, Virginia tobacco had become a significant crop, but native tobacco had faded somewhat.[9] In spite of its importance, however, tobacco was omitted from this study because it raised some problems with regard to the accounting framework which could not be easily resolved. These problems center around the Virginia tobacco subsidy program which was started in 1955. Under this program the Agricultural Credit and Cooperative Financing Administration (ACCFA) was to purchase Virginia tobacco and resell it either for domestic use or export at a price that would cover its costs. Unfortunately, the purchase price was established far above any reasonable market value of the tobacco. Growers

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[9]The output data on tobacco are included in Appendix B.

responded by rapid increases in production, and the crop soon reached significant production levels. Consequently ACCFA and its successors continually accumulated stocks of tobacco which could not be disposed of. It is these tobacco stocks which create a problem for the accounting framework. There is no place in the framework for inventory change as a use of output. Furthermore, even if there were, there is the question of valuation of both the output and the stocks. For these reasons tobacco was simply omitted from the study.

The consequences of the omission of tobacco production from the output series are obvious. Inclusion would raise the level for all years, and would increase growth rates for the later years.

Use of an averaging procedure to shift data from crop year to calendar year. The data on crops are collected and published by the Department of Agriculture and National Resources on a crop year rather than a calendar year basis. In the Philippines the crop year is taken as 1 July to 30 June. The NEC makes an adjustment designed to approximate what was produced during a calendar year. The adjustment is to use an average of adjacent crop year figures for the calendar year that they have in common. In this study crop year data were simply treated as calendar years. Having all data on a calendar year basis is certainly desirable. It was felt, however, that the averaging process is rather arbitrary; further, the harvest season for many crops in the

Philippines results in a larger share of output being harvested in the second half of the crop year, and this is the first half of the calendar year of the same date. Hence no adjustment was made in this study.

The result of the NEC adjustment of crop year data is generally to make the NEC estimates for calendar years higher than for crop years of the same date. This situation will prevail as long as output is rising. Since output has risen in most years in Philippine agriculture, the crop year averaging process gives a slightly higher series for the NEC data than for that of this study. Over periods of several years, the adjustment will have very little, if any, effect on the growth rate.

Use of different estimation procedures. For several products evidence existed that the output estimates of the Department of Agriculture and Natural Resources could be significantly improved. A major part of the work of this study was therefore devoted to constructing improved estimates. The principal products for which new estimates were constructed were coconuts, sugar, meat and poultry, eggs, and logs. Details of the methods used to make these estimates are given in Appendix A. The resulting series were very significantly lower than the DANR series for meat and poultry, eggs, and logs. The net result was a substantial reduction in the level of the total output series of this study. This source alone contributed 37 percent of the total difference between the two series in 1960. It is certainly possible that the series for meat,

poultry, and eggs may have been adjusted downward too far. In the judgment of the author, however, the new estimates are considerably more reliable in showing the longer-run trends of production.

Use of different prices to value output. One of the serious shortcomings of the NEC national income accounts is that, for some output series, prices that reflect value of product at the farm or other point of production are not available. Instead, prices from the Manila wholesale markets are used. These wholesale market prices include a significant margin covering marketing and distribution costs. Thus the NEC estimates of gross value of production include a significant amount of marketing and processing costs. The compilers of the national income accounts readily acknowledge that it would be desirable to eliminate these costs, since they raise value above its correct level. Unfortunately suitable prices are not available, and the NEC compilers use prices from available price series that are conceptually closest to the correct ones. In the present study, the framework requires marketing and processing costs to be identified separately. Hence some split must be made between output costs and marketing-processing costs. For the group of products which had no farm level or forest level prices, some adjustment had to be made. The adjustment was for the most part a proportionate reduction in the Manila wholesale price. The size of the reduction was determined by whatever relevant information could be obtained and, in effect, was simply informed judgment. This procedure

is arbitrary, but at least it brings each production series roughly to its appropriate value level at the point of production. As can be seen from Table 10, this adjustment reduced the contribution of forestry and egg production.

The adjustment to eliminate marketing-processing costs worked uniformly to lower the level of the estimates of this study relative to the NEC series. In 1960, it accounts for 26 percent of the difference between the two series.

Before drawing general conclusions about the differences between the NEC series and that of this study, a comment on the classification of sources of difference will be helpful. For some products, the adjustments included in the fourth source of difference, i.e., different estimation methods, were at least in part adjustments of prices used for valuation purposes. The NEC estimates of meat and poultry production, and forestry include a large amount of processing which does not belong in agriculture. This was eliminated by using different estimation procedures, but it could also have been eliminated by reducing the price used to value these products to eliminate the margin covering these costs. Since explicit estimates of this source of difference could not be obtained for those products where different estimating methods were used, the whole difference was included in the fourth source. Hence, the fourth source is somewhat overstated and the fifth understated.

Let us now draw some conclusions from the study of differences between the gross value series of this study and the NEC. As noted earlier,

these conclusions are, for practical purposes, equally applicable to the value added in agriculture because most of gross value in agriculture is value added.

First, the series presented in this study are somewhat lower than a "correct" series would be because there were some outright omissions. The NEC series, on the other hand, clearly overstate the gross value of output because the prices used to value output include more than agricultural production. A "correct" series would be somewhere between the two. In the judgment of the author, it would be closer to the NEC series than that of this study. Second, regarding the trend over time--and the resulting growth rates--the series of this study is the more reliable. This study shows a higher growth rate than the NEC series. The omissions of this study would either have raised the growth rate or left it unchanged. The other important sources of differences reflect efforts to improve the reliability of individual series. To the extent that these efforts were successful, the aggregate series should also be improved. If the trend of the series presented in this study is the more accurate of the two, it would be appropriate for uses of the output data in which the growth rate and trend are more important than the level. In particular, this is the case in productivity studies. It is for this reason that in Part II, where productivity in agriculture is examined, the output series presented here are preferred to those of the NEC.

Estimates of Intersectoral Flows Consistent with the National Income Accounts

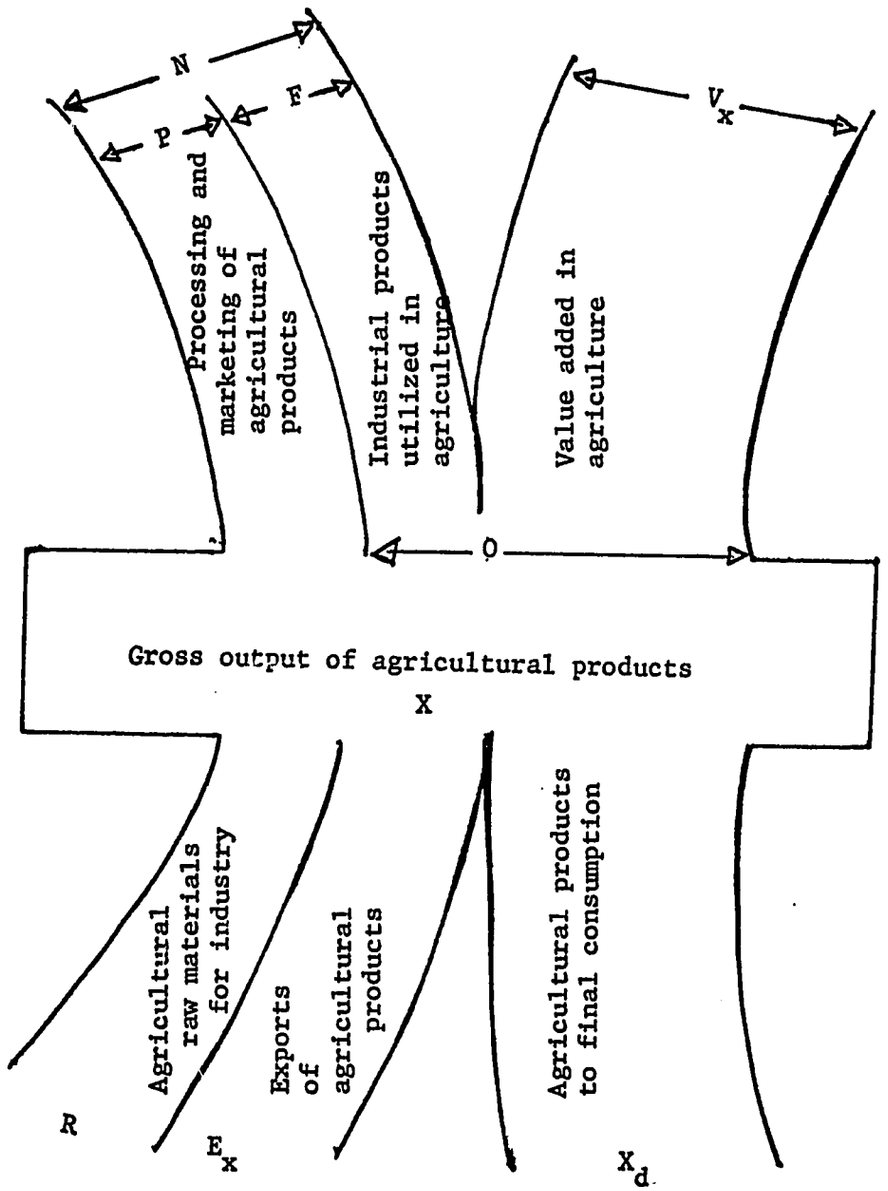
As noted earlier in this paper, the original purpose in undertaking this study was to provide estimates of certain flows in the agricultural production sector that are needed in the Fei-Paauw national income accounting framework. The flows in question are intermediate goods from agriculture to industry (R), and intermediate goods and services from industry to agriculture (N).

The accounting framework is simply an elaboration of the conventional national income accounts. When applied to a given country, the country's national accounts provide the natural starting point for estimation of the framework's flows. The previous section noted the difference between value added in agriculture estimated from this study and that shown in the national income accounts of the NEC. This difference suggests that the other flows concerning agriculture which have been estimated in this study are not consistent with the national income accounts, and should therefore be adjusted before use with data from the national accounts. Accordingly, this section presents estimates of intermediate goods and services flows between agriculture and industry which have been adjusted to be consistent with the level of value added in agriculture shown in the national accounts.

The flows into and out of the agricultural production sector are shown in Figure 2. In this figure, O is the gross value of output valued at the

FIGURE 2

Flows Related to the Agricultural Production Sector



farm, and O + P is output valued at end use after processing and marketing. This study produced estimates for the products covered in the study of O, P, F, and the three end uses R, E_x, and X_d. V_x was also formed simply by subtracting F from O. This estimate of V_x is given in Column 3 of Table 9. It is essentially the value added within agriculture for the products covered in this study. It excludes processing and marketing since these are value added within industry. It is gross since it covers depreciation as well as other property income and wages. Since indirect taxes levied directly on agricultural products are negligible, they have been ignored here. Thus, V_x is the contribution, including depreciation of the products in this study, to national income originating in agriculture. This relationship forms the basis for linking the study to the national income estimates. The assumption was made that the ratios of the two intermediate goods and services flows to value added (R/V_x and N/V_x) were the same for all agriculture as they were for the products covered in the study. Given the ratios from the study, it was only necessary to multiply the appropriate estimate of value added in agriculture from the national accounts by these ratios.

Table 11 presents the constant price adjusted estimates of the two intermediate flows, calculated as described above. The data necessary for the calculations come from Tables 4, 6, and 9. No adjusted estimates of the current price data were made because the NEC agricultural value added data, including depreciation, had not been obtained.[10]

[10]Given the appropriate NEC value added data, the adjustments could be made as follows: (1) Calculate value added, this study (V_X), by subtracting agricultural chemicals (Table 5) from gross agricultural output (Table 3). (2) Calculate R/V_X and N/V_X using the R estimates of Table 3 and the N estimates of Table 5. (3) Apply the two ratios as described in the text above.

Table 11

Adjusted Estimates of Intermediate Goods and Services Flows in Constant Prices
(million pesos, 1955 prices)

(1)	(2)	(3)	(4)	(5)
Year	V_x Net Value Added and Depreciation (NEC)	R/V_x This Study[1]	N/V_x This Study[2]	R Adjusted Estimates of Raw Materials from Agriculture to Industry (1) x (2)	N Adjusted Estimates of Industrial Inputs to Agriculture (1) x (3)
1949	2078	.161	.352	335	731
1950	2285	.157	.362	359	827
1951	2522	.132	.365	333	921
1952	2657	.137	.375	364	996
1953	2971	.120	.382	357	1135
1954	3146	.118	.382	371	1202
1955	3258	.115	.379	375	1235
1956	3295	.117	.384	386	1265
1957	3349	.131	.396	439	1326
1958	3496	.138	.412	482	1440
1959	3324	.128	.417	425	1386
1960	3192	.121	.409	386	1306
1961	3378	.129	.398	436	1344
1962	3469	.128	.410	444	1422
1963	3639	.135	.412	491	1499
1964	3533	.142	.401	502	1417

[1] Column 3, Table 4 ÷ Column 3, Table 9.

[2] Column 3, Table 5 ÷ Column 3, Table 9.

Part II. Postwar Performance of Philippine Agriculture

In this part the production record of Philippine agriculture over the period 1949-64 is examined. The production data used for this purpose are, of course, the data presented above in Part I.

Tables 12 and 13 provide the starting point for the analysis. They present, respectively, the annual growth rates[1] for constant (1955) and current price flows into and out of agriculture. The first column of each table shows the annual rate of growth for the entire 1949-64 period; the remaining three columns present growth rates over the sub-periods 1949-55, 1955-60, and 1960-64.

Since the behavior of prices is important information in interpreting the pattern of output, several tables relating to prices in agriculture follow Tables 12 and 13. Tables 14 to 17 present indexes of prices of the various components of agricultural output. Table 18 gives the annual rates of change of the various price indexes for the same periods as the output growth rates.

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[1] The growth rates of Tables 12 and 13 (and those in subsequent tables) are calculated as the compound growth rate between terminal years of each period. Growth rates calculated in this fashion are, of course, subject to erratic behavior because of unusual conditions in either terminal year, particularly when the period covered is short. Individual figures should therefore be interpreted with care.

Table 12

Annual Rates of Growth of Constant Price (1955) Flows in Agriculture for Selected Years
(percent per year)

	1949-1964	1949-1955	1955-1960	1960-1964
Gross Value of Output at Point of Production	5.1	6.5	4.1	4.2
Crops	4.7	6.4	3.2	4.0
Principally for Domestic Use	4.6	6.1	4.3	2.6
Principally for Export	4.9	6.9	0.9	7.0
Fishing	6.1	7.0	4.5	6.6
Forestry	6.8	3.2	10.4	7.8
Livestock and Poultry	4.1	8.8	4.6	-1.9
Marketing and Processing	5.6	7.8	4.0	3.3
Gross Value of Output at Point of Use (X)	5.2	6.8	4.3	3.9
End Uses Valued at Point of Use				
Agricultural Exports (E_x)	6.9	10.2	3.7	6.3
Intermediate Goods to Ind. (R)	4.1	0.7	4.8	8.5
Final Consumption in Ag. (X_{dL})	4.6	6.0	3.7	3.6
Final Consumption in Ind. (X_{dh})	5.5	8.2	5.2	1.8
Intermediate Goods and Services from Industry (N)	5.9	7.8	5.5	3.6
Agricultural Chemicals	12.2	6.5	23.2	7.8
Marketing and Processing	5.6	7.8	4.9	3.3

Source: Calculated from Tables 2, 4, 6, 8.

Table 13

Annual Rates of Growth of Current Price Flows in Agriculture for Selected Years

(percent per year)

	1949-1964	1949-1955	1955-1960	1960-1964
Gross Value of Output at Point of Production	6.2	0.9	6.8	14.0
Crops	5.5	0.0	6.0	13.7
Principally for Domestic Use	4.3	-1.0	4.8	12.1
Principally for Export	7.8	2.1	8.3	16.2
Fisheries	6.7	1.4	7.6	14.0
Forestry	11.5	2.3	13.2	23.8
Livestock and Poultry	5.9	6.1	5.8	5.1
Marketing and Processing	6.9	1.9	7.1	14.7
Gross Value of Output at Point of Use (X)	6.6	1.7	6.9	14.2
End Uses				
Agricultural Exports (E_x)	10.1	5.0	9.2	19.5
Intermediate Goods to Ind. (R)	7.4	-0.9	9.3	19.0
Final Consumption in Ag. (X_{dL})	4.6	-0.6	5.3	12.0
Final Consumption in Ind. (X_{dh})	5.6	2.1	6.4	10.1
Intermediate Goods and Services from Industry	7.1	1.6	7.8	14.7
Agricultural Chemicals	14.8	-2.7	26.7	14.6
Marketing and Processing	6.9	1.9	7.1	14.7

Source: Calculated from Tables 1, 3, 5, 7.

Table 14

Indices of Implicit Prices of Agricultural Output by Commodity Group
(1955=100)

Year	Valued at Point of Production					Marketing and Processing	Total Value at Point of Use (X)
	Crops	Fisheries	Forestry	Livestock & Poultry	Total		
1949	145	138	105	112	138	140	139
1950	146	107	103	115	134	132	134
1951	143	106	101	127	133	138	134
1952	129	106	101	141	125	125	125
1953	119	107	106	138	118	118	118
1954	105	98	104	99	103	105	104
1955	100	100	100	100	100	100	100
1956	101	99	108	103	102	104	102
1957	105	105	104	100	104	111	106
1958	114	105	100	103	110	115	111
1959	116	114	100	101	113	114	113
1960	114	115	112	105	113	111	113
1961	127	115	116	127	124	124	124
1962	132	125	136	125	131	135	132
1963	148	139	187	135	149	150	150
1964	163	151	197	139	161	169	163

Source: Calculated from Tables 1 and 2.

Table 15
Indices of Implicit Prices of Agricultural Crops by Groups, Valued at Point of Production
(1955 = 100)

Year	Crops Principally for Domestic Utilization	Crops Principally for Export	All Crops
1949	152	132	145
1950	150	138	146
1951	146	139	143
1952	138	113	129
1953	110	137	119
1954	101	113	105
1955	100	100	100
1956	101	101	101
1957	101	112	105
1958	104	132	114
1959	102	151	116
1960	102	142	114
1961	117	150	127
1962	115	171	132
1963	123	197	148
1964	145	198	163

Table 16
Indices of Implicit Prices of Agricultural Output, by Demand Use, Valued at Point of Use
(1955 = 100)

Year	Exports (E_x)	Intermediate Goods to Industry (R)	Final Consumption in Agriculture (X_{dL})	Final Consumption in Industry (X_{dh})	Total (X)
1949	133	111	146	142	139
1950	135	110	138	139	134
1951	140	112	134	138	134
1952	111	106	129	135	125
1953	130	119	113	117	118
1954	112	105	101	101	104
1955	100	100	100	100	100
1956	103	107	101	102	102
1957	113	110	104	104	106
1958	128	115	106	106	112
1959	135	123	107	106	114
1960	129	123	108	106	113
1961	138	128	120	120	124
1962	163	144	121	120	132
1963	198	161	131	129	149
1964	206	179	148	145	163

Source: Calculated from Tables 3 and 4.

Table 17
Indices of Implicit Prices of Intermediate Goods and Services from Industry to Agriculture (N)
(1955 = 100)

Year	Agricultural Chemicals	Marketing Processing Services	Total (N)
1949	211	140	142
1950	169	132	134
1951	169	138	140
1952	158	125	126
1953	123	118	118
1954	102	105	105
1955	100	100	100
1956	112	104	104
1957	112	111	111
1958	113	115	115
1959	114	114	114
1960	114	111	111
1961	121	124	124
1962	135	135	135
1963	140	150	150
1964	146	169	167

Table 18
Annual Rates of Change in Prices of Agricultural Output
(percent per year)

	1949-1964	1949-1955	1955-1960	1960-1964
Gross Output Valued at Point of Production	1.0	-5.2	2.5	9.3
Crops	0.8	-5.5	2.7	9.3
Principally for Domestic Use	-0.3	-6.7	0.4	9.2
Principally for Export	2.7	-4.5	7.3	8.7
Fishing	0.6	-5.3	2.8	7.0
Forestry	4.3	-0.8	2.3	15.1
Livestock and Poultry	1.5	-1.9	1.0	7.3
Marketing and Processing	1.3	-5.5	2.1	11.1
Gross Output Valued at Point of Use (X)	1.1	-5.3	2.5	9.6
End Uses, Valued at Point of Use				
Agricultural Exports (E_x)	2.9	-4.7	5.2	12.4
Intermediate Goods to Ind. (R)	3.2	1.7	4.2	9.9
Final Consumption in Ag. (X_{dL})	0.1	-6.2	1.6	8.2
Final Consumption in Ind. (X_{dh})	0.1	-5.7	1.2	8.1
Intermediate Goods and Services from Industry (N)	1.1	-5.7	2.1	10.7
Agricultural Chemicals	-2.4	-11.7	2.7	6.4
Marketing and Processing	1.3	-5.7	2.1	11.1

Source: Calcualted from Tables 14-17.

The price indexes in Tables 14 to 17 were calculated by dividing the current value output series by the corresponding constant price series. Since the constant price series are based on 1955 prices, this procedure produced price indexes with 1955 as 100.

The production record shown in Table 12 suggests that agriculture as a whole enjoyed moderate growth over the entire 1949-64 period. The 5.1 percent growth rate for the period is well above the country's population growth rate of approximately 3.2 percent. However, these figures for the entire period obscure several important developments which occurred. To trace these developments it is necessary to divide the period into sub-periods and examine the behavior of the major components of agricultural output during these sub-periods. To explain the choice of these sub-periods, it will be helpful to anticipate the general conclusions about the pattern of growth in agriculture during the entire period.

Two clearly defined periods can be identified in post-war Philippine agriculture, with 1955 as the dividing point between the two periods. In the first, 1949-55, output grew rapidly and prices fell. It was apparently a period in which supply was increasing more rapidly than demand, with a resulting significant downward pressure on agricultural prices. In the second, 1955-64, output grew more slowly and prices rose. The basic conditions seem to have been reversed, with supply increases apparently tending to lag behind demand

increases. Furthermore, in the later period agriculture dependent on export demand performed better than that dependent on domestic demand. Regarding this different behavior between export and domestically oriented agriculture, it is apparent that changes in exchange controls had some effect on agriculture's growth pattern. Hence, 1955-64 was divided into two periods, 1955-60 and 1960-64. In these two periods the impact of exchange control was radically different. During 1955-60, exchange controls became more and more stringent and overevaluation of the peso became progressively worse. During 1960-64, government exchange policy was reversed and the exchange controls were relaxed on a piece-meal basis. The last controls were actually not dropped until 1965, but for practical purposes they had been eliminated by 1964 and the peso had been permitted to reach a free market rate of ₱3.90: $1.00. To summarize, over the entire 1949-64 period we may characterize the exchange control situation as follows: 1949-55, mild controls; 1955-60, increasingly stringent controls with increasing overvaluation of the peso; 1960-64, devaluation of the peso and elimination of practically all controls. The status of exchange controls should be kept in mind in examining the behavior of the components of agriculture in the three sub-periods.

Let us now consider the growth pattern for the period 1949-55 in detail. This period was one of fairly rapid growth in agricultural production accompanied by falling prices. Real output, at point of production, grew at

6.5 percent per year, and prices fell at 5.2 percent per year (see Tables 12 and 18, respectively). This combination indicates that agricultural supply was increasing more rapidly than demand. In other words, the growth was not just a response to strong increases in demand; some other explanation must be found other than simply demand growth.

One possible explanation for the rapid growth in production in 1949-55 is that a significant increase in agricultural productivity occurred in this period. If productivity were significantly increased, presumably agricultural producers would be willing to increase production even in the face of falling prices. If this were the case, it would represent a significant and hopeful development in agriculture. Another explanation, one less encouraging in its implications than a productivity increase, is that the rapid growth simply represents recovery from wartime dislocations of production.

To choose between these two hypotheses for the 1949-55 period one would need considerably more information than is currently available. However, some light can be thrown on the question, at least for crops. Data are available for 1940 that are comparable to the DANR data on crops that were used in this study. On the basis of these data some idea of crop yields and per capita outputs

can be gained. Tables 19 and 20 present the relevant data[2] for 1940 and five selected post-war years. The use of a single year, 1940, as a base year for the pre- post-war comparison presents some risk because of normal variations in annual data for agriculture. Such variations might make 1940 unsuitable as a year to represent the pre-war condition of agriculture. The author knows of no problems for 1940, however, and it appears to have been a reasonably normal year.

Table 19 shows that the population of the Philippines grew quite significantly between 1940 and 1948, despite wartime losses and dislocations. Output and area harvested, on the other hand, did not even regain their pre-war levels by 1948, much less keep up with population growth. To assist in interpreting the movements of output and area harvested, Table 20 shows the yields per hectare, and the output and area harvested per capita. Yields per hectare seem to have recovered their pre-war levels sometime shortly after 1950. Output

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[2]Some caveats are in order for the DANR data on output and crop area harvested. The output figures are in metric tons. Hence the aggregate behaves as a quantity index with relative tonnage as weights for individual crops. The constant price output data utilized in this study will not necessarily behave in the same way because individual crops have fixed weights based on relative value of the individual crop in 1955. Some comparisons for the post-war years suggest, however, that the tonnage series and value series actually behave very similarly.

A second warning is that area harvested, used here, is not the same as area under cultivation. Area harvested counts twice land which is double cropped, three times land which is triple-cropped, etc. Area under cultivation counts a cultivated piece of land once no matter how many crops are grown on it.

per capita, however, did not recover its 1940 level until about 1955, and area harvested per capita did not reach its 1940 level until after 1955.

The figures of Tables 19 and 20 suggest that the rapid growth in agriculture from 1949 to 1955 can be explained principally as a combination of recovery from wartime dislocations and growth by extending cultivation to meet the needs of the growing population. There does not seem to have been any significant improvement in agricultural productivity as compared to pre-war periods. Whatever the increases in yields during 1949-55, they were mostly only a return to pre-war levels and not long-run productivity increases.

Some elaboration should be made regarding the decline in prices over the period 1949-55. The explanation offered here is simply that in 1949 agricultural supplies were still short by comparison with 1940 standards, and as supplies gradually caught up to 1940 per capita levels, prices eased. Thus, the rapid increase in agricultural output on balance, represents the effort by the agricultural population to re-establish its general pre-war output levels.

Another explanation, different from the one offered above, may be suggested and should at least be considered. Conceivably the decline in price was only a monetary phenomenon, and in terms of non-agricultural products for which the agricultural products are traded, demand could have actually been increasing strongly. This situation would exist if the prices of non-agricultural products purchased by farmers fell more rapidly than prices of the agricultural

Table 19

Population Crop Output and Crop Area Harvested for Selected Years

Crop Year	Population (1000)	Crop Output (1000 Metric Tons)			Crop Area Harvested (1000 Hectares)		
		Food	Commercial	Total	Food	Commercial	Total
1940	16, 320[a]	4049	2111	6160	3528	1644	5173
1948	19, 234[b]	3650	1592	5242	3291	1375	4666
1950	20, 231[b]	4266	1735	6001	3609	1467	5077
1955	23, 472[b]	6054	2831	8885	4791	1544	6434
1960	27, 088[a]	7315	3096	1 0411	6008	1588	7596
1965	31, 946[b]	8479	3764	1 2243	5995	2257	8252

[a]Census Years

[b]Interpolated or extrapolated from nearest census year.

Source: Population figures from First Conference on Population, 1965 (Quezon City: University of the Philippines Press, 1966), p.438. Output and area harvested from Philippine Department of Agriculture and Natural Resources Bureau of Agricultural Economics.

Table 20

Crop Yield Crop Output per Capita and Crop Area Harvested for Selected Years

Crop Year	Crop Yield (Metric Tons per Hectare)			Crop Output per Capita (Metric Tons per Capita)			Crop Area Harvested per Capita (Hectares per Capita)		
	Food	Commercial	Total	Food	Commercial	Total	Food	Commercial	Total
1940	1.148	1.284	1.191	.248	.129	.377	.216	.101	.317
1948	1.109	1.154	1.123	.190	.083	.273	.171	.071	.242
1950	1.182	1.183	1.192	.211	.086	.297	.178	.073	.251
1955	1.238	1.334	1.381	.258	.121	.379	.208	.066	.274
1960	1.218	1.950	1.733	.270	.114	.384	.222	.059	.281
1965	1.414	1.668	1.484	.266	.118	.384	.198	.071	.259

Source: Calculated from Table 19.

products sold outside agriculture. Under these conditions the demand for agricultural products outside agriculture would be increasing in real terms. Since about 60 percent of agricultural production is exported or utilized by the non-agricultural sector in some way, an increase in real demand in this fashion could be of great significance.

A simple reflection of the behavior of real demand from outside agriculture is the terms of trade of agriculture vis-à-vis exports and non-agricultural goods and services. If these terms of trade were to improve, the farmer would still be perfectly rational in increasing output to trade for non-agricultural goods and services. In fact, however, the terms of trade for agriculture actually deteriorated rather than improved over the period 1950-55.[3,4] This development is shown in Table 21. Accordingly, the hypothesis that a real

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[3] The year 1949 was omitted from the index because of a lack of complete data for that year. The available data suggest that the omission does not change the basic pattern.

[4] This statement is based on the price indexes presented in Table 21. A similar index of terms of trade for agriculture was calculated by the author for use in a paper to be published in a forthcoming issue of the Philippine Economic Journal. This latter index was calculated using different price indexes for both agricultural and non-agricultural products. The earlier terms of trade index shows approximate stability instead of decline over the period 1950-55. The index used here is, in the opinion of the author, the more reliable one.

increase in demand over the 1949-55 period took place even with falling prices may be rejected. The hypothesis that growth over 1949-55 was only regaining pre-war agricultural production relative to population is clearly the best explanation of those offered here.

We turn now to developments over the periods 1955-60 and 1960-64. In both these periods growth in aggregate output was only slightly over 4 percent annually. Comparing the growth rates in these periods to the 6.5 percent in 1949-55, it appears that once pre-war standards had been reached again, improvement slacked off markedly. Examination of components of total production suggests two further conclusions.

First, the bulk of the slackening in growth occurred in products for domestic consumption, which in Philippine agriculture is largely food. Of the series identifiable mostly as food products, the slackening is apparent in crops principally for domestic use, and livestock and poultry. Fishing is the exception that does not follow this pattern. In terms of end uses, this slackening shows up as decided declines in growth rates of final consumption in both agriculture and industry. These declines are, of course, the other side of the declines in growth rates of food production.

Second, while the pattern is not a strong one, there seems to be some tendency for production for export to have picked up relative to production for home use. In considering this development, it should be noted that a large

Table 21

Price Indexes for Flows Into and Out of Agriculture and Terms of Trade for Agriculture, 1950-1964 (1955 = 100)

Year	Domestically Produced Agric. Products Consumed by Non-ag. Households	Domestically Produced Ag. Products for Export	Domestically Produced Ag. Raw Materials to Non-Ag. Producers	All Domestically Produced Ag. Goods to Non-ag. and Export	Non-Ag. Consumption Goods and Services Consumed by Ag. Households	Intermediate Goods & Services from Industry to Agric.	All Non-Ag. Goods & Services Utilized by Agric.	Terms of Trade for Agric.
1950	139	135	110	135	104	134	117	115
1951	138	140	112	135	114	140	125	108
1952	135	111	106	123	104	126	113	109
1953	117	130	119	122	103	118	109	112
1954	101	112	105	105	101	105	103	102
1955	100	100	100	100	100	100	100	100
1956	102	103	107	103	102	104	103	100
1957	104	113	110	108	102	111	106	102
1958	106	128	115	115	103	115	108	106
1959	106	135	123	119	105	114	109	109
1960	106	129	123	116	107	111	109	106
1961	101	138	128	118	108	124	115	103
1962	120	163	144	138	113	135	122	113
1963	129	198	161	158	114	150	129	122
1964	145	206	179	171	107	167	133	129

Source: Columns (1), (2), and (3), Table 16; Column (4), weighted average of (1), (2), and (3) with weights of 0.51, 0.35, and 0.14, respectively; Column (5), consumer price index for Manila, excluding food from Central Bank of the Philippines, Statistical Bulletin (Manila: Central Bank of the Philippines Dept. of Economic Research). Column (6), Table 17; (6) weighted average of (4) and (5), with weights of 0.57 and 0.43 respectively; Column (7) = (3) ÷ (6).

percentage, well over 80 percent of intermediate goods to industry (R) ultimately is exported. Refined sugar and plywood are examples of industrial export products fed from agricultural production. Thus, when considering the total export demand for agriculture, most of R should be included with direct agricultural exports, E_x. The growth rates for the combination of R and E_x in 1955 prices were as follows:

1949-64	1949-55	1955-60	1960-64
5.9	6.9	4.0	6.9

These figures suggest two points. First, agricultural production related to export demand grew more rapidly than agriculture as a whole. Second, the slackening in growth in the middle period and the subsequent more rapid rise correspond respectively to periods when the peso was fixed at an overvalued rate and when it was permitted to approach practically a free market level. The slackening and subsequent rebound in growth rates of production for export seem readily explainable in terms of the price incentives for such production.

The pattern of growth in the two later sub-periods seem to be ones in which demand changes were the dominant elements, with supply responding rather slowly. As was noted earlier, prices for all agricultural products rose after 1955, but they rose much more rapidly for export products than for domestically consumed products. The shift toward production of products for export, especially in the last period when the peso was decontroled and peso

prices for exports rose dramatically, was the natural result. The slow increase in prices of domestically utilized products in the 1955-60 period followed by a fairly rapid increase in these prices in the last period suggests a further effect of the switch toward export production. The data are at least consistent with the hypothesis that the diversion of resources towards exports reduced available supplies of products for domestic use to the point where prices for these products also began to rise rapidly.

Reinforcing the conclusion of the previous paragraph is the response of agricultural producers to the demand shift in terms of area harvested. The first two columns of Table 22 show the area harvested for crops destined for domestic use and for export. The area harvested for domestically utilized crops grew steadily to a peak in 1959 and then began a clear decline which lasted at least until 1964. The area harvested for crops destined for export, on the other hand, increased slowly to 1954, leveled off from 1955 until about 1959, and then began a rapid rise which continued through the end of the period under study. Since total area harvested was relatively constant from 1959 to 1964, it is plain that the increase in area harvested for export products was largely a shift away from domestically utilized products.

In ending the discussion about the productive record of post-war Philippine agriculture, it would be highly desirable to say something about changes in productivity over this entire period. Unfortunately it is not possible to draw

Table 22

Area Harvested, Output in 1955 Prices, and Output per Hectare for Domestically Utilized and Exported Crops, 1949-1965

Crop Year	Area Harvested (1000 hectares)			Output Valued at Point of Production (million pesos)			Output per Hectare (pesos per hectare)		
	Domestically Utilized	Exported	Total	Domestically Utilized	Exported	Total	Domestically Utilized	Exported	Total
1949	3493	1390	4883	638	309	948	183	223	194
1950	3609	1422	5030	676	352	1028	187	248	204
1951	3714	1477	5192	695	409	1104	187	277	213
1952	4086	1482	5569	781	400	1181	191	270	212
1953	4512	1510	6022	876	387	1264	194	257	210
1954	4573	1520	6093	902	454	1356	197	299	223
1955	4876	1506	6382	912	461	1374	187	306	215
1956	5264	1478	6742	953	501	1453	181	339	216
1957	5435	1488	6923	973	494	1467	179	332	212
1958	5455	1457	6912	953	486	1438	175	333	208
1959	6340	1479	7819	1067	457	1523	168	309	195
1960	5999	1501	7500	1128	483	1611	188	322	215
1961	6115	1628	7743	1144	457	1601	187	281	207
1962	6073	1745	7817	1230	541	1771	203	310	227
1963	5978	1859	7837	1234	630	1863	206	339	238
1964	5867	1993	7860	1249	633	1882	213	318	240
1965	6048	2181	8229	1305	658	1963	216	301	239

Source: Area harvested, Bureau of Agricultural Economics, Department of Agriculture and Natural Resources; Output, Table 8.

firm conclusions on this subject because information on productivity in agriculture is very scanty. We shall, however, examine what data are available.

Ideally, productivity should be measured in terms of all inputs used in production. If one relies on partial productivity indexes, i.e., those measuring total output per unit of a single factor, it is always possible for the partial index to move quite differently from the total index. Unfortunately, total productivity indexes were not possible for Philippine agriculture over the period of this study. The relevant input data are not all available. For this reason we must fall back on partial indexes plus inferences drawn from the behavior of output and prices. The method is fallible, but it is the only method possible with available data.

In the discussion above regarding the output pattern of agriculture for 1949-55, it was suggested that, at least for crops, whatever productivity increases that may have occurred were attributable principally to regaining pre-war levels. The basis for this conclusion was data on output in metric tons per hectare. For the post-war period these data have been put in the form of value of output, in 1955 prices, per hectare. Yields per hectare calculated in this fashion for each year from 1949 to 1965 are presented in Table 22. Yields calculated on the

basis of fixed prices have one danger which should be noted. If there is any systematic shift towards those crops which have higher than average value of output per hectare, the peso yield calculated by dividing aggregate output by aggregate area harvested will rise even though no improvement in yield has occurred in any individual crops. In the case of the Philippines, such a shift may have occurred, because of a shift from rice to sugar production for example. Such a shift did in fact occur, and it must be kept in mind in interpreting the yield figures to Table 22.

The output per hectare for all crops is shown in the last column of Table 22. The two adjacent columns show the crops broken into those going into domestic use and those going into exports. As noted above, the rise in all series in the first two or three years seems to reflect the recovery from war-time declines. Starting with the early 1950's as the time when yields had recovered to normal levels, the following pattern prevailed: For yields of all crops together, relative stability prevailed from the early 1950's to 1961, and from 1961 to 1965 a modest improvement occurred. The stability of the decade of the 1950's for all crops is the result of off-setting decreases in yields in domestically utilized crops and increased yields in exported crops. The modest rise over the period 1961-65 is the result of the recovery and subsequent small rise in yields of domestically utilized crops. Over the entire 1950-65 period both series

thus rose moderately. The irregularities of the series make it difficult to specify exact figures for the improvement. In round numbers, however, once recovery from war-time problems was completed, yields of domestically utilized crops rose about 10 percent and those of exported crops about 13 percent. These are indeed modest increases for a period of 15 years.

It was noted earlier that a shift in the mix of output toward higher value crops would result in a rise in the constant price value yields, even though individual crop yields had not significantly changed. Is this sort of shift responsible for the improvement shown in the crop yields presented here, or has there been a real improvement at the individual crop level? The shift in production from crops utilized domestically to those which are exported contributed slightly to the rise in the overall peso yields, since export demand crops have a higher peso yield per hectare then domestically utilized crops. However, this shift was not sufficient to account for any significant share of the overall improvements because it was of minor proportions. The shift effect could, however, have been responsible for the improvement in either of the two component series. A systematic study of production shifts among individual crops would be necessary to establish this point, and no such study has been undertaken. However, some indication of what has happened in this regard can be gained by an inspection

of the individual crop data in Appendix B. These data are the original DANR value, volume of output, and area harvested figures for individual crops, and they were the figures used for most of the crops in this study. As described in Part I, adjustments for some crops have been made in these data. The original data can be used, however, to get an impression of what has happened to yields for individual crops.

A reading of the data in Appendix B suggests that the shifting among food crops (approximately the same group as those classified in this study as domestically utilized crops) was roughly offsetting. The downward influence of corn in the total for foodcrops was offset by the upward influence of citrus fruits, vegetables, and coffee. The shifting among commercial crops (approximately the same group classified in this study as export crops) did add significantly to this group's peso yield. Slow growth in coconuts, a low peso yield crop, and rapid growth in sugar and tobacco, high peso yield products, all pushed the average up.

In addition to the shift effects noted, there must have been some improvement in individual crop yields. Examination of the Appendix B peso yield data generally confirm this conclusion. The data show substantial year to year variations for individual crops. Among the foodcrops, however, there appears to have been a modest improvement in yields of rice, corn, and rootcrops, as well as more substantial improvements in

several of the minor crops. Among the commercial crops, coconuts show much annual variation but apparently no improvement; sugar shows definite though modest improvement; and the remaining crops show so much year to year variation that no trends are clearly apparent.

Evidently there has been a modest, on balance, improvement in yields in both groups. This real improvement in yields combined with the small shift effect explains the rises in the yield series of Table 22.

Of what economic significance is the result of the previous paragraph? The yield data are partial productivity measures and do not reflect what is happening to inputs other than land. Without knowing how other inputs increase, it is not possible to conclude with certainty what has happened to total productivity. The principal other inputs are labor, animals, machinery, irrigation, and fertilizer.

Of the inputs not accounted for, annual data are available only for fertilizer. As Table 12 shows, the growth rate of agricultural chemicals has been very much higher than output. Hence, some contribution to the yield improvement must have come from this source. The exact contribution of fertilizer over this period cannot be calculated but some very rough computations suggest that the increased fertilizer use could well account for practically all the increase in individual yields.

Fertilizer experts claim that the output response to fertilizer in the Philippines will provide three pesos in return for each peso of fertilizer utilized.[5] To calculate the effect of the increased use of fertilizer let us assume that agricultural techniques remained the same as they were at the beginning of the period except for increased use of fertilizer. On the basis of this assumption, if all inputs except fertilizer increased at the same rate, and fertilizer increased at one-third the rate of the others, yields per hectare would remain the same. As a round figure, yields in 1955 prices were about ₱ 210 per hectare in 1951. Applying this yield to the 7,860,000 hectares harvested in 1964 gives a hypothetical output of ₱ 1,651 million for that year. Actual output was ₱ 1,882 million, or ₱ 231 million greater. As another round figure, total fertilizer used matching the ₱ 210 per hectare yield was ₱ 25 million. If

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[5]See Esso Standard Fertilizer and Agricultural Chemical Co. (Philippines), "Fertilizer: Its Importance in the Development of Philippine Agriculture," (Manila; 1965). This claim is, of course, dependent on the relative prices of fertilizer and agricultural products. Use of the 3:1 relationship implies a fixed price relationship as well as a particular physical response. The relative price relationship did change over the period, but the change was to reduce the price of fertilizer relative to output. (See Tables 16 and 17). The marginal physical response must, of course, fall as more fertilizer is used relative to other outputs, but the Esso Fertilizer experts suggest that fertilizer use in 1964 was far from the point of equating marginal cost to marginal revenue. Fertilizer use would have to reach ten times its level of 1964 to be near this point. The computations made above therefore seem reasonable.

fertilizer use grew at one-third the rate of the land input, i.e., 1.17 percent instead of 3.2 percent per year, it would have reached ₱29 million in 1964. It actually reached ₱73 million, or ₱44 million more than enough to keep yields at ₱210 per hectare. If the return on this additional fertilizer was actually 3:1, the increased output due to the additional fertilizer would have been 3 x ₱44,000,000 = ₱132,000,000. This figure is well over half the ₱231 million representing the entire yield improvement. If one made any allowance for the effect on peso yields from shifting to higher value crops, the entire (modest) increase in peso yields would be accounted for by these two factors.

The calculations of the previous paragraph are very rough and rest on several untested assumptions. In particular, we do not know what was actually happening to the other inputs to agriculture. One should therefore consider the conclusions as being highly tentative.

The conclusions noted above pertain to crops alone and are based on land productivity. Crops, of course, make up roughly two-thirds of agriculture and what happens to crop productivity will strongly affect productivity of all agriculture. For all agriculture, data are available which permit the calculation of labor productivity for the last 10 years of this study, and these data may give some idea of what is happening in the entire sector.

Table 23 presents estimates of agricultural employment[6] plus the production estimates of this study and the value added estimates of the National Economic Council. Labor productivity is calculated by dividing employment into the constant price output and value added series. The conclusions one draws depends on which series one chooses as better representing the output of agriculture, that of this study or that of the NEC. Output per worker based on the output series of this study shows some year to year variation, but no significant trend either up or down. Value added per worker based on the NEC estimates shows similar year to year variation but a significant downward trend over the 10 year period. If one accepts the NEC series, one must reach seriously pessimistic conclusions about agricultural productivity. For reasons discussed in Part I, however, the output series of this study are, in the author's opinion, to be preferred.

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[6]The employment series are based on sample surveys conducted by the Philippine Bureau of the Census and published in the Philippine Statistical Survey of Households Bulletin. T. K. Ruprecht has adjusted the PSSH series upward to match the population censuses of 1948 and 1960. His series are undoubtedly better than the unadjusted PSSH series, but they stop in 1962. The adjustments that he made apparently do not affect the trend of the series, only its level. Since the trend is the characteristic of interest here, the original PSSH data are used. See T. K. Ruprecht, "Labor Absorbtion Problems and Economic Development in the Philippines," The Philippine Economic Journal, Vol. V, No. 2, (Second Semester 1966), pp. 289-312.

Table 23

Output and Value Added Per Worker in Agriculture
(1955 prices)

Year	(1) Agricultural Employment	(2) Gross Value of Output at Point of Production (This Study ₱ Millions)	(3) Output per Worker (₱)	(3) (Index)	(4) Value Added (NEC) (₱ Millions)	(5) Value Added Per Worker (₱)	(5) (Index)
1956 (Oct.)	4547	2183	480	100	3295	725	100
1957 (")	4997	2248	450	94	3349	670	92
1958 (Nov.)	5277	2279	432	90	3496	662	91
1959 (Oct.)	5297	2396	452	94	3324	628	87
1960 (")	5224	2500	479	100	3192	611	84
1961 (")	5514	2474	449	94	3378	613	85
1962 (")	5898	2685	455	95	3469	588	81
1963 (")	5777	2874	497	104	3639	630	87
1964 (May)	6188	2945	476	99	3533	571	79

Source: Column (1), Bureau of the Census, Philippine Statistical Survey of Households; Column (2), Table (2); Column (3) = (2) ÷ (1); Column (4) Central Bank of the Philippines, Statistical Bulletin; Column (5) = 4 ÷ (1).

The productivity series based on this study's series show no progress, which is certainly not reassuring, but at least they do not show retrogression!

Because of lack of data, nothing can be said directly about the productivity in forestry, fishing, and poultry and livestock. The data for crop yields suggest that a very modest improvement has occurred in the crop productivity. This conclusion, in conjunction with the conclusion that productivity has been stable for all agriculture, would suggest that productivity in the omitted group must have fallen. One hesitates to press this conclusion, however, because much of the data which support it are so shaky. The crop data have serious shortcomings, but for various reasons they are likely to be of better quality than the output data for the rest of agriculture or the employment data. Relatively small changes in productivity, therefore, cannot be measured reliably.

Conclusions

The second part of this paper has been an effort to examine the behavior of production and productivity in Philippine agriculture in the post-war period. For crops, the major component of agriculture, the general conclusion was that once output relative to land and population had

reached pre-war levels, there was at best a very moderate improvement in productivity. For forestry, poultry and livestock, and fishing, there was growth in output but the productivity picture is not clear. Productivity in forestry is an ill-defined concept at best. This is particularly true in the Philippines, because forestry practiced on a sustained yield basis is practically unheard of. It is really similar to mining a non-replacable ore, with the added complication that the government makes only a nominal charge for access to forest lands. The rapid growth of forest products suggests that those producing these products gained considerable financial advantage. For the country as a whole, however, the fact that production with sustained yield is not practiced means that productivity in real resource terms may have been quite low.

For the remaining industries, fishing, and poultry and livestock, the low growth rates relative to the rest of agriculture suggest that their productivity record was a poor one, and there may indeed have been declines.

While production growth rates have been mediocre, one development in Philippine agriculture suggests that there may be significant potential for improvement in the future. This development is the fairly clear response in output patterns to changes in relative prices after 1955. The response to changes in relative prices was particularly marked in comparing the behavior of products dominated by export demand with that of products

dominated by domestic demand. The shifts in production which seem to have occurred because of changes in the price structure suggest that a significant part of agriculture is responsive to monetary incentives and will at least change products under such incentives, if not production methods. If this conclusion is correct, it would seem likely that producers could be induced to improve methods once a suitable set of institutions and incentives was established. One immediately thinks of such things as the provision of credit, making fertilizer readily available, making improved seed varieties available, land reform, etc. The specific policies to establish a suitable set of institutions and incentives is beyond the scope of this paper. The post-war record of Philippine agriculture suggests, however, that a significant part of this industry would respond with improved productive methods if appropriate policies were carried out.

APPENDIX A

Sources of Data and Methods of Estimation of Production by Product and by End Use, Marketing and Processing Costs and Agricultural Chemical Inputs

This appendix contains detailed sources and explanations of the derivation of each of the series given in Tables 1-8 of the text.

Tables 1, 2, 3, 4, 7 and 8 (Production Estimates)

The starting point for all the production estimates was the individual production series. Most of these were manipulated according to the following steps in order to obtain the individual contribution to the various aggregate series:

Step (1): The series on output were obtained in both physical units and current value at the point of production (i.e., at the farm for crops, in the forest for logs, and at point of landing for fish). The physical series were converted to value in constant prices by multiplying by unit value in 1955.

Three problems were important enough in obtaining individual production series to deserve general comment. The first is that, for some products, the original value series were calculated with prices which

included marketing and processing costs. Examples are sugar, egg, and log production. Any series in which the official value data were known to contain marketing and processing costs were adjusted to eliminate this component and thereby obtain value at point of production. The second problem for some series was that reported output series were completely inconsistent with data on use, such as export use and industrial consumption use. In three such cases, coconuts, sugar, and forest products, output series were constructed by working backwards from the use data, since the latter appeared to be more reliable. The third problem concerned output of livestock and poultry. For these items only stock figures as of the end of the crop year were reported for much of the period under study. To obtain estimates of slaughtering, it was necessary to extrapolate slaughter rates backwards from data available for some recent years. Similarly, the production of eggs had to be estimated for early years by using the ratio of eggs produced to number of chickens and ducks. The use of slaughter ratios and egg producing ratios give estimates which are approximately correct for level but which certainly do not satisfactorily reflect year to year changes.

Step (2): After the individual current and constant price production series had been obtained, they were allocated to six end uses: (a) the part used at point of production (e.g., rice consumption on the farms where

subsistence farming is practiced, fish consumption by subsistence fishermen, etc.); (b) the part marketed or processed away from the point of production but consumed by agricultural households (e.g., rice marketed for cash and consumed by agricultural households); (c) the part consumed by industry households (e.g., rice marketed for cash and consumed by urban households); (d) the part utilized by industry as raw materials; (e) the part exported; and (f) the part going into inventory change.

The way in which allocation among these six end uses was accomplished for individual series varied considerably. For some products, such as coconuts and sugar, available data permitted fairly accurate allocation to the important end uses for each year. Allocation was possible for such products because export and industrial uses were known. For others, such as minor food crops, the allocation was made only by informed guesses using fixed proportions to each end use. The detailed descriptions given below explain the procedure used for each product.

Note should be taken at this point of end use (f), the part of production going into inventory change. Data on inventories are generally not available. It was clear from comparisons of available production and end use data, however, that there were significant fluctuations in stocks of some products. For example, some products had substantially greater exports than production in certain years; evidently these products

experienced a significant drawdown of stocks in these years. Abaca showed the largest differences of this sort,[1] but it was clear that sugar, ramie, and pineapple also had significant inventory fluctuations. Therefore, in order to account for all production, an inventory change use was established for these four products. The estimates of inventory changes were only the difference between production and apparent use for the products, since no actual observations of inventories or inventory change were available. For all products except these four, inventory change was assumed to be zero.

The accounting framework has no place for inventory changes. Fortunately, the inventory changes for the above products tended to cancel each other, and for the four together they were generally not significant. For this reason the end use of inventory change was ignored in the aggregate estimates. As noted below, this treatment introduced some minor discrepancies in the production and use data.

The allocation of output among the uses identified above raised the question of how to classify certain products which originate in agriculture.

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[1] Actually tobacco had far greater inventory fluctuations than any other crop, and by 1964 the Philippine Virginia Tobacco Administration had accumulated over ₱100 million worth of Virginia tobacco under its guaranteed buying program. Tobacco, however, was excluded from this study, partly because of the problem of handling this inventory accumulation in the accounting framework.

For example, is sugar consumed by households an industrial or agricultural product? If it is classified as an agricultural product, it will be a part of the flows from agriculture to households (X_{dh} and X_{dL} in the accounting framework), and its processing costs will be part of the intermediate flow from industry to agriculture (N in the accounting framework). If it is classified as an industrial product, it will be part of the flows from industry to households (Y_{dh} and Y_{dL} in the accounting framework) and the sugar cane supplied by agriculture will be shown as part of the intermediate flow from agriculture to industry (R in the framework). The following example shows that for a given set of basic data, the choice made on this problem yields quite different pictures of the economy.

Let us assume that net agricultural output (value added) is ₱10 of which ₱3 goes directly into final use, while the remaining ₱7 is processed in some way before going into final use. The industrial sector performs this processing, valued at ₱2, and produces additional output worth ₱4, a total of ₱6 as industrial value added. The question is: Should the ₱7 of net agricultural output that gets further processing be considered an input into industry, with the final classification being industrial output, or should it be considered agricultural output with the ₱2 of processing being an input to agriculture? The alternative treatments are shown in Figure A-1, "A" representing the former choice and "B" the latter. The arrows point in

the direction of money flows. The flow of real goods and services would, of course, be in the opposite direction.

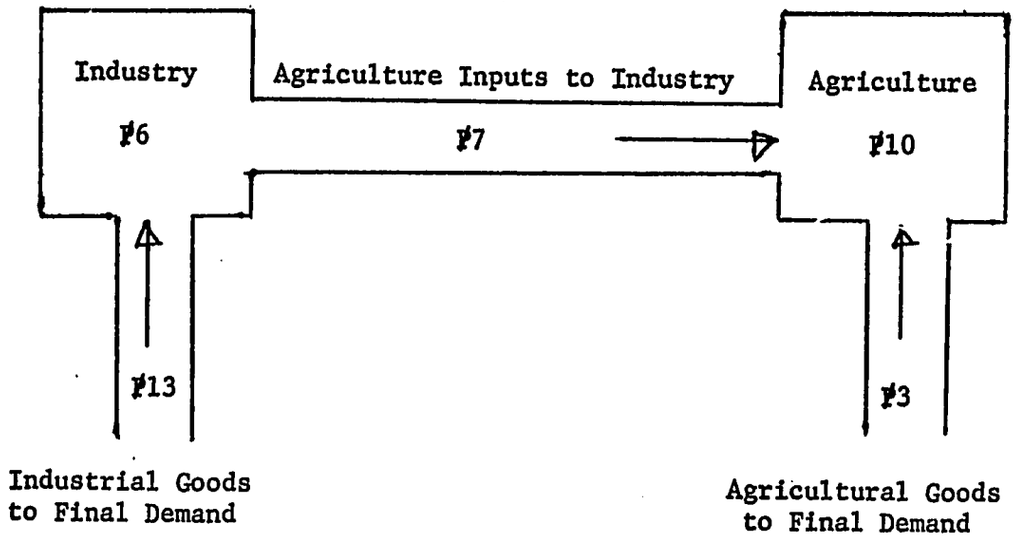
Either treatment shown in Figure A-1 is logical. Both show the value added in each industry and total final demand to be the same. However, the distribution of final demand between the two types of goods and the intersectoral flows are very different.

Choice between the alternatives should depend on the use to which the data are to be put. In the open, dualistic economy framework, the identification of the final demand flows with the sector in which they originate is of importance. For this reason, the treatment illustrated in "B" has been chosen for this study. An additional reason is that classification of the origin of goods for final demand according to alternative "B" will reflect growing intersectoral flows between agriculture and industry if industrialization, in fact, requires increasing supplies of domestic raw materials. Alternative "A", where goods receiving any industrial processing at all would be shown to flow into the industrial sector and hence reckoned as industrial goods, greatly obscures this process. Intersectoral flows from agriculture and industry and the final demand for industrial goods would both be seriously overstated at the start of the development process, and the changes that take place as industrialization proceeds would not be accurately reflected.

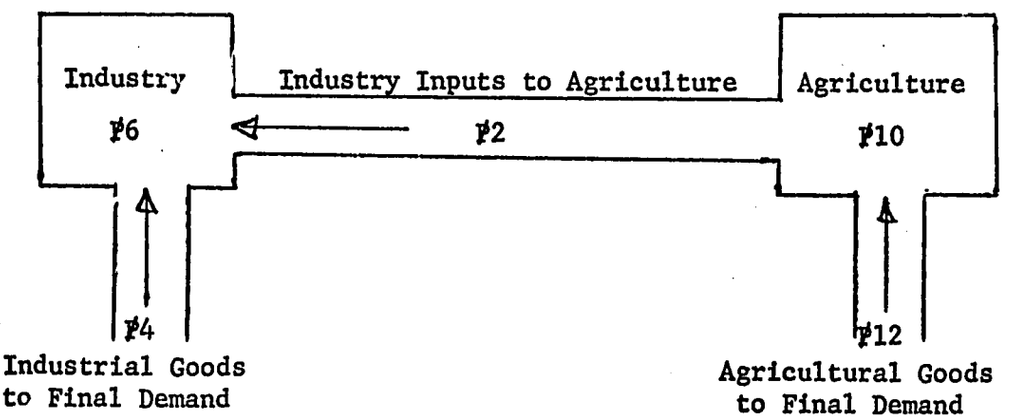
FIGURE A-1

Alternative Treatment of Intermediate Goods and Services

A



B



Note: Arrows point in the direction of money payments; real flows are in the direction opposite to arrows.

The practical classification rules consistent with treatment "B" are: (1) the processing, storage, transportation and marketing services for any product will be classified as an input from industry to the sector in which the goods are produced, and (2) where goods are worked on by both sectors, they will be assigned for final demand purposes to the sector that contributes the larger share of value, excluding the storage, transportation and marketing services. For example, the shares of commodities such as corn, abaca, and lumber which flow into final demand (as consumption or exports) will be classified as agricultural products, Products such as corn starch, abaca rugs, and wooden furniture will be industrial products. Although the latter originate as agricultural products, a dominant part of their value added is industrial. These latter products will, of course, require a flow of intermediate raw materials from agriculture into industry.

Generally, the use of these two rules will mean that any product which has its organic nature changed by processing will be classified industrial. A few borderline cases occurred where one might consider that the organic nature had been changed by processing, yet the value added by processing was not sufficient to have the product classified industrial. Sugar is the only important example in this study. In most other cases, the classification rule produced results which would be the same as some sort of change-in-organic-nature criterion.

Step (3). Once the output valued at point of production had been allocated to the six end uses for each product, marketing and processing margins were estimated. These margins were estimated separately for each product's end uses.

The marketing-processing margin includes the cost of two different types of activities. The marketing function covers storage at various points in the distribution system, transportation between points in the system, and the handling by dealers at each point. Processing would include activities such as rice milling, copra making, production of fiber from abaca leaves, sugar milling, etc. In the accounting framework both types of services are provided to agriculture by industry, and their cost represents an input from industry to agriculture. It is assumed that the physical services provided by industry are constant per unit of individual agricultural product. It would perhaps be of interest to separate the cost of marketing from the cost of processing for various products, but this is impossible with present data. Even if the data were available, it is doubtful how meaningful the split would be. The doubt arises because both kinds of activities are often undertaken by the same individual. Hence, they are all lumped here into a single marketing-processing margin.

The marketing-processing margin was measured by the difference between unit prices at point of production and point of use. This difference represents the cumulative effect of marking up the price of a product in order to cover the costs of marketing and processing as it passes through the marketing-processing system. Thus, the total cost of these services for a product is the margin per unit of output times total output. Clearly this margin shrinks and widens from period to period. This variation is a reflection of the relative pressure on the dealers and processors between supply at the point of production and demand at the point of use. Hence, for the current price series, even though the physical services of marketing and processing per unit of output of product are constant, the margin must be estimated for each year. For the 1955 price series, of course, the unit cost of marketing and processing is constant at its 1955 value.

In practice, it was not possible to measure the marketing-processing margin accurately for a large share of the products. The details for individual products are given below. In summary, however, all products fell into three classes. For one group, sufficient data were available to permit direct estimation of the marketing-processing margins on a year by year basis. For a second group, an estimate could be made for one year from census data and this single margin was applied in all years. For the

remainder, the margins were simply informed guesses, again held constant for all years. The first group included several major products: rice, coconuts, and sugar cane. Hence, a little less than half the value of output was included in products which permitted direct estimation of marketing-processing margins for each year. The remainder of output had its mark marketing-processing margins fixed for the entire period; and, for some products, these margins were only rough guesses. Because constant margins were used for many products, the marketing-processing margin estimates for agriculture as a whole are undoubtedly more fixed in relation to output than was actually the case.

After the three steps outlined above had been accomplished for each agricultural product, it was a straightforward matter to aggregate the appropriate pieces to obtain the output estimates presented in Tables 1, 2, 3, and 4. Briefly, the necessary aggregations were as follows:

Table 1--Output of Agricultural Products in Current Prices: Columns 1 through 4, output valued at point of production, are summations of the appropriate individual current price series obtained in Step (1) above. (The individual series are shown in Table 7). Column 5 is the sum of Columns 1-4. Column 6, the marketing-processing component, is the summation of the marketing-processing estimates for individual products in Step 3.

No sub-aggregates are presented for the marketing-processing because it was felt that they were considerably less reliable than the aggregate.

Table 2--Output of Agricultural Products in 1955 Prices: Aggregations were obtained in the same manner as Table 1 except that estimates in 1955 prices (obtained in Steps 1 and 3) were used in place of the current price estimates.

Table 3--Gross Agricultural Output (X) in Current Prices by Demand Use includes marketing and processing costs. Column 1, Exports of Agricultural Products (E_x), is the summation of the individual product contributions in current prices to (e) of Step 2, plus the corresponding marketing and processing estimates of Step 3. Column 2, Intermediate Goods to Industry (R), is the summation of individual product contributions in current prices to (d) of Step (2) plus the corresponding marketing and processing estimates of Step (3). Column 3, Final Consumption in Agriculture, is the summation of individual product contributions in current prices to (a) and (b) of Step (2), plus the corresponding marketing and processing estimates of Step (3). Column 4, Final Consumption in Industry, is the summation of individual product contributions in current prices to (c) of Step (2), plus the corresponding marketing and processing estimates of Step (3).

Table 4. Gross Agricultural Output (X) in Constant (1955) Prices, by Demand Use. Same as Table 3 except 1955 price data is used instead of current price data.

Note on Tables 1, 2, 3, and 4: Comparison between Tables 1 and 3, and 2 and 4 of total output, including marketing and processing costs, will show small differences between the corresponding pairs of series. These differences are due to the omission of the inventory change end use (f) of Step (2) from the two end use tables. These changes are included implicitly in Tables 1 and 2. They are of relatively small magnitude and the difference between the two sets of output estimates was not considered important enough to adjust either set of estimates. These differences are most certainly less than the inherent errors in the estimates of these tables.

Table 7. Principal Agricultural Products, Current Prices, Valued at Point of Production. This table contains most of the individual series of production in current prices which were obtained as outlined in Step (1).

Table 8. Principal Agricultural Products, 1955 Constant Prices Valued at Point of Production. Same as Table 7 except that data in 1955 prices were used.

Tables 5 and 6. Intermediate Goods and Services from Industry to Agriculture (N) in Current and Constant (1955) Prices. The intermediate goods and services input from industry to agriculture has two components.

The first is agricultural chemicals and the second is the marketing-processing services provided by industry to agriculture. The marketing-processing input is the same as the marketing-processing component of output valued at point of use. The derivation of this series was described above in connection with Tables 1-4, and will not be repeated here.

The agricultural chemical input is essentially a fertilizer series, even though agricultural chemicals include insecticides and other pesticides as well as fertilizer. Unfortunately, data are available only on the latter. Industry sources indicated that the value of insecticides and other pesticides were probably about 10 percent of the value of fertilizer used. Therefore the fertilizer input was estimated as described below and 10 percent of that series was added to allow for all other agricultural chemicals.

The supply of fertilizer is made up of both imports and domestic production. Import data were provided by the Department of Research, Central Bank of the Philippines, and domestic production figures in metric tons came from Market Research Department, The San Miguel Corporation, The Fertilizer Industry in the Philippines, (December 1965). The imports were converted to metric tons and added to the domestic production to get a series of the physical supply of fertilizer. (This procedure is very rough since it weighs different kinds of fertilizer according to their physical weight

rather than peso value or fertilizing potential. Fertilizing potential varies considerably among different kinds of fertilizer.)

To value the physical series, a series of prices of fertilizer at the farm was needed. For this purpose the price of ammonium sulphate was used. Ammonium sulphate is the most popular fertilizer in the Philippines and is in the middle price range of fertilizers. The price series available is the weekly quotations of the Bureau of Commerce. This series is the price of a 45.5 kilo bag of ammonium sulphate at Manila wholesale. To obtain an annual figure, the weekly prices were averaged for the year. To obtain price at farm level, the average Manila wholesale price was increased by 25 percent. This markup was consistent with the price of ₱10 per bag which prevailed at farm level in 1956-57. The current price fertilizer series was therefore the Manila wholesale price per metric ton plus 25 percent times the supply in metric tons; the 1955 price fertilizer series was the same physical supply series times the 1955 price. To these two series 10 percent was added as allowance for insecticides to obtain preliminary estimates of agricultural chemicals.

Inspection of the fertilizer import data, the larger part of fertilizer supply showed violent year-to-year fluctuations. Increases and decreases of 50 to 100 percent were the rule over much of the post-war period. No data are available on consumption at farm level, but it seems

very unlikely that fluctuations in consumption were as great as those in imports. To obtain the final estimates of agricultural chemicals, therefore, the preliminary estimates were smoothed by use of a two-year centered moving average.

Estimates of Individual Agricultural Product Output and Marketing-Processing Margins

The remainder of the appendix is devoted to the detailed description of methods used to obtain the output and marketing-processing margins of individual products. The products are grouped as they are shown in Tables 7 and 8 of the text.

I. Crops

A. Crops Principally for Domestic Utilization

1. This section is made up of 15 commodities, namely: rice, corn, fruits and nuts (except pineapples), rootcrops, vegetables, onions, potatoes, beans and peas, coffee, cacao, peanuts, rubber, maguey, kapok, and cotton.

2. Source of data on quantity and value of production: Crop and Livestock Statistics, Bureau of Agricultural Economics, Department of Agriculture and Natural Resources.

3. Quantity and value of production at farm level were taken as reported by BAE, DANR, with the exception of rubber, of which only

50 percent of the reported value of output was assumed to be its implicit value at farm level, the remaining 50 percent being considered as its processing margin.

Data on potato output from 1949 to 1952 were not available. Production for these years was estimated by extrapolating backward at the actual rate of growth of output in subsequent years.

4. Total output of each commodity valued at farm level was then allocated to its various demand uses, obtained as constant ratios of the value of output, with the exception of rice, where increasing or decreasing ratios were also used.

a. For output which is utilized directly on the farm, the following ratios (estimated by the author) were applied to the output of the following commodities valued at farm level: fruits and nuts (excluding pineapples)--.05; corn, vegetables, and onions--.10; rootcrops, potatoes, and peas and beans--.20 of value of output of farm.

In the case of rice, a decreasing ratio, from .20 to .10 of the total farm value of output from the year 1949 to 1965, was used, with ratios for the intervening years being interpolated from the above stated ratios.

It was assumed that there was no direct utilization at farm of coffee, cacao, peanuts, rubber, maguey, kapok, and cotton.

b. To determine the value of output which was processed and then consumed within agriculture as final use, the following ratios (estimated by the author) were applied to the total value of output of the pertinent commodity: rice, rootcrops, vegetables, onions, potato, beans and peas, coffee, cacao--. 40; fruits and nuts (excluding pineapple)--. 45; corn--. 65; peanuts--. 20; and for maguey, kapok, and cotton--. 10.

c. The value of output which goes to industry was calculated using the following ratios: corn--. 05; peanuts--. 50; maguey, cotton, and kapok--. 90 of the total value of output. In the case of rubber, the whole output valued at farm level (i. e., 50 percent the reported value of output) was classified as a flow to industry.

d. The value of output which goes to non-farm households directly or with minor processing was calculated in the same manner as the other demand uses, with the exception of rice again where an increasing ratio, from . 40 to . 50 of the total value of rice output valued at farm from the year 1949 to 1965, was utilized, with the ratios for the intervening years being interpolated from the aforementioned ratios.

For the rest of the domestic crops, the following ratios were used: corn--. 20; rootcrops, potatoes, beans and peas--. 40; fruits and nuts (excluding pineapples), vegetables and onions--. 50; peanuts--. 30; coffee and cacao--. 60 of the farm value of output.

5. Processing, transportation, storage and marketing margins, taken jointly, were calculated as constant margins over the relevant farm value of output in each demand use, with the exception of rice where certain variations were observed. The following are the margins over the pertinent end use value of output:

a. For the value of processing of output utilized directly on the farm: rice--. 20; for the rest of the crops--. 25.

b. For the value of processing of output processed in some way then consumed within agriculture: rice and corn--. 30; fruits and nuts (except pineapples), rootcrops, vegetables, potatoes, beans and peas, coffee, cacao, and peanuts--. 40; onions--. 35; maguey, kapok, and cotton--. 15 of the farm value of output.

c. For the value of the processing of output that goes into industry: corn and peanuts--. 30; maguey, kapok, and cotton--. 15.

d. For the value of the processing of output that went to non-farm households: corn, fruits and nuts (except pineapples), coffee, cacao, and peanuts--. 45; onions--. 35; rootcrops, vegetables, potatoes, and beans and peas--. 60.

In the case of rice, the average market price of farm per cavan of palay (of 44 kgs.) was multiplied by $\frac{1}{12.77}$ to obtain the palay cost per ganta of rice. This cost was then subtracted from the adjusted Manila

market price per ganta of rice (i.e., fluctuations in the Manila market price had been smoothed out by using a two-year, centered average of the Manila market price) and the difference was assumed to be the processing margin per ganta of rice. The percentages of these processing margins to the values of rice at farm (palay cost per ganta of rice) were calculated and applied to the farm values of output which went to non-farm households to obtain the value of processing.

6. Constant (1955) estimates of output and processing were obtained by using the same procedure, but utilizing the 1955 unit values of output at farm le' el to calculate the values of outputs at farm level for all years.

B. Crops Principally Utilized in Exports

This section is made up of coconuts, sugarcane, abaca, ramie, and pineapples.

The basic procedure was to value output at farm level, allocate output into its various demand uses, then calculate processing margins for each crop in each demand use.

1. Coconuts. Source of data: George L. Hicks, "The Philippine Coconut Industry, Growth and Change 1900-1965," (Field Work Report #17; Washington: Center for Development Planning, National Planning Association,

June 1967), and the BAE, DANR, Crop and Livestock Statistics.

The following are the identified coconut products requiring nut inputs: copra exports, copra meal and cake exports, coconut oil exports, coconut oil used domestically, desiccated coconut exports, foodnuts for the agricultural and non-agricultural households, and home-made oil consumed by the agricultural and non-agricultural sectors.

The first step was to convert each end use to nuts utilizing the following conversion rates:

4 nuts = 1 kg. of copra;

5 nuts = 1 kg. of desiccated coconut;

1 kg. of copra = .60 kg. oil + .30 kg. meal and cake.

Since all copra meal and cake produced were assumed exported, the number of nuts used to produce the exported meal and cake were presumed to be the total number of nuts utilized in the production of both copra meal and cake, and coconut oil. The number of nuts was obtained by the application of the conversion ratio above.

The split between nuts for cake and meal, and oil, into nuts for exported copra meal and cake, exported oil, and domestically used oil was made by taking the proportion of the current value of each component to the total value of the three. This treatment is arbitrary since the same nuts are used for all three products.

The quantity of nuts that went into food nuts and homemade oil was jointly and arbitrarily estimated at 500 million per year for all years. This figure was split into their demand uses, with 60 percent going into farm households and remaining 40 percent to non-farm consumption.

The value of the coconut output at farm level was taken to be the implicit value of a nut as copra times the number of nuts produced.

Processing, transportation and marketing margins all taken together were determined, in the case of copra, to be the difference between the Manila export price of copra (data from Hicks), converted into its equivalent nut price, and the farm level price per nut (DANR unpublished data).

The difference between the value of a nut's worth of desiccated coconut for export and the farm level value of a nut was the combined processing, transportation and marketing margin for desiccated coconut.

For copra meal and cake, and coconut oil, the processing margin was taken to be the difference between the value of a nut's worth of meal and cake, and oil (obtained by dividing the total value of these three products by their nut input) and a nut's worth of exported copra.

To estimate the processing margin for foodnuts and homemade oil, a 10 percent margin over the farm value of output which went to consumption in the agricultural sector, and a 25 percent margin over the farm value of

output which went into non-agricultural consumption were assumed to be appropriate processing margins.

Constant 1955 values of output and processing were obtained by applying exactly the same procedure but utilizing 1955 prices and processing margins.

2. Sugarcane. Total sugarcane output was estimated from its immediate products, i.e., centrifugal sugar, molasses, and muscovada and panocha.

Source of data: George L. Hicks, unpublished data on production and value, exports, and average annual wholesale price of sugar.

From the total output of centrifugal sugar was subtracted the quantity exported and the quantity that went into the production of refined sugar (conversion ratio of centrifugal to refined was 1 to 1) to arrive at the quantity of centrifugal sugar consumed domestically. Of centrifugal sugar consumed domestically, 60 percent was assumed to go into agricultural consumption and 40 percent into non-farm consumption.

Refined sugar exports were then subtracted from total refined sugar output. From the residual, the quantity used as table sugar and the quantity going into industry as raw material for soft drinks, confectionary, etc., was arbitrarily estimated.

First, table sugar consumption was assumed to have increased from 20,000 metric tons in 1949 to 50,000 metric tons in 1965, with the quantities for the intervening years increasing at the interpolated amount of 1,900 metric tons per year.

The remaining quantities of refined sugar were taken as flows to industry.

Table sugar output was split, with 90 percent going into non-agricultural consumption and the remaining 10 percent into agricultural consumption.

The value of centrifugal sugar output at farm level was taken to be 63 percent of the average wholesale price per metric ton times the quantity of centrifugal sugar. (The 63 percent is an average figure for the contractual share going to the planter; the remainder goes to the miller.)

George Hicks' data on the average wholesale price of centrifugal sugar was in pesos per picul, and to obtain the average wholesale price per metric ton, the price per picul was multiplied by 15.81.

Hicks' data on molasses output and exports were also utilized. As in the case of centrifugal sugar, exports were subtracted from total output and from the remainder, or apparent domestic consumption, the flow of industry was estimated (by the author). The residual was charged to inventory change.

Molasses was valued at farm level in the same way as centrifugal sugar, i.e., 63 percent of the average wholesale price of molasses times the quantity of output.

Data on the average wholesale price of molasses were converted from pesos per gallon to pesos per metric ton by multiplying pesos per gallon by 200.15.

Total output of muscovado and panocha was split between agricultural and non-agricultural consumption with 90 percent going to the former and 10 percent to the latter.

Muscovado and panocha output was valued at farm level with the assumption that 70 percent of the average wholesale price of centrifugal sugar per metric ton was the price of muscovado and panocha per metric ton.

For centrifugal sugar, 37 percent of its average wholesale price per metric ton was used as the processing margin per unit of output, except for the quantity of centrifugal sugar that went into the production of refined sugar. For the share going into refined sugar, the price difference per metric ton between refined and centrifugal sugar was added to the average wholesale price of centrifugal sugar.

Similarly, in the case of molasses, processing margin per metric ton was assumed to be 37 percent of the average annual wholesale price of molasses per metric ton.

The value of the processing of muscovado and panocha was arbitrarily estimated at 10 percent over the farm value of the output going into consumption in the agricultural sector, and 90 percent over the farm value of output going into non-agricultural consumption.

The same procedure was used to obtain constant (1955) estimates of output and processing, but 1955 prices and margins were used in valuing both of these items.

3. Abaca. Source of data: Production quantities and values of abaca outputs were taken from the Bureau of Agricultural Economics, Department of Agriculture and Natural Resources; quantities and values of exports, from The Foreign Trade Statistics of the Philippines, published by the Bureau of Census and Statistics.

Production quantity and value of abaca at farm level were taken as reported by the BAE, DANR. Output was then distributed into its two demand uses, i.e., exports and flow to industry. Because data on the domestic utilization of abaca were unavailable, the quantity exported was subtracted from total output to obtain apparent domestic consumption. Apparent domestic consumption was then split, year by year on a judgement (by the author) basis, into flow to industry and the residual inventory change.

Quantity of exports, flow to industry, and inventory changes were

valued at farm level by multiplying the quantities by the unit value of output at farm.

The value of processing was calculated by multiplying output in its various demand uses by the price difference between the unit value of exports (based on the Foreign Trade Statistics data) and the unit value of output at farm level.

Constant 1955 values of output and processing were obtained in the same manner as above, substituting the 1955 unit value and processing margin for the current.

4. Ramie. Source of data: Production quantity and value of ramie were obtained from the BAE, DANR; quantity and value of exports from The Foreign Trade Statistics of the Philippines, published by the Bureau of the Census and Statistics.

Exports were deducted from output after export figures had been converted into the same unit, i.e., metric tons, using the following conversion factors: 1 bale = 126.5 kgs., 1,000 kgs. = 1 metric ton. From the remainder was estimated the flow to industry with any residual being taken to account in inventory change.

Following the usual procedure, the value of processing for all demand uses of output was obtained by multiplying each output by the margin of the unit export price over the unit farm level price.

Constant 1955 values of output and processing were estimated, utilizing the 1955 unit value of production at farm level to value output, and the 1955 processing margin to calculate the processing values.

5. Pineapples. Source of data: Production quantities and values from the BAE, DANR were utilized; quantity and value of exports were obtained from The Foreign Trade Statistics of the Philippines, published by the Bureau of the Census and Statistics.

Because of the unavailability of domestic consumption data on pineapples, it was necessary first to subtract exports from total output to determine that portion of output available domestically.

Data on the quantities of exports were available for three items: canned or preserved pineapple, juices, and concentrates. These were converted into their raw pineapple equivalents by the application of the following conversion factors (estimated by the author):

Preserved pineapples in metric tons x 1.66 = raw pineapples in metric tons. Pineapple juices in metric tons x 2.00 = raw pineapples in metric tons. Concentrates in metric tons x 10.00 = raw pineapples in metric tons.

As a result of the above computations, DANR quantities for production were deemed to be understated when compared to the derived

export quantities. The DANR data was thus blown up by 1.40. From 1949 to 1955 dummy production figures had to be utilized to allow for a more viable trend in the estimated (by the author), domestically consumed output. Any residual was charged to inventory change.

Output consumed domestically was split, with 30 percent going into farm consumption and 70 percent into non-farm consumption.

Output was valued at farm level by multiplying the quantities of output by relevant unit values of output. These latter were derived by dividing the DANR production values by the blown up (DANR production quantities x 1.40) production quantities.

The value of processing of the output which went into exports and inventory change was obtained by multiplying the quantities of export and inventory change by the margin of the unit export value (actual export values divided by the quantities of export after conversion into raw pineapples) over the unit value of output at farm.

For output which went into the consumption of the agricultural sector, a 25 percent margin over its value at farm level was assumed to be the value of its processing; while a 60 percent margin over its farm level value was estimated to be the processing value of the output consumed by the non-agricultural sector.

Constant (1955) estimates of output and processing were obtained

by following the same procedure but using as the unit value of output at farm level and as the processing margin those that prevailed in 1955.

II. Fisheries

Source of Data: Philippine Fisheries Commission, Department of Agriculture and Natural Resources.

The value of output at point of origin was taken as reported by the Philippine Fisheries Commission, DANR. The quantities of exports were valued at point of origin (by multiplying the pertinent unit value of output at point of origin by the respective quantity of export) and then subtracted from the total value of output to obtain the value of domestic consumption.

Output consumed domestically and valued at point of origin was split into its various demand uses (estimated by the author) as constant percentages of domestically consumed output: for output utilized directly at point of production--5 percent, for output processed and then consumed within agriculture--65 percent, for output going to industry for raw materials--5 percent, and for output which was consumed by the non-agricultural households--25 percent of the domestically consumed output.

The value of the processing of fish and fish products in their

various demand uses was calculated as a constant margin over the value at point of origin of the output that went into the relevant end use. The following are the margins used:

For output utilized directly at point of production--. 05

For output processed then consumed within agriculture--. 30

For output that went to industry--. 20

For output consumed by non-agricultural households--. 35

For output that was exported--. 35

The value of output and processing in constant (1955) prices were obtained following the above procedure but utilizing the 1955 unit value of output at farm to value output in its various demand uses.

III. Forestry

1. Source of Data: Bureau of the Forestry (as reprinted in the "Philippine Lumber Producers Association").

2. The basic procedure was to convert each end use into its log (board feet) equivalent value at point of origin, then to calculate the processing margins.

The conversion factors used are as follows:

Plywood in square feet x . 73 = log board feet

Veneer in square feet x . 16 = log board feet

Lumber in board feet x 2. 00 = log board feet

3. Log inputs were required for the following products and end destinations: Logs for log exports

Logs for plywood

Logs for veneer

Logs for domestic lumber

Logs for lumber exports

4. Logs for plywood, veneer, and domestic lumber were considered as flows to industry. Logs for plywood and veneer were derived from the Bureau of Forestry production data using the above stated conversion factors, while domestic lumber output was obtained as a residual after exports were deducted from the Bureau of Forestry total lumber output figures (after both total lumber output and exports had been converted into their log equivalents).

Lumber exports were obtained by merely converting the reported lumber exports into their log equivalents; while log exports were taken as reported by the Bureau of Forestry.

5. Value of logs for veneer and plywood at forest were obtained by multiplying weighted prices (derived from weighted plywood log domestic prices in the Manila wholesale market multiplied by 0.5) by the quantities of output.

Value of domestic and lumber exports at forest were estimated in the same way as plywood and veneer, i.e., by multiplying outputs by the relevant weighted price (derived from weighted lumber domestic prices in Manila wholesale market multiplied by 0.5).

Forest value of log exports were assumed to be 75 percent of the Bureau of Forestry export values.

6. Processing values for all end uses were arbitrarily set at 1/3 of the forest value of each item.

7. Constant (1955) values were estimated following the same procedure but utilizing the 1955 prices, except in the case of log exports where ₱79/thousand board feet was used to value log exports at point of origin.

IV. Livestock and Poultry

A. Livestock

1. This section is made up of six items: carabaos, cattle, hogs, goats, sheep, and horses.

2. Output was assumed to be the number slaughtered, disregarding inventory changes which at times resulted in negative outputs when taken jointly with the number slaughtered.

3. Sources of data:

a. Table I--Livestock: Animals slaughtered and equivalent dressed weights, by kind, Philippines, 1955-1965, Bureau of Agricultural Economics, Department of Agriculture and Natural Resources (BAE, DANR).

b. Animal population by kind, 1948-1965, BAE, DANR.

c. Inventory Values of Animal population, by kind, 1948-1965, BAE, DANR.

4. From 1949 to 1954 the number slaughtered was estimated as a constant percentage of inventory stock, this percentage being based on the ratio of the number slaughtered to inventory stock of the years immediately following where data were available.

The constant slaughter rates applied to each livestock group were as follows:

Carabaos	0.8 %	Goats	24.0 %
Cattle	31.5 %	Sheep	9.5 %
Hogs	52.0 %	Horses	8.2 %

5. Output was valued at farm level by multiplying the number slaughtered by the respective unit stock value of the livestock concerned.

6. Output valued at farm level was then distributed to its various demand uses, estimated by use of constant ratios of output valued at farm. The following are the demand uses and the pertinent ratios applied to the farm value of output of each livestock group:

a. Output which is utilized directly on the farm with any processing performed on the farm itself: hogs and sheep 10 percent, goats 20 percent. It was deemed that, in view of our previous assumption of output being the number of animals slaughtered, carabaos, cattle, and horses had no direct utilization on the farm but required minor processing before consumption by the agricultural sector.

b. Output which is processed in some way and then consumed on farm as final use:

Carabaos	50 %	Goats	40 %
Cattle	10 %	Sheep	30 %
Hogs	30 %	Horses	50 %

c. Output which goes to industry for raw materials: carabaos, hogs, and horses--5 percent; for cattle--10 percent.

d. Output which goes to non-farm households directly or with minor processing:

Carabaos	45 %	Goats	40 %
Cattle	80 %	Sheep	60 %
Hogs	55 %	Horses	45 %

7. Processing, transportation, storage, and marketing margins all taken together were calculated by the application of a constant margin over the farm level value of output of the pertinent livestock group in each demand use. The following are the margins used:

a. For output directly utilized on farm: hogs, goats, and sheep: 10 percent of the value of the relevant output utilized on the farm.

b. For output consumed on the farm after some processing: 25 percent of the value of output of each livestock group consumed in this demand use.

c. For the processing margins of output which went to

industry for raw materials: 10 percent of the farm value of output which went into this particular demand use.

d. For output which went into non-farm households: 35 percent of the farm level of the output which went into this demand use was assumed to be the appropriate processing margin.

Estimates of constant 1955 values of output and processing margins were obtained using exactly the same procedure, but utilizing the 1955 unit stock values to calculate the farm level value of outputs.

B. Poultry and Eggs

This section consists of: chicken, ducks, geese, turkeys and chicken and duck eggs.

Poultry

1. As in the case of livestock, output was assumed to be the number slaughtered.

2. Sources of data:

a. Table 3: Poultry dressed and equivalent dressed weights, by kind, Philippines, 1955-1964, BAE, DANR.

b. Poultry population by kind, 1948-1964, BAE, DANR.

c. Inventory values of animal population, by kind, 1948-1964, BAE, DANR.

3. From 1949 to 1954 the number slaughtered was also estimated as a constant percentage of inventory stock, this percentage being based on the ratio of the number slaughtered to inventory stock of the years immediately following where data were available.

The constant slaughter rates applied to the inventory stock of each poultry group are as follows:

Chickens	52 %	Geese	20 %
Ducks	21 %	Turkeys	31 %

4. The number slaughtered in each poultry group was then multiplied by its respective unit stock value to obtain the farm level value of output.

5. Output valued at farm was then allocated to its various demand uses, obtained as constant ratios of output valued at the farm level. The following are the ratios applied to output valued at farm level:

a. To determine the value of output utilized directly on the farm with any processing performed on the farm itself, 30 percent of the chicken output and 5 percent of the duck output valued at farm were assumed to be directly utilized at farm, while geese and turkey were assumed to have had no direct utilization at farm.

b. For output processed in some way and then consumed on

the farm as final use, 5 percent of geese, duck and turkey output, and 10 percent of chicken output valued at farm level was estimated as the portion of output which went into this demand use.

c. Output which went into non-farm consumption was valued at 95 percent of the farm value of the geese and turkey outputs, 90 percent of the farm value of duck output, and 60 percent of the farm value of chicken output.

6. It was assumed that the value of output which went into exports and to industry for raw materials was too insignificant to merit separate inclusion.

7. In the same way as in the case of livestock, processing margins were calculated as constant margins over the value of output at farm level in each particular demand use.

a. To the value of output utilized directly on the farm, the following margins were used: chickens--15 percent, ducks--15 percent.

b. 25 percent of the farm value of output which was processed then consumed on the farm was gauged to be the value of the processing margin of each poultry group.

c. The processing margin of output which goes to non-farm households was calculated as 40 percent of the farm value of output which went to this demand use.

8. Constant 1955 values of output and processing margins were derived by utilizing the procedure outlined above, but substituting the 1955 unit stock values to obtain the farm level value of output.

Eggs

1. In the absence of reliable data on egg output, the chicken and duck population were used as the basis for estimating chicken and duck egg output. The following eggs-per-foul factors were utilized (calculated by the author):

Chicken population x 23.8 = Chicken egg output

Duck population x 59.0 = Duck egg output

2. The next step was to value egg production at farm level. In the case of chicken eggs, it was assumed that 60 percent of the Manila wholesale egg price was the approximate value at farm, and total annual chicken egg outputs were thus multiplied by their relevant prices at farm to obtain the farm level value of output.

Similarly, it was assumed that 79 percent of the Manila wholesale price of duck eggs was the approximate value at farm and the same procedure was followed to obtain the farm level value of duck egg output.

3. Chicken and duck egg outputs valued at farm were then

distributed into their various demand uses. In the case of chicken eggs, three flows were assumed: 1/3 of the value of output was calculated as the value of output utilized directly on the farm; 1/3 as the value of output going into industry; and the remaining 1/3 as the value of output consumed by the non-farm households.

The value of duck egg output was split equally between farm and non-farm households consumption.

4. No processing margin was attributed to chicken egg output which was utilized directly on the farm. For that portion of chicken egg output which went into industry, processing was estimated as a 33 percent margin over the farm value of output which went into this demand use. For output which went into non-farm households, a 67 percent margin over the farm value of output which went into this demand use was assumed to be the value of processing.

For the value of processing of that portion of duck output which went into non-farm households, a 67 percent margin over the value of said output at farm was assumed to be its processing value.

Constant (1955) values of output and processing were obtained in the same manner as the current values, but using the 1955 farm prices to value output.

APPENDIX B

Department of Agriculture and Natural Resources Data on Physical Production, Value of Product, Area Harvested, and Yield per Hectare for 22 Crops

In this appendix the data published by the Philippine Department of Agriculture and Natural Resources on 22 crops are presented. The data shown here include physical production in metric tons, value of product in current prices, and area harvested. From these data three additional sets of series were derived: value of production in 1955 prices, yield in metric tons per hectare, and yield in output valued in 1955 prices per hectare.

The period covered is crop years 1948 to 1966. A crop year runs from July 1 to June 30 and takes its number from the calendar year in which the second half of the crop year falls. For example, crop year 1948 refers to the year July 1, 1947 to June 30, 1948.

The data presented here are completely unadjusted, i.e., they are as originally published by the DANR. The value series differ from Tables 7 and 8 of the text because adjustments, and in some cases substitutions, of various kinds have been made to arrive at the series used in this study. The adjustments and substitutions are summarized in Part I of the text and are described in detail in Appendix A.

TABLE B-1
Production of Food Crops, 1948-1966
(thousand metric tons)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Food Crops	36497	39451	42657	44186	49967	57811	59791	60542	63481	64701
Palay	22409	24913	26061	26164	28308	31442	31824	32029	32733	33459
Corn	5190	5341	5737	6032	7619	7095	7809	7701	9074	8954
Fruits & Nuts (except citrus)	2855	2864	3259	3633	4036	5288	5601	5955	6150	6383
Citrus	185	191	198	211	202	275	300	315	328	343
Rootcrops	5289	5282	6543	6986	8157	11354	11800	12000	12608	12920
Vegetables (except onions & potatoes)	309	411	469	616	937	1495	1610	1642	1666	1683
Onions	44	45	56	97	99	150	90	125	108	93
Irish Potatoes	6	--	--	--	--	74	72	67	81	96
Beans & Peas	92	142	154	220	382	358	390	400	420	441
Coffee	39	38	40	46	50	57	61	70	71	83
Cacao	7	7	7	8	13	13	14	15	15	16
Peanuts	74	96	123	161	154	170	175	176	179	182
All Other Foodcrops	--	21	11	12	12	41	45	47	48	49

TABLE B-1
(continued)
Production of Food Crops, 1948-1966
(thousand metric tons)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Food Crops	63776	70080	73150	74013	78303	79739	82983	84789	85989
Palay	32035	36845	37395	37048	39101	39670	38429	39925	40726
Corn	8521	10159	11653	12096	12663	12728	12927	13127	13798
Fruits & Nuts (except citrus)	6780	6552	6754	7007	9336	10056	12191	12135	12379
Citrus	362	370	433	539	621	621	614	708	753
Rootcrops	13300	13395	14116	14453	13341	13604	15525	15367	14920
Vegetables (except Onions & Potatoes)	1742	1707	1616	1469	1669	1519	1695	1849	1915
Onions	103	126	170	179	200	152	132	152	164
Irish Potatoes	102	70	66	101	105	151	177	159	169
Beans & Peas	478	491	423	343	330	313	274	257	240
Coffee	96	106	259	323	431	329	393	441	428
Cacao	17	17	30	36	32	34	35	42	40
Peanuts	186	164	153	128	109	111	143	132	137
All Other Foodcrops	54	78	82	300	365	451	448	495	520

TABLE B-2
Production of Commercial Crops, 1948-66
(thousand metric tons)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Commercial Crops	15919	16737	17352	24297	22239	23641	27152	28310	27605	29108
Copra	8828	6981	7801	10719	7485	8564	9420	11029	11400	13192
Desiccated Coconut	452	588	660	660	521	453	425	400	420	540
Sugar: Centrifugal & Muscovado	3958	5191	6540	9302	10189	10861	13520	13044	11633	11030
Molasses	1360	1419	1218	1953	2582	2358	2377	2422	2501	2448
Abaca	995	746	822	1304	1146	1127	1062	1045	1203	1285
Tobacco:										
Virginia	--	--	--	--	--	19	8	101	197	308
Native	223	219	264	299	267	205	268	200	186	201
Ramie	--	--	--	--	--	1	11	17	12	22
Rubber	15	12	13	15	18	19	20	20	20	22
Maguey	67	18	18	28	10	14	12	2	2	25
Kapok (with seed)	18	20	12	12	16	18	27	28	29	30
Cotton (with seed)	3	4	4	4	4	1	2	2	1	5

TABLE B-2
(continued)
Production of Commercial Crops, 1948-66
(thousand metric tons)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Commercial Crops	31286	31044	30963	30246	35199	37954	38968	37641	35939
Copra	12934	10716	10753	10710	13561	14886	14872	14709	14347
Desiccated Coconut	560	504	420	593	628	670	630	627	766
Sugar: Centrifugal & Muscovado	13181	14428	14394	13536	15057	16004	16898	16210	14603
Molasses	2754	3640	3693	3555	3967	4297	4424	4138	3681
Abaca	1246	1115	945	1148	1163	1278	1343	1340	1353
Tobacco:									
Virginia	312	299	342	283	287	254	209	172	148
Native	184	218	298	317	410	422	441	286	433
Ramie	20	25	22	20	37	54	54	55	45
Rubber	26	20	31	37	45	52	60	59	64
Maguey	17	26	21	22	24	24	24	25	27
Kapok (with seed)	33	33	32	23	15	12	12	19	22
Cotton (with seed)	19	20	12	4	5	1	1	1	*

*Less than 0.1 thousand metric ton (2/10/67).

TABLE B-3
Value of Food Crop Production, Current Prices, 1948-1966
(million pesos)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Food Crops	8972	9707	10150	10083	10849	9793	9209	9252	9752	9973
Palay	6564	7355	7686	6947	6953	6781	5995	6121	6094	6213
Corn	990	1069	894	1077	1280	987	1076	1060	1161	1145
Fruits & Nuts (except citrus)	690	601	752	926	1012	706	744	750	822	851
Citrus	64	51	52	71	72	80	124	132	101	111
Rootcrops	431	381	470	633	778	462	489	496	778	804
Vegetables (except Onions & Potatoes)	77	76	95	160	230	302	312	281	334	356
Onions	19	16	22	51	50	47	28	25	34	32
Irish Potatoes	--	--	--	--	--	52	51	15	31	36
Beans & Peas	49	68	74	147	243	176	192	164	201	296
Coffee	48	44	47	117	127	95	94	106	95	111
Cacao	13	14	15	30	49	39	42	44	41	46
Peanuts	24	31	41	57	54	64	58	54	57	58
All Other Foodcrops	--	--	--	--	--	3	4	4	4	4

TABLE B-3
(continued)
Value of Food Production, Current Prices, 1948-1966
(million pesos)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Food Crops	10075	10993	11700	13625	14383	15400	18402	19653	21726
Palay	6352	7054	7119	8383	9023	9488	11982	12277	13141
Corn	1066	1325	1497	1879	1713	1884	2628	2728	3105
Fruits & Nuts (except citrus)	897	881	889	925	1068	1294	1240	1383	1827
Citrus	111	114	105	151	138	154	153	175	185
Rootcrops	741	691	844	1139	1118	1211	1437	1500	1797
Vegetables (except Onions & Potatoes)	355	354	374	348	441	393	428	498	557
Onions	32	38	55	64	69	51	44	48	55
Irish Potatoes	41	34	27	40	40	59	70	63	67
Beans & Peas	230	234	233	191	178	164	148	140	140
Coffee	135	162	381	287	385	475	546	586	600
Cacao	49	50	90	116	95	99	97	113	109
Peanuts	61	51	52	47	42	45	62	56	61
All Other Foodcrops	4	6	14	55	75	82	67	90	84

TABLE B-4
Value of Commercial Crop Production, Current Prices, 1948-1966
(million pesos)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Commercial Crops	4318	4813	4932	6305	5103	5800	6111	6275	5957	6486
Coconut	3263	2630	2608	4196	1842	2469	2112	2414	2555	2999
Sugar Cane	858	1574	1570	2179	2347	2437	3446	3233	2631	2496
Abaca	477	481	526	798	687	608	389	352	354	379
Tobacco:	—	—	—	—	—					
Virginia	--	--	--	--	--	34	15	175	301	472
Native	118	108	207	213	196	72	94	75	71	77
Ramie	--	--	--	--	--	--	7	11	12	22
Rubber	12	10	11	26	21	24	11	13	21	22
Maguey	20	5	6	8	3	5	3	--	--	6
Kapok	6	6	4	4	6	6	8	14	12	12
Cotton	1	--	--	--	--	--	--	--	--	1

TABLE B-4
(continued)
Value of Commercial Crop Production, Current Prices, 1948-1966
(million pesos)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Commercial Crops	7902	7096	8781	7841	10102	11949	13059	14333	--
Coconut	3769	2554	3896	3266	4480	5871	6615	6723	--
Sugar Cane	3108	3449	3499	3217	4285	4731	4946	6263	--
Abaca	387	394	588	653	613	614	789	786	--
Tobacco:									
Virginia	498	556	603	502	477	492	351	292	--
Native	74	79	131	139	168	190	249	158	--
Ramie	17	21	11	10	19	32	32	32	--
Rubber	29	22	35	42	49	58	67	67	--
Maguey	4	6	4	5	5	6	5	5	--
Kapok	12	12	11	7	5	4	4	6	--
Cotton	4	4	2	1	1	--	--	--	--

TABLE B-5
Value of Food Crop Production in Constant (1955) Prices, 1948-1966
(million pesos)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Food Crops	5862	6399	6815	7013	7882	8871	9015	9248	9653	9852
Palay	4282	4761	4980	5000	5410	6009	6081	6121	6255	6394
Corn	715	735	790	831	1049	977	1075	1060	1249	1233
Fruits & Nuts (except citrus)	370	373	411	443	494	669	721	750	779	801
Citrus	77	80	83	88	83	115	125	132	137	143
Rootcrops	215	215	275	290	338	480	488	496	521	534
Vegetables (except onions & potatoes)	53	69	84	112	163	250	269	281	293	297
Onions	9	9	11	20	20	30	18	25	22	19
Irish Potatoes	1	--	--	--	--	17	17	15	19	22
Beans & Peas	38	59	63	88	166	147	160	164	172	180
Coffee	59	57	60	70	75	87	92	106	107	126
Cacao	20	19	21	22	37	38	41	44	44	48
Peanuts	23	29	37	49	47	52	53	54	55	55
All Other Foodcrops	--	--	--	--	--	--	--	--	--	--

TABLE B-5
(continued)
Value of Food Crop Production in Constant (1955) Prices, 1948-1966
(million pesos)

	1958	1959	1960	1961	1962	1963	1964	1965	1966*
Food Crops	9652	10779	11426	11566	12458	12551	12662	13250	13490
Palay	6122	7041	7146	7080	7472	7581	7344	7630	7782
Corn	1173	1399	1604	1665	1744	1753	1780	1807	1899
Fruits & Nuts (except citrus)	852	820	875	889	1127	1250	1409	1529	1559
Citrus	151	152	174	200	231	230	224	261	267
Rootcrops	550	551	570	581	536	550	620	601	576
Vegetables (except Onions & Potatoes)	312	316	304	316	364	327	361	415	430
Onions	21	26	34	36	40	31	27	31	33
Irish Potatoes	24	16	15	23	24	35	41	37	39
Beans & Peas	195	202	176	142	140	123	115	107	100
Coffee	145	161	391	489	652	498	595	668	648
Cacao	50	51	90	106	95	99	103	123	117
Peanuts	57	50	47	39	33	34	43	41	40
All Other Foodcrops	--	--	--	--	--	--	--	--	--

* Preliminary: Because of lack of data, figures for Fruits & Nuts, Citrus, Rootcrops, Vegetables, and Beans & Peas, were obtained by multiplying the 1965 figures by the percentage increase in production from 1965 to 1966.

TABLE B-6

Value of Commercial Crop Production in Constant (1955) Prices, 1948-1966
(million pesos)

	1948	1949	1950	1951	1952	1053	1954	1955	1956	1957
Commercial Crops	3164	3761	3899	5327	4796	5147	5924	6242	6201	6706
Coconuts	1690	1660	1856	2414	1719	1888	2037	2331	2413	2822
Sugar Cane	1014	1740	1642	2332	2562	2734	3379	3271	2926	2784
Abaca	335	252	277	440	386	380	358	352	406	433
Tobacco:	—	—	—	—	—					
Virginia	--	--	--	--	--	34	15	175	341	533
Native	84	82	99	112	100	77	100	75	70	75
Ramie	--	--	--	--	--	1	7	11	8	14
Rubber	16	13	14	16	18	20	11	13	22	23
Maguey	17	4	5	7	3	4	3	--	--	6
Kapok	8	10	6	6	8	9	14	14	15	15
Cotton	--	--	--	--	--	--	--	--	--	1

TABLE B-6
(continued)

Value of Commercial Crop Production in Constant (1955) Prices, 1948-1966
(million pesos)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Commercial Crops	7191	7001	7001	6932	7838	8362	8500	9091	--
Coconuts	2783	2328	2289	2376	2941	3218	3193	3160	--
Sugar Cane	3315	3636	3619	3391	3770	4013	4235	4962	--
Abaca	420	376	319	488	392	431	453	452	--
Tobacco:									
Virginia	539	516	592	489	496	439	361	296	--
Native	69	82	112	119	154	158	165	107	--
Ramie	13	16	14	13	24	35	15	35	--
Rubber	28	21	33	39	48	55	57	63	--
Maguey	4	7	5	6	6	6	15	6	--
Kapok	17	16	16	11	7	6	6	10	--
Cotton	3	3	2	--	--	--	--	--	--

TABLE B-7
Land Utilization for Food Crops, 1948-1966
(thousand hectares)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Food Crops	3291	3487	3609	3713	4091	4522	4585	4891	5276	5449
Palay	2026	2164	2214	2252	2466	2655	2645	2656	2743	2768
Corn	826	866	909	953	1044	1101	1120	1388	1675	1787
Fruits & Nuts (except citrus)	179	187	195	201	227	288	317	332	332	345
Citrus	16	16	17	17	18	17	19	20	21	21
Rootcrops	166	172	186	189	198	259	270	273	280	292
Vegetables (except onions & potatoes)	12	16	18	20	31	84	90	91	92	94
Onions	1	1	2	3	3	4	4	4	4	4
Irish Potatoes	--	--	--	--	--	2	2	3	3	3
Beans & Peas	36	32	34	41	61	61	66	68	70	75
Coffee	10	9	10	10	12	15	17	19	20	22
Cacao	4	4	4	4	6	7	7	7	6	7
Peanuts	14	19	21	22	24	27	28	28	29	29
All Other Foodcrops	--	1	1	1	1	2	2	2	2	2

TABLE B-7
(continued)
Land Utilization for Food Crops, 1948-1966
(thousand hectares)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Food Crops	5470	6351	6008	6118	6073	5977	5869	5995	6062
Palay	3154	3329	3307	3198	3179	3161	3087	3200	3109
Corn	1381	2107	1846	2046	2016	1950	1898	1923	2106
Fruits & Nuts (except citrus)	366	349	320	359	367	366	365	372	353
Citrus	22	22	23	28	29	29	28	29	29
Rootcrops	300	300	289	283	261	264	288	274	263
Vegetables (except onions & potatoes)	96	92	72	54	55	48	47	46	47
Onions	4	5	7	6	6	5	4	5	5
Irish Potatoes	4	2	2	2	2	3	3	3	3
Beans & Peas	81	82	78	63	67	69	61	56	55
Coffee	23	26	31	39	50	42	42	44	46
Cacao	7	7	7	10	9	10	9	10	9
Peanuts	31	27	24	22	20	19	25	24	26
All Other Foodcrops	3	4	4	11	11	12	12	11	12

TABLE B-8

Land Utilization for Commercial Crops, 1948-1966
(thousand hectares)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Commercial Crops	1375	1434	1567	1530	1524	1539	1556	1543.8	1540.9	1555.8
Coconut	960	966	985	987	988	990	990	990.0	992.0	992.0
Sugar Cane	82	129	130	169	201	225	265	267.7	290.2	234.7
Abaca	283	283	291	305	275	272	239	217.0	216.8	231.5
Tobacco:	--	—	—	—	—					
Virginia	--	--	--	--	--	3.3	4.7	15.5	35.3	37.7
Native	33.7	38.7	41.1	50.8	46.4	35.4	43.5	37.1	39.8	42.9
Ramie	0.3	0.47	0.35	0.39	0.36	0.70	1.30	2.9	2.9	2.9
Rubber	3.3	5.0	3.4	5.9	5.4	5.0	5.0	5.0	5.0	5.0
Maguey	8.1	7.9	7.0	7.2	3.8	3.9	3.8	3.0	3.0	2.5
Kapok	3.3	3.4	3.4	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Cotton	1.0	1.2	1.2	1.2	1.2	0.5	1.0	2.5	2.8	2.8

TABLE B-8
(continued)
Land Utilization for Commercial Crops, 1948-1966
(thousand hectares)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Commercial Crops	1526.8	1558.6	1589.0	1715.4	1844.9	1957.3	2087.1	2256.5	2234.5
Coconut	985.6	1006.1	1059.4	1199.9	1283.7	1392.3	1482.9	1604.7	1610.9
Sugar Cane	238.7	252.2	242.2	232.2	254.7	258.8	269.9	350.5	315.3
Abaca	192.8	192.5	175.2	174.6	182.6	181.9	210.5	199.3	198.0
Tobacco:									
Virginia	48.7	49.0	51.7	45.2	47.3	41.3	34.5	28.8	25.4
Native	36.1	42.0	44.1	45.9	55.2	56.1	61.0	47.3	60.3
Ramie	1.5	1.7	1.7	2.0	2.6	3.2	3.2	3.1	2.8
Rubber	5.0	4.9	5.2	10.1	14.4	18.1	19.8	17.0	15.7
Maguey	2.3	3.7	2.9	2.6	3.0	2.9	2.5	2.7	3.9
Kapok	3.2	3.2	3.4	2.3	2.6	2.6	2.7	3.0	3.1
Cotton	2.9	3.5	2.2	0.6	0.8	0.1	0.1	0.1	*

*Less than 1 thousand hectares.

TABLE B-9
Physical Yield of Food Crops, 1948-1966
(metric tons per hectare)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Food Crops	1.11	1.13	1.18	1.19	1.22	1.28	1.30	1.24	1.20	1.19
Palay	1.11	1.15	1.18	1.16	1.15	1.18	1.20	1.21	1.19	1.21
Corn	.63	.62	.63	.66	.73	.64	.70	.55	.54	.50
Fruits & Nuts (except citrus)	1.59	1.58	1.67	1.86	1.78	1.84	1.77	1.79	1.85	1.86
Citrus	1.16	1.16	1.19	1.21	1.15	1.62	1.60	1.59	1.60	1.60
Rootcrops	3.19	3.07	3.52	3.70	4.12	4.38	4.40	4.40	4.50	4.43
Vegetables (except onions & potatoes)	2.53	2.62	2.59	3.13	3.06	1.78	1.80	1.79	1.81	1.80
Onions	4.40	3.21	2.66	3.73	2.91	3.94	2.30	3.13	2.97	2.65
Irish Potatoes	1.50	--	--	--	--	4.11	4.00	2.57	2.70	3.00
Beans & Peas	.26	.45	.45	.53	.63	.59	.59	.59	.60	.58
Coffee	.41	.41	.40	.45	.40	.37	.35	.36	.36	.39
Cacao	.18	.17	.16	.19	.21	.19	.21	.23	.23	.24
Peanuts	.54	.52	.59	.72	.62	.62	.62	.61	.62	.62
All Other Foodcrops	--	2.10	2.20	2.00	2.00	2.15	2.14	2.13	2.08	2.04

TABLE B-9
(continued)
Physical Yield of Food Crops, 1948-1966
(metric tons per hectare)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Food Crops	1.16	1.10	1.22	1.21	1.28	1.33	1.41	1.41	1.42
Palay	1.01	1.11	1.13	1.16	1.23	1.25	1.24	1.25	1.31
Corn	.62	.48	.63	.59	.63	.65	.68	.68	.66
Fruits & Nuts (except citrus)	1.85	1.87	2.11	1.95	2.54	2.75	3.34	3.26	3.51
Citrus	1.64	1.68	1.89	1.94	2.17	2.13	2.16	2.47	2.64
Rootcrops	4.44	4.46	4.88	5.11	5.10	5.14	5.39	5.61	5.60
Vegetables (except onions & potatoes)	1.82	1.86	2.24	2.73	3.01	3.18	3.64	4.03	4.07
Onions	2.78	2.42	2.62	3.25	3.33	3.14	3.14	3.16	3.15
Irish Potatoes	2.83	2.92	3.14	4.59	4.77	6.04	6.80	6.36	6.76
Beans & Peas	.59	.60	.54	.54	.49	.45	.45	.46	.44
Coffee	.41	.41	.85	.83	.86	.78	.94	1.00	.94
Cacao	.24	.24	.45	.38	.35	.35	.38	.43	.43
Peanuts	.61	.62	.63	.59	.55	.57	.56	.54	.53
All Other Foodcrops	2.00	2.22	2.05	2.68	3.28	3.88	3.79	4.34	4.44

TABLE B-10

Physical Yield of Commercial Crops, 1948-1966
(metric tons per hectare)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Commercial Crops	1.16	1.17	1.18	1.59	1.46	1.59	1.74	1.83	1.79	1.87
Coconut	.97	.78	.86	1.53	.81	.91	.99	1.15	1.19	1.38
Sugar Cane	6.49	5.12	5.98	6.66	6.35	5.88	6.00	4.88	5.38	5.74
Abaca	.35	.26	.28	.43	.42	.41	.44	.48	.55	.56
Tobacco:	--	--	--	--	--					
Virginia	--	--	--	--	--	.58	.17	.65	.56	.82
Native	.66	.56	.64	.59	.58	.58	.62	.54	.47	.47
Ramie	--	--	--	--	--	.14	.85	.59	.41	.76
Rubber	.45	.24	.38	.28	.33	.38	.40	.40	.40	.44
Maguey	.83	.23	.26	.39	.26	.36	.32	.07	.07	1.00
Kapok	.55	.59	.35	.34	.53	.60	.90	.93	.97	1.00
Cotton	.30	.33	.33	.33	.33	.20	.20	.08	.04	.17

TABLE B-10
(continued)
Physical Yield of Commercial Crops, 1948-1966
(metric tons per hectare)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Commercial Crops	2.05	1.99	1.95	1.76	1.91	1.94	1.87	1.67	1.61
Coconut	1.36	1.12	1.05	.94	1.11	1.12	1.05	.96	.97
Sugar Cane	6.68	7.16	7.47	7.36	7.47	7.84	7.90	5.81	5.80
Abaca	.65	.58	.54	.66	.64	.70	.64	.67	.68
Tobacco:									
Virginia	.64	.61	.66	.63	.61	.62	.61	.60	.58
Native	.51	.52	.68	.69	.74	.75	.72	.60	.72
Ramie	1.33	1.47	1.29	.10	1.42	1.69	1.69	1.77	1.61
Rubber	.52	.51	.60	.37	.31	.29	.30	.35	.41
Maguey	.74	.81	.72	.85	.80	.83	.96	.93	.69
Kapok	1.03	1.03	.94	1.00	.58	.46	.44	.63	.71
Cotton	.66	.57	.55	.66	.62	1.00	1.00	1.00	1.00

TABLE B-11
Peso Yield of Food Crops, 1948-1966
(pesos per hectare, 1955 prices)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Food Crops	178.1	183.5	188.8	188.9	192.7	196.2	196.6	189.1	183.0	180.8
Palay	211.4	220.0	224.9	222.0	219.4	226.3	230.0	230.5	228.1	231.0
Corn	86.6	84.9	86.9	87.2	100.5	88.7	96.0	76.3	74.6	69.0
Fruits & Nuts (except citrus)	206.7	199.5	210.8	220.4	217.6	232.3	227.6	225.7	234.3	232.2
Citrus	484.3	487.8	500.0	508.7	474.2	676.5	664.9	670.1	668.3	668.2
Rootcrops	129.5	125.0	147.8	153.4	170.7	185.3	182.2	181.9	186.1	183.1
Vegetables (except onions & potatoes)	434.4	439.5	491.7	568.5	532.7	296.9	300.6	307.8	319.1	317.3
Onions	900.0	642.9	523.8	769.2	588.2	789.4	461.5	625.0	611.1	542.9
Irish Potatoes	250.0	--	--	--	--	944.4	944.4	576.9	633.3	687.5
Beans & Peas	105.8	185.0	185.3	212.6	274.3	241.8	242.1	242.2	245.7	238.7
Coffee	621.1	619.6	612.2	686.3	604.8	564.9	528.7	552.1	540.0	586.0
Cacao	512.8	475.0	525.0	523.8	587.3	567.2	602.9	676.9	687.5	716.4
Peanuts	167.9	155.9	176.2	219.7	188.8	189.8	187.9	190.1	191.0	187.7
All Other Foodcrops	--	--	--	--	--	--	--	--	--	--

TABLE B-11
(continued)
Peso Yield of Food Crops, 1948-1966
(pesos per hectare, 1955 prices)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Food Crops	176.5	169.7	190.2	189.0	205.1	210.0	215.8	221.0	222.5
Palay	194.1	211.5	216.1	221.4	235.0	239.8	237.9	238.5	250.3
Corn	85.0	66.4	86.9	81.4	86.5	89.9	93.8	94.0	90.2
Fruits & Nuts (except citrus)	232.9	235.0	273.8	248.0	307.5	341.5	386.5	411.0	441.6
Citrus	683.3	690.9	759.8	719.4	807.7	790.3	788.7	912.6	936.8
Rootcrops	183.5	183.8	197.2	205.6	205.1	208.0	215.4	219.7	219.2
Vegetables (except onions & potatoes)	326.0	338.1	421.6	587.4	657.0	685.5	776.3	906.1	914.9
Onions	567.5	500.0	523.1	654.5	666.0	645.8	642.9	645.8	634.6
Irish Potatoes	666.7	666.7	714.3	1045.4	1090.9	1400.0	1596.9	1480.0	1560.0
Beans & Peas	240.4	247.5	225.1	225.0	208.3	178.5	188.2	191.1	182.1
Coffee	619.7	628.9	1282.0	1153.8	1293.7	1185.7	1416.6	1507.9	1417.9
Cacao	704.2	939.1	1363.6	1164.8	1044.0	1076.1	1119.6	1281.3	1244.7
Peanuts	186.9	188.0	193.4	178.9	168.4	134.9	170.6	170.1	155.0
All Other Foodcrops	--	--	--	--	--	--	--	--	--

TABLE B-12

Peso Yield of Commercial Crops, 1948-1966
(pesos per hectare, 1955 prices)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Commercial Crops	230.1	280.7	265.8	348.2	314.7	334.4	380.7	404.3	402.4	431.0
Coconut	176.0	171.8	188.4	244.6	174.0	190.7	205.8	235.5	243.2	284.5
Sugar Cane	1236.6	1348.8	1263.1	1379.9	1274.6	1215.1	1275.1	1221.9	1218.2	1186.2
Abaca	118.4	89.0	95.2	144.3	140.4	139.7	149.8	162.2	187.3	187.0
Tobacco:	—	—	—	—	—					
Virginia	--	--	--	--	--	1030.3	319.1	1129.0	966.0	1413.8
Native	249.2	211.9	240.8	220.5	215.5	217.5	229.8	202.2	175.9	174.8
Ramie	--	--	--	--	--	142.8	538.5	379.3	275.9	482.8
Rubber	484.8	260.0	411.8	296.3	333.3	400.0	220.0	260.0	440.0	460.0
Maguey	209.9	50.6	71.4	97.2	78.9	102.6	78.9	--	--	240.0
Kapok	242.4	294.1	176.5	171.4	266.6	300.0	466.6	466.6	500.0	500.0
Cotton	--	--	--	--	--	--	--	--	--	--

TABLE B-12
(continued)
Peso Yield of Commercial Crops, 1948-1966
(pesos per hectare, 1955 prices)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Commercial Crops	471.0	449.2	440.9	404.1	424.8	453.2	407.3	406.8	--
Coconut	279.5	321.4	216.1	198.0	229.1	231.1	215.3	196.2	--
Sugar Cane	1388.8	1441.7	1494.2	1460.4	1480.2	1550.6	1569.1	1415.7	--
Abaca	217.8	195.3	182.0	279.5	214.7	236.9	215.2	226.8	--
Tobacco:									
Virginia	1106.8	1053.1	1145.1	1081.9	1048.6	1063.0	1046.3	1027.8	--
Native	191.1	195.2	254.0	259.2	279.0	281.6	270.5	226.2	--
Ramie	866.7	941.2	823.5	650.0	923.1	1093.8	468.7	1129.0	--
Rubber	560.0	428.6	634.6	386.1	333.3	303.9	287.9	370.6	--
Maguey	173.9	189.1	172.4	230.8	200.0	206.9	600.0	222.2	--
Kapok	531.2	500.0	470.6	478.3	269.2	230.8	222.2	333.3	--
Cotton	103.4	85.7	90.9	--	--	--	--	--	--