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A BALANCE SHEET OF AGRICULTURE FOR FINLAND 1948—1967

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A BALANCE SHEET OF AGRICULTURE FOR FINLAND

1948 - 1967

A Study on the Amount and Distribution of Capital Invested in Finnish Agriculture

RISTO IHAMUOTILA B.F. STANTON

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PREFACE

Finnish agriculture will likely experience some rather marked structural changes in the 1970's. The total number of farms as well as agricultural population will decline while the average size of farms is expected to increase. One of the most important tasks in agricultural policy will be to insure that farmers receive sufficient capital to finance these changes. In order to evaluate the amounts of capital needed, basic data on the total amount of capital invested in Finnish agriculture is necessary. The study was carried out to provide that information.

The study was started in the Agricultural Economics Research Institute, Finland in the spring 1967 during the sabbatical leave of professor B.F. Stanton of Cornell University, at the Institute. The study was continued and completed by the undersigned, after an interval of nearly two years, first in Finland and from September 1969 at Cornell University, U.S.A. The chapters on buildings, machinery and equipment and receivables were largely written by Dr. Stanton. The undersigned is primarily responsible for the rest of the chapters.

The study has been also published in the series of Cornell University (Agricultural Economics Research 319). Some minor changes have been made, however, for the issue published in Finland.

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Helsinki, September 1970

Risto Ihamuotila

Contents

1. INTRODUCTION

11. General Review on Topic

A balance sheet for an individual firm provides a summary statement of its asset and debt position. Over a period of years such balance sheets provide a record of growth and development, of changes in net worth, and changes in structure, if any. It is one of the most commonly used devices in studying and understanding the nature of individual businesses and corporations, a commonly accepted means of describing an economic organization.

The construction of a balance sheet for an industry is less common although the concepts involved are essentially the same. All the individual businesses making up an industry are considered as if they were one large organization. Individual assets and debts must be merged into one total. For purposes of public policy such aggregation has some advantages. One can see the whole and the effects of change on an industry over time. Much is obscured by the aggregation process but the broad elements of change are also made to stand out.

A balance sheet of agriculture has been prepared in the United States for the years since 1940 as a regular part of the research effort of the Department of Agriculture (i.e.USDA 1967). Similar estimates have been prepared by TOSTLEBE (1954, 1957) extending the series for the United States back to 1870 for each of the census years. Individual balance sheets have been constructed for agriculture in given states. Minnesota constructed such a series in the 1950's (COX) and New York developed such a series in 1968 (TUBBS and SMITH).

In a similar manner balance sheets for agriculture have been constructed in many western countries with the support and encouragement of FAO. A common format has been developed for member countries in OECD (1969 a and b). Basic statistics are now sought to evaluate public policy proposals and to observe changes in plant and equipment in agriculture in member countries. In Europe also some separate studies have been made; for example, by MÜLLER and SCHMIDT (1959) and by BOLIN (1969).

A balance sheet of agriculture has not been constructed previously on a regular basis in Finland. Many series appropriate to such a statement have been kept over a period of years by various government and private agencies. A special theoretical study of the capital stock in the form of buildings and related facilities was made by KOLJONEN (1968). Balance sheets for individual farms involving both agriculture and forestry were developed by IHAMUOTILA (1970).

12. Elements of a Balance sheet

One commonly thinks of a balance sheet as presenting a complete picture of the asset and debt position of a firm at some point in time. When considering an industry the specific point in time may be less important as long as one is consistent from year in the selection of a date to estimate specific assets and debts. The balance sheet then should show how assets and debts have changed from year to year and what the change in net worth for an industry has been.

In agriculture assets are concentrated to an important extent in real estate or land, land improvements and buildings. This concentration of assets in land complicates the evaluation of capital investment because the market for land is imperfect and land prices were often difficult to establish. Non-real estate assets include livestock, machinery and equipment, and inventories of supplies used in production and goods in process or in storage for sale or later use on the farm.

An indication of the importance of land and buildings in the total asset structure of farms is presented in Table 1. While the American situation may differ from that in other countries to some degree, there is also much that is similar. This table provides a basis for considering the elements of the balance sheet itself and for discussing alternative ways of presenting the asset and debt structure of an industry.

Table 1. Comparative Balance Sheet of Farms, United States, 1950, 1960 and 1967

Items	1950	1960	1967
	- Billion dollars -		
ASSETS			
Physical assets:			
Real estate	75.3	172.2	182.0
Livestock	12.9	17.5	18.8
Machinery and motor vehicles	12.2	27.1	28.9
Crops stored on and off farms	7.6	9.7	10.0
Household furnishings, etc.	8.6	8.6	8.5
Financial assets:			
Deposits and currency	9.1	10.0	10.3
U. S. Savings Bonds	4.7	4.1	4.0
Investments in cooperatives	2.1	6.5	7.0
Total Assets	132.5	255.7	269.5
DEBTS			
Liabilities:			
Real estate debt	5.6	21.2	23.3
Non-real estate debt to -			
Commodity Credit Corporation	1.7	1.4	1.2
Other credit institutions, Personal and merchant	5.1	19.0	21.2
Total Liabilities	12.4	41.6	45.7
Proprietor's Equities	120.1	214.1	223.8
Total	132.5	255.7	269.5

Source: The Balance Sheet of Agriculture 1967. U.S.D.A. Agriculture Information Bulletin 329.

The perspective of the American balance sheet is that of ownership of agriculture by farm families.. Thus, the asset and debt position shown does not separate the non-agricultural assets of farmers from those in agriculture. Personal investments, farmers' homes and personal possessions, and savings are all included in the balance

sheet. As a result, the totals really describe the financial position of American farmers taken as a group and not agriculture as if it were a giant corporation. The productive resources of agriculture would be something less than this total, although the difference would not be too great since most farmers in the United States do not have a second major enterprise such as forestry to complicate the industry accounts.

If the objective of preparing a balance sheet for a national industry such as agriculture is to show change through time in that industry and to provide a basis for evaluating that change in terms of productivity or efficiency calculations, then a basic issue in the construction of a balance sheet is the exclusion of other personal property to which farmers have title. In the case of Finland, concurrent ownership of farm and forest by individual farmers forces recognition of this issue immediately. Over the years these two enterprises have usually been considered separately in farm accounting, national income accounts, and public policy. While this separation is somewhat artificial in terms of the income or welfare of the farm family itself it is more than academic in terms of aggregate considerations such as exports, imports and investment policy. For purposes of analysis or description, it is important to consider agriculture and forestry as individual industries on the national level.

Once such a decision is accepted, then the structure of the balance sheet itself can be considered in more detail. This means that the farmer's personal wealth or lack of it is not of primary interest. The residence on a farm is no more a part of agriculture than it is of forestry on an industrial basis. Insofar as possible it must be excluded from the real estate totals, much in the same manner as residential construction is separated from other construction in the national income accounts.

Conceptually then a balance sheet for agriculture in Finland should differ from the one prepared annually in the United States. Assets would include those used in agricultural production, the business assets of agriculture. Financial assets other than the working capital of the farm business would be separated and left out

of the analysis. In the same manner debts should be business debts, not personal items. But this is of course easier to state than to develop with firm figures. It is the farmer, not the farm, who borrows money even though farm property is often used as security. Short term debt, while ostensibly for business purposes, may in fact allow purchase of consumption goods. On the other hand, long term debt can be used not only in agriculture but also in forestry and in residential construction. Nevertheless, the intention is clear. The elements of the balance sheet should present a picture of the capital position of the agricultural industry in the country, with farmers' other capital resources separated as clearly as possible from agriculture itself.

13. Objectives and Procedures of Study

The objective of this study is to develop annual balance sheets for the agricultural industry of Finland for the postwar years, from 1948 to the present. Emphasis will be placed on the asset side of the balance sheet. While the debt position of the agricultural industry is of interest, it is obviously influenced strongly by other considerations than the economic health of agriculture itself. But capital inputs and structural changes in the use of this capital have primary importance. As a result a greater number of individual categories of agricultural assets will be considered separately than were presented in Table 1.

There are basic differences between real estate and working capital invested in agriculture. To contrast these changes through time, the following categories of assets have been established for separate considerations:

Real Estate
- Land
- Land Improvements
- Buildings

Working Capital
- Livestock
- Horses
- Machinery and Equipment
- Supplies
- Growing Crops
- Receivables

Excluded from consideration will be capital investments in housing for the farm operator and his family as well as capital invested in non-agricultural enterprises such as forestry and recreation.

Estimates of the capital stock will be made both in current and constant prices. The base year for the series in constant prices is 1954. In many respects this series will most accurately reflect changes in the volume of investment and the changing structure of that investment through time.

14. Sources of Data

The stock of capital invested in any given type of asset at a point in time reflects the physical quantity or number of items and the prices or values of these individual units. A balance sheet while presented in value terms in summary form, must be constructed from physical information insofar as possible. Hence, both physical and financial sources of information are necessary on an annual basis.

Three basic sources provide most of the information used in this study. First there are the national income statistics for agriculture prepared annually by Central Statistical Office, Finland. Gross domestic capital formation within agriculture is estimated annually for machinery and equipment, buildings and land improvements.

Depreciation accounts are also developed for these three forms of capital investment. A second source is the agricultural statistics where physical information on the use of land, numbers of livestock, and crop production are made available annually. Thirdly, the annual calculations for agriculture prepared by the Agricultural Economics Research Institute provides some information on investments, inputs and outputs for this national industry. The institute also constructs an annual food balance sheet which appraises all national data on the use of crops and provides a running inventory of crops in storage. Further, the Institute maintains a national farm account summary. Each year data have been published on capital investments in agriculture on more than 1000 bookkeeping farms scattered all over the country. Although these are not aggregate figures and the farms cannot be considered a random sample of all farms in Finland,this continuous series provides valuable information for estimating the nature of change in investment in agriculture as a whole through time.

15. Contribution of Agriculture to the Total Finnish Economy

Despite the loss of 10 percent of her agricultural land at the end of the war and heavy depletion of working capital, Finland made a strong recovery in the immediate postwar years. Agricultural output soon reached prewar levels and then slowly but steadily continued to increase. As in nearly all western countries during the last 10 years agricultural policy has now turned to controlling the capacity of agriculture to produce and directing that capacity toward products where there is effective demand.

Comparative information on total production and the level of prices for the agricultural sector and the total economy are presented in Table 2. During the 20 postwar years gross domestic product increased by 7.5 times while agricultural production tripled. Even though both of these rates of growth far surpass those of most other periods in the country's history, it is clear that the agricultural sector has not contributed as much to national growth as some other

sectors. Agriculture's share of gross domestic product has declined from 20 percent in 1948 to 8.6 percent in 1967. This trend is similar to that found in most other developed countries during the same period.

During this period of expansion agricultural prices as well as those in the rest of the economy increased quite rapidly. Inflation was somewhat greater than in many other European countries but did not get out of hand. Agricultural prices increased somewhat more rapidly than consumer prices, but the two series moved together quite consistently.

Even though producer prices were generally favorable, per capita incomes in agriculture increased at a somewhat slower pace than in most other industries in the country. This fact combined with increased substitution of capital for labor in agriculture encouraged migration of excess labor out of agriculture into other industries. Unfortunately, applications of new technology in many industries proceeded at slow enough a pace so that the Finnish economy had some difficulty in absorbing excess labor from agriculture and some other sectors. As a result, there may continue to be some underemployment of labor in Finnish agriculture despite the general increases in productivity observed over the past 20 years.

Table 2. Growth in the Economy as a Whole and the Agricultural Sector in Finland 1948-1967

Year	Gross domestic product		Gross domestic product of agriculture			Volume index for agric. production	Index of prices received by farmers	General cost of living index
	Mil. mks	Index (1954=100)	Mil. mks	(1954=100)	Percent of total	(1954=100)	(1954=100)	(1954=100)
1948	3 545.6	45	723.9	77	20.4	85	59	70
1949	3 764.4	47	673.3	71	17.9	94	73	71
1950	4 772.3	60	752.3	80	15.8	94	82	81
1951	6 975.0	88	861.6	91	12.4	93	99	94
1952	7 159.8	90	898.7	95	12.6	101	103	98
1953	7 101.2	89	932.0	99	13.1	100	101	100
1954	7 950.5	100	943.5	100	11.9	100	100	100
1955	8 992.2	113	1 021.3	108	11.4	90	111	97
1956	9 911.3	125	1 115.7	118	11.3	91	127	108
1957	10 552.1	133	1 195.0	127	11.3	98	128	120
1958	11 376.5	143	1 355.3	144	11.9	104	134	128
1959	12 503.5	157	1 450.7	154	11.6	111	138	130
1960	14 082.1	177	1 506.8	160	10.7	115	147	134
1961	15 708.1	198	1 632.3	173	10.4	120	147	137
1962	16 770.0	211	1 655.0	175	9.9	118	149	143
1963	18 532.4	233	1 788.4	190	9.7	117	156	150
1964	21 140.3	266	1 999.8	212	9.5	127	168	165
1965	23 145.7	291	2 040.6	216	8.8	120	186	173
1966	24 746.1	311	2 165.8	230	8.8	122	189	180
1967	26 855.9	338	2 303.1	244	8.6	121	200	189

Sources: MARJOMAA, P. 1968. National income statistics for agriculture 1948-1965. Repr. Tilastokats. 9, 66 p. Statistical Yearbook of Finland, Volumes 1948-67. Tilastotiedotus 15.4.1969. Tilast. Päätoim. Agric.Ec.Res.Institute. Finland: Official price indices. Pellervo-Society: Price indices.

2. ESTIMATES OF THE CAPITAL STOCK IN AGRICULTURE

21. Land

Of all the resources employed in agriculture none is perhaps more important or more difficult to evaluate than land. Market prices for land are difficult to obtain in all countries. Many things in addition to expected income from agricultural production determine the prices paid for this resource. Most commonly farms are inherited or sold to other family members. This process tends to condition sale prices on the conservative side. Small parcels of arable land are sometimes sold to farmers who have special uses for these parcels. Here prices may be somewhat inflated. Urban development strongly influences the value of arable land as does the location of industry. But most important of all, very little land in Finland is sold through normal market channels so that prices are few and far between.

When market prices are available they are difficult to interpret because farm real estate is usually sold as a unit for one sum. Included in this amount are the values of arable land, land improvements, forests, and buildings including the residence. People talk in general terms about the prices of the component parts but the final sale is made on the basis of the entire unit. As a result it is difficult to find comparable time series data on the prices of agricultural land alone. There is neither a regularly published statistical series nor index numbers showing changes in the value of arable land in Finland.

While there is a lack of reliable government statistics on the price of agricultural land there is a good series published annually on the amount and use of arable land in agriculture. In a physical sense, data on the capital stock of land are quite complete. Insofar as use suggests something about general productivity levels there is rather complete information about the quality and character of that land as well.

Table 3. The Area of Arable Land and its Percentage Distribution with Given Crop Categories, Finland, 1948-1967.

Year	Total area in 1000 hectares	Cereals	Potatoes	Other row crops	Fodder and hay	Rotated pasture	Fallow	Other
		percent						
1948	2 417.9	35.6	4.3	1.3	39.4	11.3	5.2	2.9
1949	2 455.2	37.1	3.5	1.3	40.8	10.3	4.3	2.7
1950	2 430.9	36.6	3.9	1.2	43.0	9.1	3.2	3.0
1951	2 458.2	35.4	3.8	1.6	43.9	9.2	3.3	2.8
1952	2 499.4	35.7	3.9	1.4	44.3	8.7	2.8	3.2
1953	2 516.4	35.0	3.7	1.1	45.2	8.6	2.9	3.5
1954	2 540.2	35.8	3.5	1.3	44.8	8.6	2.8	3.2
1955	2 565.7	34.2	3.4	1.5	45.5	9.2	3.1	3.1
1956	2 580.0	35.1	3.6	1.4	45.9	8.5	2.6	2.9
1957	2 596.1	33.1	3.6	1.2	47.1	9.1	3.0	2.9
1958	2 611.2	34.2	3.3	1.2	46.3	9.3	2.9	2.8
1959	2 633.2	36.6	3.2	1.1	45.0	9.3	2.3	2.5
1960	2 654.0	38.4	3.3	1.3	43.9	9.0	2.1	2.0
1961	2 670.7	38.6	2.9	1.3	44.0	8.7	2.3	2.2
1962	2 686.7	39.4	2.7	1.5	43.5	8.6	2.4	1.9
1963	2 703.2	39.1	2.8	1.4	43.2	9.0	2.7	1.8
1964	2 716.7	41.4	2.6	1.5	41.5	8.8	2.3	1.9
1965	2 731.2	41.4	2.7	1.5	40.1	9.8	2.5	2.0
1966	2 741.2	41.3	2.5	1.3	40.5	9.7	2.9	1.8
1967	2 746.2	43.0	2.3	1.4	38.9	10.0	2.8	1.6

Source: Agricultural Statistics 1948-67.

In the late 1930's there were about 2,600,000 hectares of arable land used in agriculture. By 1958 that figure had been reached again as new lands were established by reclamation and the clearing of forests and the reclamation has continued. Despite demands for arable land for building new roads, for industrial development and for urban expansion, there has been a net addition to arable land in 19 of the last 20 years.The expansion of the agricultural base will probably level off soon. The acreage reserve system created in 1969 is expected to influence this process.

Over the postwar years, cereal production has claimed an increasing share of arable land. In 1967 hay and fodder occupied the same relative position as they did 20 years earlier. During the interim, however, the percentage of arable land devoted to these crops increased steadily, reaching a peak of 47 percent in 1957, followed by a reversal in the trend. The share of land used to produce both cereals and hay and fodder increased from about 76 percent in the late 1940's to nearly 82 percent in the most recent years. This rising share of arable land for feed crops has been at the expense of all other uses of the land except row crops other than potatoes. Sugar beets, a relatively recent addition to the cropping system, are replacing some of the older crops. Fallow land is declining, in both absolute and relative terms, as improved crop rotation systems and chemical weed control have lessened the need for this practice.

Alternative sources of estimates of agricultural land values were investigated. The Board of Land Settlement has collected value data on real estate transactions in which they have been involved. These values, however, include forest lands and buildings as well as arable land. Other data available on land prices are for a short period of time or a limited area only.

A continuous series of average land values is available from the annual summaries for the bookkeeping farms in Finland. While these farms are somewhat larger and more productive than the average farm in the country they are widely distributed and similar methods have been used over time in making annual calculations. A weighted average value of arable land in marks per hectare was also calculated for the years since 1959, using as weights the proportion of farms in the country as a whole in each of four basic size groups. The weighted averages as well as simple averages and estimates of values for each year's new bookkeeping farms are presented in Table 4.

The average value per hectare of arable land more than doubled between 1948 and 1951. In the latter year a reappraisal of all agricultural property was made on all bookkeeping farms to establish current values for the various capital items after rapid inflation during the first postwar years. Since then land values increased

about 2 percent per year and by 1967 were about 40 percent higher than in 1951, when the general price level as measured by the cost of living index rose 101 percent and agricultural producer prices rose 103 percent during the same time period (calculated from Table 2). It is clear that the land values, especially in the most recent years are somewhat underestimated. This underestimation is a result of current accounting practices on bookkeeping farms. This holds true in most other western countries. According to this practice the land values of individual farms have remained constant over the years if no purchase of land has taken place. The gradual increase in the averages results largely from changes in the national sample and from additions to existing farms at a price generally higher than that of the original holdings.

Table 4. Average Values of Arable Land per Hectare and Estimates for the Country as a Whole, Finnish Bookkeeping Farms, 1948-67

Year	All farms		New bookkeeping farms [2]
	Simple average	Weighted average	
	marks per hectare [1]		
1948	260	..	..
1949	438	..	..
1950	447	..	..
1951	558	..	558
1952	557	..	557
1953	561	..	578
1954	565	..	587
1955	577	..	645
1956	580	..	597
1957	588	..	633
1958	619	..	795
1959	639	631	752
1960	649	642	705
1961	663	655	742
1962	673	667	729
1963	689	680	779
1964	707	696	809
1965	725	717	827
1966	765	751	991
1967	783	778	885

[1] The numbers represent values in the beginning of bookkeeping year, which was July 1 from 1948-1964 and Jan. 1 from 1965.

[2] Estimated assuming 15 percent annual change in bookkeeping farms. Figures got from following formula:

$$U_n = \frac{V_n - 0.85\ V_{n-1}}{0.15}$$

, where U_n = value of new farms and V_n = value of original farms in year n.

Based on the above situation it may be assumed that the land price of each year's new bookkeeping farms would approximate real values at that time. To establish this price level a third series has been estimated by assuming an annual 15 percent change in bookkeeping farms. Land values in this series increased 58 percent in the period 1951-1967. Marked changes in value from year to year are due to the uneven distribution of new bookkeeping farms throughout the country and variations in average quality of land in these farms. In addition, the proportion of new farms is not a constant as was assumed when the estimates were made.

It is clear that the land values of each year's new bookkeeping farms are not an accurate measure of land values. It is not plausible that real land values would have risen much more slowly than the general price level in the country. Statistics prepared recently by OECD (1969 b) for several western countries indicate that the rise of agricultural land values since the early 1950's has been markedly more rapid than the rise in consumer prices. Despite the special conditions encountered in Finland, it is improbable that land values would have risen more slowly than the rise in the general price level.

Another source of information on the value of agricultural land is the taxing authority. The assessed value is based on expected average productivity. Changes in the taxable values have, however, been affected perhaps more by political than scientific decisions. Secondly, property taxation tends to underestimate the current values of assets, agricultural as well as others. For these reasons, the tax values were not considered as a reliable source for this study.

One possibility in determining the value of arable land is to use income valuation, in other words to use the capitalized value for net return obtained to capital. In this case the share of land of net return to total agricultural capital (so-called land rent[1]) should be determined. In Finland there are, however, difficulties to apply this method generally. According to the results from bookkeeping farms the net return to total agricultural capital has usually been fairly low in average - even negative in some years - and has had wide variation from year to year. The share of arable land of this net return would remain too low to give any rational results.

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Taking the above facts into account it seems obvious that the best available estimate of values of agricultural land is that of the bookkeeping farms for the fiscal year 1951-52. As mentioned earlier a careful reappraisal of agricultural assets of those farms was made at that time and therefore these estimates can be considered reliable. The slow increase in land values on bookkeeping farms since 1951 necessitates estimating values to parallel the trend of another acceptable price series. These series should be based on wholesale rather than retail prices. Four alternative series of index numbers were considered: a general wholesale price index based on 1949 prices and weights; a food sector index which has been somewhat more volatile than the total; the Pellervo index of prices paid to producers of farms products; and the official agricultural producer price index of the Agricultural Economics Research Institute (AERI). The Pellervo index is the only such index which covers all of the postwar years, and the AERI index was estimated for earlier years by linking it to the Pellervo index.

Table 5 presents the alternative index numbers and the land prices generated from them. The average value of one hectare of arable land on the bookkeeping farms in 1951-52 was used as the base for all calculations. This base value was then increased or decreased in proportion to changes in each of the four series of index numbers. Similar results were obtained when each of the two agricultural producer prices indices and the food sector of the wholesale price index were used. There are, however, some marked differences between the value based on the wholesale food index and on the agricultural indices. Estimated land prices based on each of these three indices about doubled between 1951 and 1967. Land prices based on the index of all wholesale prices were less variable and increased about 50 percent during the same time.

When examining the appropriateness of these price indices it is evident that the agricultural producer prices present the strongest case for the purposes of this study. Farm real estate markets in Finland are limited because the majority of farm transfers occur between generations. It is also probable that farm real estate values are affected more by profitability of agriculture than in many other countries. From the two producer price indices in Table 5 the one published by Agricultural Economics Research Institute has been chosen for this study.

Table 5. Estimated Value of Arable Land per hectare, based on some indices, Finland, 1948-67.

Year	Wholesale price (1949=100)		Agric. producer price indices		Value marks per hectare based on			
	Index total	Food sector	Pellervo 1937-39=100	Agr. Ec. Res. Institute 1956-57=100	Wholesale total ind.	Wholesale food ind.	Agr. Ec. Res. Inst. adjusted index	Pellervo index
1948	99[1]	123[1]	1217	64	341	505	458	458
1949	100	100	1061	56	344	410	401	399
1950	116	118	1234	65	400	484	465	465
1951	162	136	1482	78	558	558	558	558
1952	164	147	1531	81	565	603	579	576
1953	158	148	1513	79	544	607	565	570
1954	156	146	1500	79	537	599	565	565
1955	153	143	1663	87	527	587	622	626
1956	162	160	1901	100	558	656	715	716
1957	176	187	1949	101	606	767	723	734
1958	190	197	2062	106	654	808	758	776
1959	191	199	2176	109	658	816	780	819
1960	199	210	2250	116	685	862	830	847
1961	200	206	2228	116	689	845	830	839
1962	203	210	2266	120	699	862	858	853
1963	210	220	2405	127	723	903	909	906
1964	226	244	2641	144	778	1001	1030	994
1965	236	254	2880	148	813	1042	1059	1084
1966	241	258	2930	150	830	1059	1073	1103
1967	248	268	3056	158	854	1100	1130	1149

[1] Estimated based on old (1935=100) wholesale price index

Sources:

[1] NURMI, 1962. Tukkuhintaindeksi vuosina 1949-1967. Tilastokats. 12:45-63.

[2] Statistical Yearbook of Finland, 1963-1967.

[3] Unpublished price series from Pellervo and the Agricultural Economics Research Institute.

A few studies have been made which will provide benchmarks for checking the land price estimates obtained above. These studies are limited in the years and area included. RYYNÄNEN's (1962) study is concerned with the value of arable land in one commune in Northern Karelia. The study, based on the voluntary real estate transactions between 1956 and 1960, excludes transactions between relatives. The value for arable land in this area averaged 830 mks per tax-hectare (a field of medium quality). The price obtained in the RYYNÄNEN study is somewhat higher than the 758 mks/hectare price calculated using the 1958 agricultural producer price index.

The studies by LEPONIEMI (1968), and LEPONIEMI and LAMMI (1968) of bona fide sales of farms shed some light on changes in value of farm real estate from 1961 to 1966. Based on size of arable land, the following illustrates the increase in value from 1961 to 1966:

Farm size, hectares of arable land	1961	1962	1966
2 - 5	100	110	136
5 - 10	100	106	149
10 - 20	100	101	156
20 - 50	100	135	160

From 1961 to 1966 farm real estate prices rose faster than the cost of living or agricultural producer prices. Since the most rapid price increase was in the largest size group, it appears that a major factor in farm real estate prices is the price of arable land and forest. The small sample size in the 20-50 hectare group limits the reliability of these data. It must be, however, considered that only around 5 percent of all farm transactions were included because others did not represent conditions of free price formation. That is why the final sample was not a random one either.

Prices of arable land in 1965-1967 collected and estimated by local Land Settlement Offices is presented in Table 6. These prices represent the estimated value per hectare of arable land. The estimates were based on the selling price of the farm relative to separately appraised values of arable land, forest and buildings. Excluded from the estimates were prices paid for individual fields which were purchased

to add arable land to an existing farm. In Finland average size of farm is small and farmers are willing to pay high prices for additional land which can be operated without adding to fixed costs.

Data in Table 6 show a wide variation in prices among regions and within regions. If prices are weighted by area within regions an average of roughly 1,750 mks per hectare is obtained for the whole country. This is about 50 percent higher than the estimated price based on the agricultural producer price index in Table 5. The high prices at the upper limits of the price range indicate that the data possibly include land in urban centers. If this is so the average price of arable land must be somewhat lower than that calculated from Table 6.

A new level of unit values of arable land was established for the fiscal year 1968 on the bookkeeping farms. These values range between 1,500 and 2,000 mks per hectare in the research region of South Finland, decreasing as one moves north and east with values in the research regions of North Finland between 800 and 1,200 mks per hectare. The land value on all bookkeeping farms averaged 1,419 mks per hectare in 1968.

Table 6. Prices of Arable Land in Different Land Settlement Regions in 1965-1967 Estimated by Land Settlement Offices, mks per tax-hectare.

Land settlement region	Average price	Limits of variation
Helsinki	2,219	1,295 - 3,446
Turku	2,677	1,858 - 3,684
Hämeenlinna	2,073	1,698 - 2,571
Tampere	2,067	808 - 3,213
Pori	2,180	1,221 - 3,519
Vaasa	1,698	979 - 3,088
Seinäjoki	1,915	888 - 2,766
Ylivieska	1,345	1,008 - 1,704
Jyväskylä	1,840	1,252 - 3,165
Kouvola	1,659	1,371 - 1,958
Mikkeli	1,654	867 - 2,572
Kuopio	1,544	1,183 - 1,904
Iisalmi	1,180	789 - 1,539
Joensuu	1,094	800 - 1,508
Lieksa	1,049	688 - 1,325
Kajaani	844	710 - 1,125
Oulu	920	604 - 1,231
Rovaniemi	931	550 - 1,333

In each of the studies described above the price of arable land rose more rapidly than any of the various price level indices. This was true in other Western European countries, as well (OECD 1969 b). In an attempt to construct a price series for arable land it was assumed that the average price on bookkeeping farms in 1951 - when the careful reappraisal of each asset was made - is a correct one. It was hypothesized that the average annual price of arable land will rise 1.5 times faster than agricultural producer prices. Secondly, agricultural land prices are, of course, affected by the prices of agricultural products and inputs used for production. Because the prices of products and inputs developed quite similarly, only the product prices were used to construct the new series.

The new index of prices of arable land as well as land prices estimated from the index is presented in Table 7. As explained earlier, the increase in arable land values was estimated at 1.5 times the rise in prices of agricultural products for the years since 1954. For the years before 1951 as well as for the period of steady prices from 1951-1954, changes in the original product price index excluding the additional 50 percent rise was used.

It is apparent from Table 7 that the 1967 price of arable land is more than three times the 1948 price. Comparing these estimated prices with those estimated by RYYNÄNEN (1962, p.6), the reappraised average prices on all bookkeeping farms in 1968, those obtained in the LEPONIEMI (1968) study and the Land Settlement Office data indicate the acceptability of these estimates.

The total value of arable land calculated from the total agricultural land area and the land price obtained here is also presented in Table 7.

Garden, natural meadow and cleared permanent pasture areas were added to the arable land area since they are part of the agricultural capacity. There is little year-to-year change in these areas, and total value in constant prices rose only 8 percent from 1948 to 1967.

Table 7. Land Price Index, Land Price and Total Value of Agricultural Land, Finland, 1948-1967

Year	Agric. prod.price index[1]	Land price index[2]	Land price per hectare[3]	Total area of agric. land[4]	Total land value at current prices	Index of total value	Total land value at constant (1954) prices	Index of total volume
	---- 1951=100 ----		marks	1000's hect.	Million marks	1948=100	Million marks	1948=100
1948	82	82	458	2 590.2	1 186.3	100	1 463.4	100
1949	72	72	401	2 627.5	1 053.6	89	1 484.5	101
1950	83	83	465	2 558.2	1 189.6	100	1 445.4	99
1951	100	100	558	2 582.5	1 441.0	121	1 459.1	100
1952	104	104	579	2 625.0	1 519.9	128	1 483.1	101
1953	101	101	565	2 641.9	1 492.7	126	1 492.7	102
1954	101	101	565	2 666.0	1 506.3	127	1 506.3	103
1955	112	118	658	2 691.1	1 770.7	149	1 520.5	104
1956	128	143	798	2 705.5	2 159.0	182	1 528.6	104
1957	129	145	809	2 720.1	2 200.6	186	1 536.9	105
1958	136	157	876	2 735.4	2 396.2	202	1 545.5	106
1959	140	163	910	2 757.8	2 509.6	212	1 558.2	106
1960	149	179	999	2 740.6	2 737.9	231	1 548.4	106
1961	149	179	999	2 734.2	2 731.5	230	1 544.8	106
1962	154	188	1 049	2 740.9	2 875.2	242	1 548.6	106
1963	163	204	1 138	2 752.0	3 131.8	264	1 554.9	106
1964	185	245	1 367	2 762.9	3 776.9	318	1 561.0	107
1965	190	255	1 423	2 799.9	3 984.3	336	1 581.9	108
1966	192	259	1 445	2 796.9	4 041.5	341	1 580.2	108
1967	203	282	1 574	2 794.4	4 398.4	371	1 578.8	108

[1] Official index of Agric. Econ. Research Institute since 1956. For the years 1948-55 adjusted by Pellervo index.

[2] Here constructed index (see text).

[3] Based on land price index.

[4] Total area in adjusted hectares. It has been calculated multiplying the original land use areas by the following coefficients: garden and arable land 1.0, natural meadow and cleared pasture 0.4.

While these estimates of the value of agricultural land are open to criticism, they are probably as good as any available and indicate a trend in value of land. More reliable estimates can be made only when better statistics on real estate markets and arable land prices are available in Finland.

22. Land Improvements

Land in its native state is not ready for agriculture. To obtain full benefit of the soil's inherent productivity man must prepare the land by clearing trees and stones, providing drainage, building roads and applying basic lime and fertilizer. In most cases land would not be arable without these improvements.

Permanent improvements, clearing operations, basic liming, etc., have been included in the value of land in many European countries. Improvements such as tiling, bridges, etc., while long-term inputs, depreciate with time and must be reconstructed. These are called land improvements in agricultural economics and are not included in the value of land. This idea is followed in bookkeeping accounts. National income statistics for Finland also treat land improvement as a separate gategory in the gross domestic capital formation account. Land itself is not, however, considered in these accounts. It is natural to treat land improvements as a separate item in the balance sheet of agriculture, too. In a pure market economy it would be difficult to separate the value of land improvements from land or from real estate as a whole.

Two primary sources provide information over a period of years on value of land improvements. These are the bookkeeping farms and the national income accounts. The bookkeeping summaries give basic information on amounts of capital that the above average farmers have invested in land improvements. Most expenditures have been for drainage. Unlike the capital account for land on these farms, the value of these improvements has increased at a steady rate over a period of years. The original investment made in 1954, for example, was not increased in value in 1966 to reflect changes in the price level. The figures are similar to those for machinery and equipment, a statement of the depreciated value remaining from the original capital outlay.

An indication of the increasing importance of farmers' investments in land improvements is provided in Table 8. In the years immediately after the war, this capital account was small on most farms. Compared with the land account it was of only minor importance. In the early 1950's land improvements constituted about 10 percent of the book value of land. By 1967 this had risen to more than 25 percent and was increasing at an increasing rate. Capital investments of this type are most commonly made on the larger farms, as is shown by the difference in the simple and weighted averages[1].

Table 8. Average Values per Hectare[2] and Estimates for Total Value of Land Improvements, Bookkeeping Farms 1948-1967.

Year	Simple average		Weighted average	Estimated total value	Estimated total net
	mks per hectare	Percent of value of land	mks per hectare	based on simple average	investment
				million of marks	
1948	23	8.8	..	59.6	5.5
1949	21	4.8	..	55.2	-4.4
1950	30	6.7	..	76.7	21.5
1951	42	7.5	..	108.5	31.8
1952	49	8.8	..	128.6	20.1
1953	58	10.3	..	153.2	24.6
1954	72	12.7	..	192.0	38.8
1955	76	13.2	..	204.5	12.5
1956	88	15.2	..	238.1	33.6
1957	96	16.3	..	261.1	23.0
1958	93	15.0	..	254.4	-6.7
1959	102	16.0	74	281.3	26.9
1960	113	17.4	80	309.7	28.4
1961	120	18.5	84	328.1	18.4
1962	133	19.8	93	364.5	36.4
1963	148	21.5	103	407.3	42.8
1964	181	25.0	138	500.1	92.8
1965	194	25.4	146	543.2	43.1
1966	204	26.1	165	570.6	27.4
1967	218	27.8	181	609.2	38.8

1) The weights are determined by the proportion of all arable land falling in each of four size categories. The averages for bookkeeping farms in each of these sub-groups are multiplied by the weights to obtain weighted averages.

2) Because the published values represent situation in the beginning of bookkeeping year, the numbers here describe the values on July 1 each year from 1948-63. From 1964 the numbers represent values on Jan. 1 (the beginning of bookkeeping year since 1965) in following year, which values are considered to describe situation on Dec.31 of the year in question.

The estimates of the total value of land improvements in Finland in Table 8 provide a basis for a critical look at other series in this account. Since the bookkeeping farms are generally thought to be somewhat above average in terms of management, the outlay by the private sector for the country as a whole might well be expected to be somewhat less.

Data from the annual capital accounts of the national income statistics should provide the most accurate and comprehensive coverage of investment in land and water improvements. At the outset, however, it must be remembered that the national income statistics have as a primary objective a statement of the economic transactions of the whole country. As a result all economic activity must be apportioned to some sector. The concern is with the aggregate rather than with the individual sector accounts. Economic series must therefore be interpreted accordingly.

There are three capital accounts in which agriculture plays an important role: machinery and equipment, buildings and construction, and land improvements. Data for these three are aggregated into an annual total of gross domestic capital formation for agriculture. Only since 1960 have they been published as an item in the national statistics. Unpublished data are available from 1948 and these are reproduced here.

Annual aggregates for agricultural land and water improvements are presented in Table 9. One notes immediately that outlays gradually increased until middle of 1960's. When the influence of prices is removed the peak period for new investments appears to have been in the late 1950's. A few moments of reflection also indicates that these figures are larger than expected. The discrepancy between Tables 8 and 9 has narrowed with passing time.

Table 9. Annual Capital Outlays for Land Improvements Attributed to Agriculture in Finland[1], National Income Accounts, 1948-67

Year	Current prices			1954 prices		Index of prices
	Gross outlay	Depre-ciation	Net-outlay	Gross outlay	Net outlay	
	million of marks					1954=100
1948	23.4	1.0	22.4	39.7	38.6	58.9
1949	34.5	1.0	33.5	54.5	53.4	63.3
1950	56.2	1.1	55.1	76.4	75.3	73.6
1951	49.2	1.4	47.8	52.6	51.4	93.5
1952	57.3	1.4	56.0	57.1	55.9	100.5
1953	68.8	1.4	67.4	68.8	67.5	100.0
1954	54.0	1.3	62.7	64.0	62.7	100.0
1955	65.5	1.4	64.1	64.9	63.4	100.9
1956	69.0	1.4	67.6	63.6	62.1	108.5
1957	66.5	1.5	65.0	58.7	57.1	113.3
1958	81.0	1.7	79.3	68.0	66.3	119.1
1959	85.0	1.8	83.2	71.2	69.4	119.4
1960	83.9	1.8	82.1	67.7	65.8	123.9
1961	77.1	2.0	75.1	61.5	59.5	125.4
1962	70.0	2.2	67.8	54.2	52.1	129.2
1963	73.5	2.5	71.3	55.1	52.7	133.9
1964	79.5	3.0	76.5	56.3	53.7	141.2
1965	81.6	3.3	78.3	54.4	51.6	150.0
1966	77.7	3.9	73.8	49.5	47.0	157.0
1967	64.8	4.4	60.4	38.8	36.1	167.1

[1] Unpublished data from the Central Statistical Occife on capital formation. The standard SNA accounting method is used here. Repairs and maintenance are not included in gross capital outlays.

As the title of the account indicated, both land and water improvements are included. All public expenditures associated with land reclamation, drainage, stream regulation for flood control as well as land clearing and resettlement are included in this account. Even though a capital outlay may be made it does not necessarily follow that the resulting improvement or structure will have value equivalent to the original capital outlay. As an example, when public funds are used to build roads, dams, and drainade ditches the increase

in value of the lands close by may not equal the public expenditure of capital. Moreover, one may question whether one can logically attribute this value to a single sector since it is invested for the general welfare of all the people and has more than one use.

To meet these problems, at least partially, the Central Statistical Office has divided the aggregate annual investments into two categories. One is essentially investments by the private sector, including public subsidy grants; the other is the public sector. In the ten years from 1952 through 1961 investment in the public sector exceeded that in the private sector. In the early and most recent years the private sector was the more important (Table 10).

Table 10. Annual Gross Investments in Land Improvements and Estimates of Aggregate Investments for Agriculture, National Income Accounts, Public and Private Sectors, 1948-67

Year	Annual gross investment in land improvements: Public sector	Annual gross investment in land improvements: Private sector	Estimates of aggregate value of investment in private sector: Aggregate less depreciation	Estimates of aggregate value of investment in private sector: Simple aggregate	Estimates of aggregate value of investment in private sector: Adjusted for prices
	Millions of marks				
1948	7.66	15.78	64.9	65.9	64.9
1949	10.03	24.43	88.3	90.3	93.1
1950	23.82	32.43	119.6	122.7	139.5
1951	20.73	28.47	146.7	151.2	204.3
1952	28.80	28.58	173.9	179.8	246.8
1953	36.43	32.42	204.9	212.2	276.6
1954	36.42	27.53	231.1	239.8	302.8
1955	37.41	28.11	257.9	267.9	332.2
1956	37.90	31.05	287.5	298.9	386.9
1957	38.03	28.45	314.5	327.4	431.0
1958	45.44	35.52	348.3	362.9	486.9
1959	47.51	37.52	384.0	400.4	523.8
1960	47.31	36.56	418.8	437.0	578.3
1961	40.53	36.57	453.3	473.5	619.9
1962	33.89	36.08	487.2	509.6	672.6
1963	27.23	46.60	531.3	556.2	741.2
1964	27.40	52.06	580.4	608.3	830.7
1965	35.58	46.00	623.1	654.3	925.2
1966	33.70	44.00	663.2	698.3	1 008.5
1967	22.40	42.40	701.2	740.7	1 111.4

Source: Basic data provided by Central Statistical Office

Since a principal objective of this study is to estimate the value of the capital stock invested in agriculture, some method of appraising these annual investment totals and accumulating them into an acceptable total attributable to the agricultural sector must be established.

Three alternative stock figures for land improvements were constructed from the annual investment figures for the private sector. In the first case depreciation was deducted from the annual investment figure and added to the total for the previous year. In the second, depreciation was ignored in the accumulated total and might be considered a partial correction for increasing prices during the time span. The third figure was an adjusted aggregate where depreciation was deducted each year in a manner similar to the first series. However, before adding annual investment less depreciation to the past aggregate, this total was adjusted by the change in prices in the year in question based on the index presented in Table 9.

All three of the aggregates based on private sector investments in agricultural land improvements taken from the national income accounts are larger than the corresponding totals estimated from the bookkeeping averages. The greatest differences can be seen in the third series in Table 10, which takes the rather rapid price increase into account. It must be remembered. however, that on the bookkeeping farms old stock is affected by price changes only when new farms are added.

The series of aggregate values in Table 10 is higher than/would be a series which would describe the values of conceptually similar assets on bookkeeping farms. The concept land improvements in the national income accounts differs from that one used in agricultural economics. Land and stone clearing is included in land improvements in national income accounts whereas in agricultural economics this item is included in the value of agricultural land itself.

To obtain a series comparable to the concept of land improvements in agricultural economics the values of drainage investments have been collected from national income accounts. These figures include the value of constructing new tile, plastic or wooden pipe drainage

systems in the fields. The contents of these figures are also nearly consistent to the bookkeeping items. The annual gross investments, depreciation and calculated capital stock of these aggregate assets are presented in Table 11.

The calculated aggregate figures on capital stock (at current prices) in Table 11 differ from the corresponding series in Table 10. In 1967 the capital stock in drainage was approximately one-third of the total value of land improvements in private sector calculated by adjustment for prices. The accumulated values of land clearings, etc., have so been larger at that time than one may have expected. Drainage costs have been rising rather slowly. The volume of drainage stock has increased more than four times during the time period of this study.

Table 11. Land Improvements in Drainage. Capital Stock and its Formation in 1948-67[1].

Year	Gross investment At constant (1954) prices	Depreciation[2]	Capital stock		Price index of drainage costs	Capital stock At current prices	
	Million of marks		Index (1948=100)		(1954=100)	Million of marks	Index (1948=100)
1948	2.5	1.1	68.5	100	87.1	59.7	100
1949	3.8	1.1	71.2	104	91.7	65.3	109
1950	4.8	1.1	74.9	109	98.9	74.1	124
1951	5.3	1.2	79.0	115	120.3	95.0	159
1952	6.5	1.2	84.3	123	112.6	94.9	159
1953	8.2	1.3	91.2	133	105.5	96.2	161
1954	8.4	1.4	98.2	143	100.0	98.2	164
1955	10.6	1.5	107.3	157	92.5	99.3	166
1956	9.4	1.5	115.2	168	90.9	104.7	175
1957	8.3	1.6	121.9	178	94.2	114.8	192
1958	10.2	1.7	130.4	190	102.1	133.1	223
1959	12.3	1.8	140.9	206	98.1	139.4	233
1960	11.5	1.9	150.5	220	95.8	144.2	242
1961	14.5	2.0	163.0	238	98.8	161.0	270
1962	15.4	2.1	176.3	257	102.0	179.8	301
1963	21.5	2.4	195.4	285	109.0	213.0	357
1964	26.4	2.6	219.2	320	115.2	252.5	423
1965	24.8	2.8	241.2	352	117.6	283.7	475
1966	25.7	3.1	263.8	385	127.7	336.9	564
1967	24.1	3.3	284.6	415	132.7	377.7	633

1) Source: Central Statistical Office

2) Depreciation rate 1.1 percent per annum for tile drainage, 2.8 percent for others.

The capital stock in drainage has been rather similar to the aggregate based on bookkeeping farms in the early years of this study. Bookkeeping farms invested heavily in drainage in the early 1950's, whereas similar development in Finnish agriculture as a whole began ten years later.

In total, the series in Table 11 are quite appropriate for this study. The low depreciation rate used in national income accounts is due to the newness of the assets in question and is becoming higher with the age of these assets. These series are used in this study to describe the capital stock in land improvements in Finland.

23. Agricultural Buildings

In a northern country where livestock, primarily dairy cows, provide a large share of agricultural income, capital investments in buildings are a large and necessary part of farming. And where the number of small farms is large the relative importance of farm buildings in the total capital structure is even larger. As a result farm buildings make up a major share of farm real estate and are a major item in the balance sheet calculations. This study, being restricted to agriculture only, excludes dwellings and other non-agricultural buildings.

As was the case for land improvements there are two primary sources of basic data. These are the bookkeeping farms and the national income statistics. In the first case these data have been presented annually as a stock of capital; in the second they have been developed as annual investments in the gross domestic capital formation accounts.

As a part of the accounting process separate values are recorded annually for the residence, livestock buildings, and other farm buildings on bookkeeping farms. This fact makes it much easier to get some kind of benchmark data on the farm buildings separately from the residence which would not be the case in many bookkeeping systems. The proportion which the dwelling makes up of the total investment in buildings has remained relatively constant over the years. In all cases it has been less than half of the total, usually falling between 35 and 45 percent. New investment appears to have occurred at about the same rate in both categories.

Table 12. Value of Agricultural Buildings, Bookkeeping Farms, Finland, 1948-67

Year	Value of buildings per hectare: Total	Residence	Agricultural buildings	Weighted average Agr. buildings	Total value: agricultural buildings[1] Simple	Weighted
	marks per hectare				- million marks -	
1948	394	167	227	..	588.0	..
1949	482	198	284	..	746.2	..
1950	578	231	347	..	887.7	..
1951	775	314	461	..	1 190.5	..
1952	870	349	521	..	1 367.6	..
1953	986	395	591	..	1 561.4	..
1954	1 061	421	640	..	1 706.2	..
1955	1 185	486	699	..	1 881.1	..
1956	1 272	541	731	..	1 977.7	..
1957	1 379	587	792	..	2 154.3	..
1958	1 464	619	845	..	2 311.4	..
1959	1 523	632	891	1 036	2 457.2	2 857.1
1960	1 604	657	947	1 088	2 595.3	2 981.8
1961	1 668	692	976	1 124	2 668.6	3 073.2
1962	1 733	718	1 015	1 171	2 782.0	3 209.6
1963	1 803	758	1 045	1 218	2 375.8	3 351.9
1964	1 928	817	1 111	1 268	3 069.6	3 503.4
1965	1 883	802	1 081	1 274	3 026.7	3 567.1
1966	1 944	876	1 068	1 285	2 987.1	3 594.0
1967	2 043	943	1 100	1 332	3 073.8	3 722.1

[1] See footnote 1, page 22.

In 1951-52 farm buildings and the residence were appraised and revalued on a current basis as has already been discussed in the case of arable land. The change in value from 1948 to 1951 therefore is larger than actually occurred. Changes after 1951 reflect net additions (new buildings) or the remodeling of existing buildings. The difference between the average value per hectare for farm buildings when a simple and weighted average are compared is quite large. This results from the fact that buildings on small farms make up a larger share of the total value than they do on large farms. It also suggests that, if anything, the average bookkeeping values might tend to understate rather than overstate the total stock of value in agricultural buildings when used to make an estimate for the country as a whole.

Since 1951 the total value of agricultural buildings has increased between 2.5 and 3.0 times according to these data. The total of about 3000 million marks in 1964 to 1967 is around one third less than the value of land developed earlier and presented in Table 7. When compared with the estimates of the capital stock for Finland as a whole derived only from bookkeeping farms, since 1954 agricultural buildings have made up a greater share of the total capital than land and land improvements together.

Annual data on the value of new construction for farm buildings is available in national income accounts for the years since 1948 in current and constant prices (HEIKKONEN and VALPPU 1966 and MARJOMAA 1968). Also available are unpublished data dividing this expenditure between wood and other types of construction. Figures for depreciation and repairs and maintenance are also available. It is therefore possible to construct a series on the annual net investment made in buildings and to accumulate this over time into a set of capital stock figures. Such calculations have also been made by the Central Statistical Office in relation to their calculation of annual depreciation. Capital invested in wooden buildings has been depreciated over a period of 40 years, that in stone, concrete or masonry buildings over a period of 50 years, which rates seem to be quite acceptable.

Basic annual data are presented in Table 13. This series has been calculated especially for this study from unpublished material. Therefore, some figures differ from those in the publications mentioned above. In the years immediately after the war investment in buildings was heavy. Unlike many other forms of capital investment the rate of investment according to these data has slowed during the last decade both in current and constant prices. In fact, depreciation has been greater than new investment in almost every year in the 1960's. Thus, net investment has been negative and the stock of capital in the form of agricultural buildings has been decreasing.

Table 13. Annual Investments in Agricultural Buildings, Finland, 1948-67[1].

Year	Gross investment	Depreciation	Net investment	Price index of building costs	Net investment at current prices
	At constant (1954) prices				
	Million of marks			1954=100	million of marks
1948	109.3	42.3	67.0	68.1	45.6
1949	103.0	44.3	58.7	68.7	40.3
1950	93.3	46.0	47.3	81.0	38.3
1951	110.2	48.1	62.1	112.1	69.6
1952	125.3	50.0	75.3	114.6	86.3
1953	100.6	51.8	48.8	104.0	50.8
1954	93.4	53.1	40.3	100.0	40.3
1955	76.3	54.2	22.1	98.0	21.7
1956	47.2	54.6	-7.4	100.0	-7.4
1957	56.6	55.4	1.2	103.7	1.2
1958	58.4	56.0	2.4	101.2	2.4
1959	61.4	56.7	4.7	105.9	5.0
1960	51.9	57.3	-5.4	106.0	-5.7
1961	44.7	57.5	-12.8	109.0	-14.0
1962	43.5	57.6	-14.1	119.5	-16.8
1963	51.2	57.8	-6.6	127.0	-8.
1964	50.1	58.0	-7.9	135.3	-10.7
1965	51.7	58.4	-6.7	145.7	-9.8
1966	59.0	58.7	0.3	149.3	0.4
1967	62.5	59.2	3.3	158.9	5.2

1) Investments figures have been calculated for this study from unpublished material of Central Statistical Office.

2) Unpublished index from Central Statistical Office.

Estimated of the stock of capital in agricultural buildings were constructed from annual investment and depreciation data made available by the Central Statistical Office. Because depreciation rates for wooden and stone buildings were different, it was necessary to construct stock figures for each class separately. Annual investment and depreciation figures were in constant 1954 prices.

To get an estimate of the stock of capital in the form of stone, concrete and masonry buildings in 1948 the annual investment figures back to 1899 were used. Using straight line depreciation methods over 50 years there should be 2 % of the original investment undepreciated from 1899, 4 % from 1900, 6 % from 1901 and so on. These sums were accumulated through 1948 to get a basic stock figure. A similar procedure was made with wooden buildings starting from 1909. With this as a base, the new stock figure of each successive year was obtained by adding net investment to the stock figure for the preceding year.

The capital stock figures obtained are presented in Table 14. The basic data used to construct these series were - as previously stated - at constant prices, and are presented in the first column of the table. The peak of the volume of capital stock was reached in the middle of the 1950's, a declining trend prevailing thereafter. This is due to the decline in wooden buildings through time, not shown in the table, which has been taking place since the early 1950's. In 1967 the volume of wooden buildings was nearly 20 percent lower than in 1950. Meanwhile, the volume of stone and concrete buildings increased until the mid 1960's. The trend in the volume of buildings reflects the period of heavy investments during the years of resettlement and rebuilding just after the war, followed by the more recent period where investments other than buildings have had greater priority.

In Table 14 are two estimates of capital stock in buildings at current prices. The first one was calculated from the index of building costs used in house construction statistics. These index numbers may, however, be open to question with respect to their applicability to building costs on farms. When constructing farm buildings farmers use their own labour relatively more and processed materials relatively less than is true in house construction. So the structure of building costs is somewhat different on farms than in other construction. A second series of capital stock value was calculated using the index developed by the Agricultural Economics Research Institute. This A.E.R.I. index, planned especially for

agricultural circumstances, is available for years since 1961. For earlier years the Pellervo Marketing Research Institute index was used. The series based on the A.E.R.I. and Pellervo indices seems to be most appropriate for this study.

Table 14. Capital Stock in Agricultural Buildings, Finland,1948-67

Year	Capital stock at constant (1954) prices Million marks	1948=100	Capital stock I at current pr. Million marks[1]	Price index of agricultural building costs (1954=100)[2]	Capital stock II at current prices[3] Million marks	1948=100
1948	1 081.6	100	736.6	61.4	664.1	100
1949	1 140.3	105	783.4	61.4	700.1	105
1950	1 187.6	110	962.0	73.2	869.3	131
1951	1 249.7	116	1 401.0	99.0	1 237.2	186
1952	1 325.0	123	1 518.4	102.0	1 351.5	204
1953	1 373.8	127	1 428.8	100.0	1 373.8	207
1954	1 414.1	131	1 414.1	100.0	1 414.1	213
1955	1 436.2	133	1 407.5	102.0	1 464.9	221
1956	1 428.8	132	1 428.8	108.0	1 543.1	232
1957	1 430.0	132	1 483.0	111.9	1 600.2	241
1958	1 432.4	132	1 449.6	115.9	1 660.2	250
1959	1 437.1	133	1 521.9	116.9	1 680.0	253
1960	1 431.7	132	1 517.6	120.8	1 729.5	260
1961	1 418.9	131	1 555.1	126.8	1 799.2	271
1962	1 404.8	130	1 678.8	130.2	1 829.0	275
1963	1 398.2	129	1 775.7	139.1	1 944.9	293
1964	1 390.3	129	1 883.8	153.4	2 132.7	321
1965	1 383.6	128	2 016.0	165.6	2 291.2	345
1966	1 383.9	128	2 066.1	169.8	2 349.9	354
1967	1 387.2	128	2 204.2	180.8	2 508.1	378

[1] Calculated by building cost prices used in Central Statistical Office.

[2] Index of Agricultural Economics Research Institute since 1961, series adjusted backwards by Pellervo index.

[3] Calculated by index in footnote 2.

The capital stock at current prices represents in 1967 a value of approximately 3.8 times that 20 years earlier. Comparing these capital stock values with the series based on bookkeeping farms in Table 12, it is evident that the estimated stock in each case is approximately 80 percent higher in 1967 than in 1954. Changes in the two series within the period occurred at different rates. In the first half of the period the estimates on bookkeeping farms rose more rapidly

than the other estimates but remained rather stable during the 1960's. The bookkeeping farms made heavier investments in buildings in the 1950's than the average farms of the country. In contrast, the situation of average farms in the 1960's reflects increase resulting in large part from rising prices rather than additions to the real capital stock. This influence cannot be seen in the bookkeeping values due to their accounting practice mentioned above. The new bookkeeping farms added each year, however, are an exception to this rule.

The series in Tables 12 and 14 raise a further question of the accuracy of the estimate based on bookkeeping farms since 1954 since this estimate is higher than the aggregate. The common relationship, the smaller farm the higher the value of buildings per arable land unit, is expected. This relationship is evident in Table 12 when comparing the bookkeeping farms simple average to the weighted one (see p. 29). On that basis the capital stock calculated by the aggregate system would be expected to be higher than the one calculated by bookkeeping results. It is evident, however, that the buildings on bookkeeping farms are of higher quality and in better condition than is true on the average farms resulting in the reverse relationship of building value per arable land unit.

24. Livestock and Horses

One of the most important forms of productive capital in Finland is livestock. Without livestock it would be difficult to convert the grass and cereal grains which grow best in most of Finland into desirable products for domestic consumption. Livestock over the years have also provided an important part of the power requirements. Horses have declined in numbers and importance in recent years as tractor power has proven more economical in many operations. But they are still important on many farms and especially in the forests. Because horses are kept primarily to provide power and other livestock are kept to convert feed into animal products it seems logical to treat them as separate categories in the balance sheet accounts.

241. Livestock

The primary source of data on livestock numbers is the annual agricultural statistics. In the national income accounts livestock are not treated as a category separate from other production items. As a result there are no data from this source. The bookkeeping farms provide an annual series on capital investment in livestock. A price series could also be constructed from these data for each of the major classes of livestock.

As has been the case for other classes of capital, this series provides a good benchmark to use in considering changes through time. Because the bookkeeping farms are somewhat larger than the average of all Finnish farms the capital investment in livestock per hectare should be somewhat smaller than would be the case for the whole country. But this situation has remained relatively constant through time.

Based on bookkeeping farm averages, the value of all livestock on Finnish farms has more than doubled in the 20 years since 1948. Both simple and weighted averages are presented in Table 15. Values remained relatively constant in the first ten years considered here, rose during the last half of the 1950's and have levelled off again in the last five years exept 1967. The weighted averages, for the few years in which they are available, reflect the heavier concentration of livestock per hectare on the smaller farms in the country and some recent shifts out of livestock on the largest farms.

Annual data on numbers of livestock on farms by types and age groups are available in the agricultural statistics. These physical data automatically indicate that an accurate estimate of the value of capital in the form of livestock can be estimated for Finland if appropriate prices through time are available. No official statistics on live animal prices have been recorded in the postwar years. One apparent source of prices is the annual inventory information on the bookkeeping farms. These statistics have never been published as a price series, although they were quite readily available from the summary records. In general they would tend to be conservative market values, especially those for breeding animals and horses. This is less likely to be the case for market animals such as pigs.

Table 15. Value of all Livestock, Finnish Bookkeeping Farms, 1948-67

Year	Value per hectare		Estimated total value[1)]	
	Simple	Weighted	Simple	Weighted
	marks per hectare		million marks	
1948	223	..	577.6	..
1949	219	..	575.4	..
1950	227	..	580.7	..
1951	232	..	599.1	..
1952	224	..	588.0	..
1953	226	..	597.1	..
1954	228	..	607.8	..
1955	227	..	610.9	..
1956	230	..	622.3	..
1957	238	..	647.4	..
1958	260	..	711.2	..
1959	278	306	766.7	843.9
1960	302	333	827.7	912.6
1961	342	387	935.1	1 058.1
1962	354	409	970.3	1 121.0
1963	360	421	990.7	1 158.6
1964	359	420	991.9	1 160.4
1965	364	445	1 019.2	1 246.0
1966	356	453	995.7	1 267.0
1967	396	504	1 106.6	1 408.4

[1)] Estimated total value of livestock obtained by multiplying value per hectare by the number of hectares of arable land in agriculture, Table 3.

These price series are presented in Tables 16 and 17. The classifications were made to conform to the groupings in the agricultural statistics wherever possible. A Laspeyres type of price index was developed to summarize these livestock prices using 1954 as the base period. Horses were excluded from the index. Because this is a quantity weighted index, the prices of dairy animals strongly affect the results. Poultry and sheep prices are minor elements in the total.

A comparison of the index of live animal prices prepared from the bookkeeping farm data and the indices of prices of livestock products in Table 18 shows that there were roughly parallel movements during these twenty years. Live animal prices are, however, somewhat

lagged in most years. Milk is of course the dominant product in the livestock price series just as dairy cows is the dominant item in the live animal series. In 1950, 1954 and 1961 the two series were in close agreement. The index of live animal prices has generally been the smoother series, while livestock products have been more volatile. The closeness of the two sets of index numbers may suggest that the new index of live animal prices is a reasonably accurate one and that bookkeeping farm data at least partly should be reasonably representative for estimating the value of livestock on Finnish farms.

Table 16. Prices of Live Horses and Dairy Cattle - Finnish Bookkeeping Farms, 1948-67

Year	All horses	Dairy bulls	Dairy cows	Dairy heifers	Calves under 1 yr.
	marks per head				
1948	562	421	282	143	46
1949	487	409	299	157	48
1950	447	439	316	177	52
1951	419	480	330	193	60
1952	398	501	333	200	64
1953	387	490	347	211	66
1954	378	490	352	215	69
1955	374	513	355	216	71
1956	382	513	361	224	71
1957	386	511	378	234	73
1958	423	506	419	252	77
1959	442	494	456	266	82
1960	482	598	498	310	90
1961	523	541	577	332	96
1962	550	593	592	346	97
1963	570	573	610	358	101
1964	583	(715)	608	355	100
1965	606	557	641	399	106
1966	645	594	675	426	113
1967	703	642	732	465	121

When looking at the facts in more detail, it is evident that recently some of the live animal prices on bookkeeping farms have been underestimated. Table 19 compares 1967 values estimated by bookkeeping farms with average carcass prices.

Table 17. Prices of Sheep, Pigs and Chickens - Finnish Bookkeeping Farms, 1948-67

Year	Sheep		Pigs			All hens
	Over 1 yr.	Under 1 yr.	Over 6 mo.	From 2-6 mo.	Under 2 mo.	6 mo. +
	marks per head					
1948	26	13	217	100	34	6.2
1949	23	11	129	64	14	4.6
1950	23	11	160	67	25	3.9
1951	24	11	174	76	27	3.7
1952	25	11	201	88	34	3.9
1953	25	11	310	93	35	3.9
1954	26	11	199	80	29	4.0
1955	27	12	212	86	31	3.9
1956	28	12	220	92	34	4.1
1957	28	12	231	95	36	3.8
1958	30	12	227	89	31	3.7
1959	30	13	235	98	34	3.9
1960	33	14	241	104	37	4.0
1961	35	15	256	107	40	3.9
1962	39	16	263	107	42	4.0
1963	42	18	271	108	40	4.0
1964	45	18	272	117	43	4.0
1965	52	19	293	120	47	4.0
1966	52	24	314	125	47	4.0
1967	70	34	322	127	52	4.0

Since both sheep and pigs are raised as meat animals the value of these animals depends primarily on meat prices. Prices of live animals on bookkeeping farms even seem to be rather similar to carcass prices.

Dairy cattle are kept for milk rather than meat production and the farm value of the cows likely reflects milk prices rather than beef prices. It is also very probable - though there are no official price statistics on live dairy cows in Finland - that these prices exceed the carcass prices. The average price of all cows in Finland lies somewhere between the price of dairy cow in best milk production age and carcass value.

Table 18. Indices of Live Animal Prices, Finland, 1948-67

Year	Laspeyres index of live animal prices[1]	Pellervo Index of prices of livestock products[2]	Agr.Econ.Res.Inst. index of prices of livestock products[3]
	1954=100	1954=100	1954=100
1948	84.2	96.0	..
1949	83.5	77.5	..
1950	87.9	86.4	..
1951	92.9	99.7	..
1952	95.7	105.0	..
1953	99.4	103.9	..
1954	100.0	100.0	100.0
1955	101.5	110.1	110.1
1956	103.9	132.5	132.5
1957	108.0	133.2	132.9
1958	116.8	139.1	137.9
1959	125.9	143.6	142.8
1960	137.9	154.6	153.3
1961	155.8	154.8	153.8
1962	160.2	154.8	153.4
1963	165.1	162.7	160.6
1964	164.5	177.0	173.3
1965	175.4	197.8	193.1
1966	185.1	205.0	197.6
1967	187.3	215.1	207.4

1) Includes prices of dairy cows, bulls, heifers and calves, sheep, pigs over 6 months, 2-6 months, and under 2 months, and chickens over 6 months from bookkeeping farms.

2) Pellervo index based on 1937-39=100 and recalculated here on 1954 base.

3) An official index based on crop-year 1956-57=100. Recalculated on 1954 base assuming similar changes to Pellervo index from 1954 to 1956.

Table 19. Average Prices of Livestock, Value Based on Carcass Price and Bookkeeping Farm Estimates, 1967.

Livestock class	Average carcass weight, kg	Producer price, mks/100 kg	Value, mks	Bookkeeping value, mks
Cows	180	397.8	716	732
Small bulls and heifers, 100-199 kg	130	397.8	517	465
Horses	300	253.3	760	703
Sows and boars	140	325.9	456	322
Pigs, 56 kg and over	70	325.9	288	
Pigs, under 56 kg	45	325.9	147	127
Sheep	15	476.8	72	70

Source: Agric. Economics Res. Institute

An attempt was made to establish a price series reflecting values of live dairy cows on all farms. It was assumed that the bookkeeping values represented the average farm value in 1951, when a reappraisal of each category of assets was made. This unit value has been adjusted for changes in the price of milk. The value of milk cows also depends on milk production per cow which has almost doubled since 1948. Production per cow has been increased by improved feeding and management as well as by selective breeding. In this study a half of total increase in milk production per cow was assumed to be due to selective breeding[1]. To eliminate major fluctuations around the trend of increasing production per cow caused by variations in crop yields three-year moving averages were used. The price per cow was raised annually by half of the corresponging rise in the moving averages. The new price series for dairy cows is presented in Table 20. Essentially this new series does not purely express changes in prices because the component raising the value per cow due to improved quality actually represents change in volume. This fact, however, probably becomes easier understandable by the way presented above.

The new price series indicates a value per cow in 1967 that was 180 percent higher than in the base year and about 260 percent higher than in 1948. Using the above method, the farm value of a cow in 1968 was estimated at 1063 mks. The increase over the 1967 value is due in large part to the fairly rapid rise in milk price.
A reappraisal of assets on bookkeeping farms in 1968 used guide values of 1000-1600 mks per cow. If the average value of bookkeeping farm cows approximated 1300 mks per cow, this is about 20 percent higher than the price obtained here for 1968. In 1967 average milk production per cow was 4278 kg on bookkeeping farms, 25 percent higher than the 3421 kg average for all herds in the country. The estimated cow values appear to be reasonable.

Prices of heifers were assumed to be 70 percent of the cow price, the relationship that exists in carcass values. Price of calves under 1 year were estimated at one-half the prices of heifers. These two series are also presented in Table 20.

1) The results obtained by LINDSTRÖM (1970,p.457) show that, depending on race, 51 or 48 percent of the increase in production per cow in 1957-1968 was caused by breeding. Thus, the assumption made here was exactly correct one.

Table 20. Formation of Live Dairy Cow Prices and Prices of Heifers and Calves, 1948-67.

Year	Price index of milk[1]	Price per cow (1951) adjusted by milk price	Milk production per cow Annual amount[2]	3-year moving average	Index of moving average	Price per cow (column 2) adjusted by half of the rise of moving ave	Price per heifer	Price per calf[3]
	1951=100	marks	----- kg	------	1951=100	---------	marks	--------
1948	90	297	1 800	1 800	74	258	181	91
1949	84	277	2 100	2 090	87	259	181	91
1950	87	287	2 367	2 300	98	284	199	100
1951	100	330	2 425	2 425	100	330	231	116
1952	103	340	2 476	2 489	103	345	242	121
1953	102	337	2 566	2 526	104	344	241	121
1954	104	343	2 535	2 536	105	352	246	123
1955	114	376	2 508	2 594	107	389	272	136
1956	146	482	2 740	2 682	111	509	356	178
1957	142	469	2 799	2 775	115	504	352	176
1958	151	498	2 787	2 833	117	540	378	189
1959	157	518	2 913	2 915	120	570	399	200
1960	163	538	3 044	3 033	125	605	424	212
1961	163	538	3 142	3 091	128	613	429	215
1962	165	545	3 087	3 132	129	624	437	219
1963	175	578	3 166	3 177	131	668	468	234
1964	199	657	3 279	3 273	135	772	540	270
1965	218	719	3 375	3 359	139	859	601	301
1966	221	729	3 424	3 407	141	878	615	308
1967	233	769	3 421	3 440	142	930	651	326

[1] Milk price series which are as a base for these index series are presented further on in Table 51.

[2] Source: Annual Statistics of Agriculture 1950-1967. Figures for 1948 and 1949 are estimated.

[3] All animals under 1 year.

Since 1950 there has been little variation in the price of hens on bookkeeping farms (see Table 17). Since the accuracy of these prices is questionable, prices for live hens were estimated in the following manner: First, it was assumed that price for 1951 is a correct one. This price was then adjusted in succeeding years by the index of egg prices[1]. (In Finland hens are kept primarily for egg production, and broiler growing is of minor importance). The original live hen prices on bookkeeping farms were used for the years before 1951.

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[1] Pellervo prices.

The prices of pigs under 2 months seem to be somewhat underestimated during recent years. They are not, however, changed here because it is quite difficult to receive reliable information on those prices and because the significance of this item in total assets is a very little one.

Horses are valued on their production of power rather than as a source of food and are treated separately (see p. 48).

Statistics on the number of livestock on Finnish farms are published twice annually, as of June 15 and December 15. Quarterly estimates of numbers of pigs and chickens are also available. Before 1950 one estimate each year was made on March 1. In the series which follow, the December 15 estimates have been used for all classes of livestock after 1949.

The dairy industry dominates livestock production in Finland. Since 1956 the dairy herd has provided all of the dairy products consumed and exported as well as most of the domestic beef consumption. Changes in numbers are an important consideration in agricultural policy and are carefully observed. As the data in Table 21 indicate, the number of dairy cows has remained almost static during most of the last 10 years. The changes in this series have been very important but they have been relatively small compared to most other changes in agriculture in the same time span. The number of dairy bulls has steadily decreased as artificial insemination has become available to nearly all farmers.

Perhaps the most important change over time in dairy numbers has been the increasing number of calves. These numbers have more than doubled from the late forties to the early sixties. Most of this change can be associated with increasing interest in beef or veal and a growing demand for higher quality beef as incomes rise. The number of young animals kept primarily for meat purposes is not separated from those kept to increase the dairy herd. Perhaps it would be difficult on some farms to make such a distinction, but the growing importance of this class of animals for meat production should be clearly evident. On the other hand the number of animals over one year has remained quite stable. Some of these animals are sold regularly for meat purposes but there has been relatively little change in the proportions over the 20-year period.

Table 21. Numbers and Value of the Dairy herd, Finland, 1948-67

Year	Numbers of: Bulls	Cows	Heifers[1]	Calves[2]	Value of:[3] Bulls and cows	Young animals	Total
	thousands				million marks		
1948	11.6	1 022.9	183.4	253.5	266.9	56.3	323.2
1949	12.9	1 028.6	187.4	309.4	269.7	62.1	331.8
1950	10.4	1 110.5	231.2	430.4	318.3	89.0	407.3
1951	9.9	1 143.5	241.1	419.3	380.6	104.3	484.9
1952	10.7	1 181.8	235.5	423.4	411.4	108.2	519.6
1953	8.5	1 156.1	211.4	433.3	400.6	103.4	504.0
1954	8.6	1 158.1	221.7	496.7	410.7	115.6	526.3
1955	8.6	1 155.3	233.8	504.7	452.8	132.2	585.0
1956	7.6	1 135.9	228.2	467.0	582.0	164.4	746.4
1957	5.9	1 138.3	212.4	488.2	576.7	160.7	737.4
1958	6.3	1 134.9	234.0	560.4	616.2	194.4	810.6
1959	6.3	1 121.2	242.9	578.8	642.7	212.7	855.4
1960	4.9	1 153.1	219.3	544.2	700.6	208.4	909.0
1961	5.3	1 153.0	239.0	659.3	710.0	244.3	954.3
1962	4.5	1 182.5	265.1	700.2	740.7	269.2	1 009.9
1963	4.9	1 195.5	254.8	719.7	801.9	287.7	1 089.6
1964	3.9	1 185.1	248.2	708.7	917.9	325.4	1 243.3
1965	3.1	1 137.5	218.1	668.8	979.8	332.4	1 312.2
1966	3.2	1 095.6	215.3	734.9	964.8	358.8	1 323.6
1967	2.2	1 058.5	231.2	743.7	986.5	393.0	1 379.5

[1] Heifers include all animals not in milk over one year of age; for convenience young bulls are included in this category as well.

[2] All animals under one year.

[3] Prices used in calculations from Table 20.

The total value of cattle and calves on farms has increased more than fourfold since the late 1940's. Most of this change in value is the result of increasing prices. In constant prices calculated in the conventional way, the increase is less than 20 percent. If taking the improved quality into account, the volume has then grown more than 60 percent since 1948. The relative value of the young herd has increased somewhat through time, from about 17 percent of the total to about 28 percent. However, there has been great stability in this sector of agriculture and changes have come slowly as no doubt they will in the future.

Table 22. Numbers and Value of Pigs, Finland, 1948-67

Year	Numbers of pigs: Over 6 mo.	2-6 mo.	Under 2 mo.	Total value
	thousands			million marks
1948	114.1	134.4	55.1	40.07
1949	130.5	196.4	82.4	30.56
1950	90.9	245.0	109.7	33.70
1951	110.6	240.4	90.7	39.96
1952	108.7	220.0	85.5	44.12
1953	105.7	230.9	97.8	47.09
1954	115.3	286.0	144.4	50.01
1955	98.4	237.6	131.4	45.37
1956	96.1	220.4	119.2	45.47
1957	105.8	259.8	168.6	55.19
1958	104.7	263.6	165.7	52.36
1959	76.7	243.4	146.8	46.87
1960	74.3	244.0	113.6	47.49
1961	83.6	262.8	137.3	55.01
1962	91.2	296.2	183.2	63.37
1963	84.2	272.0	165.1	58.80
1964	87.4	283.9	180.1	64.73
1965	86.1	272.2	199.6	67.27
1966	95.9	318.2	197.5	79.17
1967	106.3	356.6	261.2	93.10

Short term fluctuations in numbers of pigs are biologically possible. This is not the case with cattle and calves. As a result, pig numbers have fluctuated modestly around a mean number which has not varied much over the years. Perhaps the most important shift in pig numbers has been the movement toward marketing lighter animals. This can be seen in the relative proportion of pigs under 2 and over 6 months. The greatest changes are in the number of pigs under two months, with a steady trend upward since the early 1950's. The total value of pigs in Finland rose from about 35 to 90 million marks during most of the postwar years. Pig prices have risen less than those for dairy and beef animals, hence the total rise in value is more modest over the years.

Table 23. Numbers and Values of Sheep and Chickens, Finland,1948-67

Year	Number of sheep: Over 1 year	Under 1 year	Total value sheep	Number of chickens over 6 mo.	Value of chickens
	----- thousands ------		mil. mk	thousands	mil. mk
1948	584.8	414.7	20.6	1 917.6	11.9
1949	635.1	431.4	19.4	2 668.4	12.3
1950	670.9	549.0	21.5	3 523.7	13.7
1951	613.8	482.6	20.0	3 870.6	14.0
1952	604.6	521.7	20.9	3 851.3	15.0
1953	538.1	459.5	18.5	3 667.1	14.3
1954	484.8	423.3	17.3	4 002.9	16.0
1955	413.5	335.9	15.2	4 059.2	17.5
1956	310.8	254.9	11.8	3 911.6	18.0
1957	243.1	214.4	9.4	3 996.4	19.2
1958	218.7	188.6	8.8	4 245.6	21.7
1959	209.4	171.4	8.5	3 416.2	18.4
1960	186.4	154.9	8.3	3 524.1	20.4
1961	164.8	142.3	7.9	3 365.3	18.5
1962	148.4	130.2	7.9	3 674.8	19.1
1963	130.5	107.1	7.4	3 871.3	21.7
1964	116.7	105.1	7.1	3 865.1	22.8
1965	104.6	94.8	7.2	4 085.3	25.3
1966	92.9	81.7	7.6	4 166.7	27.1
1967	88.2	84.5	9.1	4 499.7	30.1

The sheep industry in Finland has declined steadily since numbers reached their peak in 1950. In 1965 there were only one-sixth of the total number 15 years earlier. Such a radical shift in the fortunes of one segment of agriculture has, however, raised very little excitement because the sheep industry was never large compared with that, for example, in Norway. Other alternatives in the livestock industry have been more profitable. The value of the national flock of sheep has declined steadily since 1950 even though animal prices have risen during these years. In 1955 capital invested in sheep fell below the amount invested in chickens and has held that position ever since.

Poultry numbers are readily increased or decreased in response to changes in prices. Thus, in the 1940's the number of chickens on farms increased very rapidly as feed became available and prices of eggs encouraged production. Since 1950 size of the national flock of chickens has not changed very much. The prices of hens over six months

of age have increased about 65 percent over 1948, an increase similar to changes in egg prices. The total value of chickens on farms has increased to almost three times the 1948 level.

Capital investments in productive livestock are summarized in Table 24. The total value at current prices has risen to 3.8 times the 1948 level. The proportion of livestock other than dairy dropped to less than half the 1948 level by the early 1960's, rising a little during the last two years of study. The reasons for this development are as follows. The prices per animal have increased more rapidly in the case of the dairy herd than other livestock because of greater improvement in quality of dairy animals. Secondly, cattle numbers continued to increase while other livestock numbers, especially sheep, declined. Since the mid-1960's numbers of both pigs and chickens have risen rather markedly while the numbers of dairy cattle have remained relatively stable. During the last ten years the value of dairy herd has comprised more than 90 percent of the total value of all livestock.

Table 24. Total Value of Production Livestock, Finland, 1948-67

Year	At current prices				At constant (1954) prices			
	Dairy herd	Other livestock	Total	Other than dairy herd of total	Dairy herd[1]	Other livestock	Total[1]	Total II[2]
	million marks			percent	million marks			
1948	323.2	72.6	395.8	18	374.3	62.6	436.9	503.0
1949	331.8	62.3	394.1	16	412.5	76.0	488.5	526.8
1950	407.3	68.9	476.2	14	486.6	78.4	565.0	582.7
1951	484.8	74.0	558.8	13	504.0	80.6	584.6	597.5
1952	519.6	80.0	599.6	13	524.5	78.5	603.0	608.3
1953	504.0	79.9	581.8	14	512.6	76.1	588.7	591.3
1954	526.3	83.3	609.6	14	526.3	83.3	609.6	609.6
1955	585.0	78.1	663.1	12	534.6	73.1	607.7	602.4
1956	746.7	75.3	822.0	9	531.5	66.7	598.2	582.7
1957	737.4	83.8	821.2	10	540.9	71.5	612.4	586.6
1958	810.6	82.9	893.5	9	557.2	71.5	628.7	599.7
1959	855.4	73.8	929.2	8	564.9	60.1	625.0	588.0
1960	909.0	76.2	985.2	8	578.6	58.2	636.8	586.6
1961	954.3	81.4	1 035.7	8	607.8	61.0	668.8	608.6
1962	1 009.9	90.4	1 100.3	8	634.5	67.1	701.6	636.2
1963	1 089.6	87.9	1 177.5	7	645.4	63.5	708.9	637.2
1964	1 243.3	94.6	1 337.9	7	648.6	65.0	713.9	631.7
1965	1 312.2	99.8	1 412.0	7	623.5	64.7	688.2	602.2
1966	1 323.6	113.9	1 437.5	8	620.3	70.3	690.6	600.5
1967	1 379.5	132.3	1 511.8	9	613.1	78.5	691.6	600.3

[1] Changes in quality included in volume.

[2] Changes in quality not included in volume.

The total value of livestock at constant prices has increased a little less than 60 percent since 1948. A fairly large proportion of this increase is due to the improved quality of dairy cattle. If changes in quality are not included in the volume, it has risen less than 20 percent through time (see the last column of Table 24).

242. Horses

Horses are a form of livestock, yet they differ from all other domestic livestock in their use. As a productive input in agriculture they are much more like tractors than cows. They are primarily sources of power and in terms of output contribute as a machine does. Because horses have been declining in importance in agriculture and have been replaced by tractors which are more efficient in many jobs, they have been treated here as a special account. This will allow combining capital in the form of horses with that in the form of machinery and equipment in looking at mechanization and its impact on output.

Statistics on numbers of draft horses are presented twice annually with data on other farm livestock. Three groupings are made: horses 4 years and over, young horses 1 to 3 years old, and foals. As with the other livestock classes, numbers used here are for December 15.

As previously mentioned (page 35) bookkeeping farm statistics of prices of horses seem to be underestimated in recent years. Benchmarks for establishing recent prices of live horses are not readily available. For the 1968 reappraisal on bookkeeping farms 1000 marks per head was used as a guide in determining value. Assuming that the 1951 price was also correct and adjusting this price forwards by the agricultural producer price index, a value of 1048 marks per horse was obtained for 1968. This method was to establish live horse prices for the period of the study. The original prices of horses on bookkeeping farms has been used for the years before 1951. The constructed price series, presented below, is used for all horses over 1 year. For foals, one-half of the corresponding horse prices are used.

Table 25. Estimated Prices of Horses, 1948-67

Year	Price of live horse, marks	Year	Price of live horse, marks
1948	562	1958	587
1949	487	1959	603
1950	447	1960	649
1951	419	1961	649
1952	440	1962	649
1953	436	1963	683
1954	419	1964	746
1955	461	1965	830
1956	557	1966	863
1957	561	1967	905

The series above is naturally open to criticism. As can be seen from Table 26, the number of young horses has been declined more rapidly than that of horses over 4 years old. The quality of the horses has probably deteriorated, resulting in the average price of live horses increasing somewhat slower than in the series above. On the other hand, prices in recent years may have been inflated by the demand for horses outpacing supply. It is apparent that the two influences compensate each other and the series presented above is likely as good as any available.

Numbers and total value of draft horses are presented in Table 26. Horse numbers have declined steadily since 1950, with the number in 1967 a little more than one-third that of 1950. Due to rising prices the total value of horses was fairly stable from 1951 to 1965. A decline in total value has taken place since that time.

Horses are used for power not only on arable land and in caring for other agricultural livestock but also in the forests. It may be argued that some proportion of the capital stock of horses must be considered as an asset of forestry. The only benchmark for evaluating the proportion that is agricultural use is to study the distribution of labor hours of horses through time. Bookkeeping farms are the only source of this kind of information. Based on these statistics agriculture's share of the total work hours of horses was about 85 percent in 1950 but only 63 percent in 1967. Mechanization has replaced horse labor in agriculture faster than in forestry and other uses.

Table 26. Number and Value of Horses, Finland, 1948-67

Year	Number of horses: 4 years and over	1 to 3 years	Foals	Total value of all horses 1)
	thousands			million mks
1948	312.7	41.1	28.5	206.8
1949	308.2	64.9	28.6	188.7
1950	347.2	49.9	11.8	180.1
1951	336.4	34.9	11.1	157.9
1952	334.4	23.3	11.2	159.9
1953	314.1	18.2	6.4	146.3
1954	300.9	16.4	8.5	134.7
1955	288.8	15.0	9.2	142.2
1956	276.9	13.6	6.6	163.6
1957	255.7	15.4	4.3	153.3
1958	244.9	11.9	4.6	152.1
1959	234.5	10.7	8.6	150.5
1960	228.0	15.0	7.9	160.3
1961	213.1	16.0	5.6	150.5
1962	203.5	17.4	6.6	145.5
1963	196.1	17.5	6.4	148.1
1964	186.9	15.4	4.7	152.7
1965	168.3	12.5	3.0	151.3
1966	153.5	9.3	1.9	141.3
1967	132.0	6.6	2.1	126.4

1) Value of all draft horses in Finland with no separation made between agriculture and forestry.

On above basis it is of course possible to estimate agriculture's share of the total value of horses. If this is done, other complications will follow. A given proportion of the feeds stored on farms for horses should be excluded as assets of forestry and other non-agricultural enterprises as well as a given proportion of tractors and liquid fuels stored on farms. To avoid making adjustments for small amounts of transferred charges the value of horses is considered as an agricultural asset in this study like usually made in agricultural economics.

243. Evaluation of Estimates for Capital Stock in Livestock and Horses

If one accepts the official statistics on livestock numbers in Finland as correct, then the preceding estimates of the capital stock in agriculture should be reasonably accurate. There is no reason to assume that the statistics on numbers are not valid. The price series obtained and developed in this study are not official series. However, movements in these live animal prices closely approximate the general movement of prices of livestock products during the same time span. This is especially true when improved quality of animals is excluded from the unit values and the pure price component is considered. On the basis of logic it seems reasonable to accept the current value series for agricultural livestock and horses as the best available.

When one removes the influence of price changes in these series and establishes values in terms of constant prices, the basic data should be even more acceptable. The price relationships in the base year chosen may be subject to question when aggregation of different forms of capital is attempted. But in studying variation through time in a given series, the physical data are emphasized by this procedure. The actual numbers are the firmest data available for both livestock and horses.

Capital stocks of livestock and horses are summarized in Table 27 in terms of current and constant prices. The year 1954 has been used for the constant price series. It is near the middle of the 20-year period and it is the base used for the price indices calculated for agriculture by the Central Statistical Office in their work. The decline in importance of horses and the relatively constant amount of capital invested in livestock since 1950 is readily seen in a study of these series.

Table 27. Capital Stock Invested in Livestock and Horses, Finland, 1948-67

Year	At current prices				At constant (1954) prices[1]			
	Livestock		Horses		Livestock		Horses	
	Value	Index	Value	Index	Value	Index	Value	Index
	mil.mks	1948=100	mil.mks	1948=100	mil.mks	1948=100	mil.mks	1948=100
1948	395.8	100	206.8	100	436.9	100	154.0	100
1949	394.1	100	188.7	91	488.5	112	162.2	105
1950	476.2	120	180.1	87	565.0	129	168.7	110
1951	558.8	141	157.9	76	584.6	134	157.9	103
1952	599.6	151	159.9	77	603.0	138	152.2	99
1953	581.8	147	146.3	71	588.7	135	140.5	91
1954	609.6	154	134.7	65	609.6	140	134.7	87
1955	663.1	168	142.2	69	607.7	139	129.2	84
1956	822.0	208	163.6	79	598.2	137	123.1	80
1957	821.2	207	153.3	74	612.4	140	114.5	74
1958	893.5	226	152.1	74	628.7	144	108.5	70
1959	929.2	235	150.5	73	625.0	143	104.6	68
1960	985.2	249	160.3	77	636.8	146	103.4	67
1961	1 035.7	262	150.5	73	668.0	153	97.1	63
1962	1 100.3	278	145.5	70	701.6	161	94.0	61
1963	1 177.5	297	148.1	72	708.9	162	90.8	59
1964	1 337.9	338	152.7	74	713.9	163	85.8	56
1965	1 412.0	357	151.3	73	688.2	158	76.3	50
1966	1 437.5	363	141.3	68	690.6	158	68.6	45
1967	1 511.8	382	126.4	61	691.6	158	58.5	38

[1] Changes in quality included in volume.

25. Machinery and Equipment

The mechanization of agriculture to many people is synonymous with increased efficiency and productivity. During the past twenty years much has been done to mechanize Finnish agriculture. The replacement of horse power with tractors is but one aspect of this process. In general, animal and human labor are replaced by machine capital. The degree to which such replacement is efficient depends on the marginal products of capital and labor and the respective prices of these inputs.

There are a variety of sources of data on changes in the quantity and value of machinery, power, and equipment used in agriculture. The annual inventories and published summaries for the bookkeeping farms provide one basic, continuous series. The national income accounts provide annual data on gross domestic capital formation. From the same source there are also unpublished series on stocks of machinery and equipment in agriculture and price series for these investments. The agricultural census for 1950 and 1959 give benchmark information on numbers of principal machines. A series on the number of tractors and combines and their respective values has been developed at the Agricultural Economics Research Institute. All of these series concur in showing that the capital investment in machinery and power in Finland has been growing steadily and rapidly and that the pace has not slackened.

The summaries for the bookkeeping farms provide a basis for getting a first look at changes in stocks over the past 20 years. While these farms are somewhat larger than the average, the rate of change in investment per hectare should provide a reasonable first index with which to appraise other sources of data. Inventories are established in a conventional accounting manner with respect to depreciation and the remaining undepreciated value. Even though prices have risen over time, rapid changes in technology have made depreciated value approximate fairly closely market value in the case of most machines.

In the years immediately after the war, most of the equipment on farms was horse drawn. The number of tractors was small and electric motors were uncommon. Most of the inventory value represented older equipment which needed replacement. In the 15 years after 1950 the value of machinery and equipment per hectare quadrupled. In 1965 total value was more than four times that 15 years earlier.

Differences in the values between the simple averages and the weighted ones are small. This indicates that the smallest bookkeeping farms had essentially as large investments per hectare as did the larger farms. The larger farms were somewhat more mechanized in total since they had more arable land and hence more machinery, which could be used more efficiently.

Table 28. Capital Investments in Machinery and Equipment - Finnish Bookkeeping farms, 1948-67

Year	Value per hectare: Simple average	Value per hectare: Weighted average	Estimated total value: Simple average	Estimated total value: Weighted average
	marks per hectare		million marks	
1948	115	..	297.9	..
1949	134	..	352.1	..
1950	157	..	401.6	..
1951	199	..	513.9	..
1952	249	..	653.6	..
1953	278	..	734.4	..
1954	293	..	814.5	..
1955	310	..	834.2	..
1956	332	..	898.2	..
1957	352	..	957.5	..
1958	372	..	1 017.6	..
1959	396	392	1 092.1	1 081.1
1960	430	415	1 178.5	1 137.3
1961	480	466	1 312.4	1 274.1
1962	539	523	1 477.3	1 433.5
1963	591	565	1 626.4	1 554.9
1964	629	610	1 737.9	1 685.4
1965	613	596	1 716.3	1 668.7
1966	655	631	1 832.0	1 764.8
1967	696	670	1 944.9	1 872.2

Before considering the national income account data, it may be useful to examine two annual series constructed for tractors and combines. These are estimates of the numbers of machines on farms based on export-import information, production data, and depreciation rates corrected with census information. In 1941 there were only 5873 tractors on Finnish farms according to the census of agriculture. By 1950 this number had increased to 14,114 and in 1959 to 72,089 tractors. The estimate for 1967 was 133,000 wheeled tractors. This of course means that many of the farms with less than 10 hectares of land do not have tractors, and it is unlikely that they will have in the near future.

Table 29. Numbers of Tractors and Motor Driven Combines, Finland, 1950-67

Year	Tractors	Combines
1950	14,114	..
1951	16,500	..
1952	21,900	..
1953	25,900	..
1954	30,600	..
1955	40,800	..
1956	49,200	1,365
1957	57,700	1,855
1958	64,400	2,230
1959	72,089	3,229
1960	79,700	4,630
1961	90,900	6,930
1962	102,000	8,930
1963	112,000	11,580
1964	118,000	12,040
1965	124,000	13,500
1966	128,000	14,600
1967	133,600	16,800

Source: Agricultural Economics Research Institute - unpublished data.

The number of motor driven combines in Finland is still relatively small. Additions during the last five years account for most of the stock. It is likely that net additions will continue in the immediate future.

These data give one some impression of the state of mechanization within agriculture and the kinds of change which have been occurring in the last 20 years. Widespread use of tractors on medium and large sized farms has brought the need for new tractor drawn implements. If average farm size should slowly increase, the demand for tractors and appropriate supplementary equipment would continue to increase. Much horse drawn equipment remains in use on Finnish farms, some modified for use with tractors. On small farms it continues to be the most practical method of farming.

Basic information on annual investments in power, machinery, and equipment in agriculture and estimates of the annual amount of depreciation have been collected regularly by the Central Statistical

Office for many years. In general these are reliable statistics. They come from annual production data within Finland and from export-import statistics. These numbers provide consistent estimates with good control over output and apparent sales. Sampling is not an issue. The method of pricing and rates of depreciation might be subject to differences of opinion but it seems clear that these are reliable statistics as aggregate statistics go and should provide a good basis for constructing reliable figures for stocks.

The basic raw material published annually for the national income accounts is presented in Table 30. Annual outlays for new machinery and equipment and estimated annual depreciation are given both in current and constant prices. The annual depreciation rate used has gradually decreased from about 9.0 percent of the original value in the period immediately after the war to the current rate of 8.2 percent. This straight line method of depreciation is the most common accounting procedure and provides a simple device for gradually recovering original capital over time as a production expense. While market values seldom follow such depreciated values, because the loss in value for machines in the years immediately after purchase is so much greater than in the later years, in the aggregate these effects should balance. The aggregate of a number of years of depreciated values should about equal market values even when calculated by some more complex method.

Capital investments for new machinery have increased dramatically. In each succeeding five-year period there has been a major increase. But in the 1960's the rate seems to have levelled off and in terms of constant prices appears to have fallen. Net additions to the stock of capital in the form of machinery and equipment reached a peak in 1961 calculated in real terms. Since that time depreciation has been increasing more rapidly than new investment so that the margin between the two has narrowed and was negative in 1967. Although this fall may be temporary, it is evident that depreciation will soon equal new investment so that the stock of capital will essentially remain rather constant at least in real terms.

Table 30. Annual Outlays for New Machinery and Equipment - National Income Accounts, Finland. 1948-67

Year	Current prices			Constant prices (1954)		
	Gross outlay	Depreciation	Net outlay	Gross outlay	Depreciation	Net outlay
	million marks					
1948	37.2	22.0	15.2	79.8	47.1	32.7
1949	37.1	26.6	10.5	67.4	48.4	19.0
1950	31.6	37.6	-6.0	39.4	47.0	-7.6
1951	67.9	45.2	22.7	76.1	50.6	25.5
1952	103.0	53.0	50.0	112.2	57.8	54.4
1953	74.4	62.2	12.2	72.5	60.7	11.8
1954	86.5	64.1	22.4	86.5	64.1	22.4
1955	121.2	71.3	49.9	120.1	70.6	49.5
1956	138.7	80.6	58.1	135.4	78.7	56.7
1957	119.2	82.6	36.6	122.5	84.9	37.6
1958	131.4	110.6	20.8	106.5	89.6	16.9
1959	169.4	126.4	43.0	126.2	94.2	32.0
1960	221.5	140.0	81.5	160.4	101.4	59.0
1961	288.9	160.8	128.1	205.2	114.2	91.0
1962	287.7	181.4	106.3	198.5	125.2	73.3
1963	257.5	198.2	59.3	171.6	132.1	39.5
1964	267.1	221.5	45.6	166.2	137.8	28.4
1965	286.7	241.5	45.2	173.4	146.8	26.6
1966	296.8	262.9	33.9	173.4	155.3	18.1
1967	248.2	279.0	-30.8	140.1	157.7	-17.6

In order to establish investment and depreciation figures for a period of years in constant prices, index numbers for the prices of machinery and equipment were constructed at the Central Statistical Office. The basic index numbers were developed by VIITA (1964). The most complete series for the early years uses 1938 as the base period. New indices have been constructed for the late 1950's and 1960's using 1954, 1959 and 1964 as the base periods. The need for changing base periods and weights becomes quickly evident when one considers the many changes in types and designs of equipment over time. The basic sets of index numbers are presented in Table 31. The series based on 1954 prices and weights has been extended in both directions. Currently the 1964 index is most appropriate.

Table 31. Index Numbers of Prices of Farm Machinery and Equipment - National Income Accounts, Finland, 1936-67

Year	1938=100	1954=100	1959=100	1964=100
1936	81.4	5.37	..	..
1937	86.2	5.69	..	..
1938	100.0	6.60	..	..
1939	101.9	6.73	..	..
1940	139.5	9.21	..	..
1941	160.5	10.6	..	..
1942	169.9	11.2	..	..
1943	204.5	13.5	..	..
1944	215.6	14.2	..	..
1945	334.0	22.0	..	..
1946	550.5	36.3	..	..
1947	556.2	36.7	..	..
1948	706.9	46.7	..	..
1949	833.3	55.0	..	..
1950	1213	80.1	59.7	..
1951	1352	89.2	66.5	..
1952	1391	91.8	68.4	..
1953	1554	102.6	76.4	..
1954	1515	100.0	74.5	..
1955	1529	100.9	75.2	..
1956	1552	102.5	76.3	..
1957	1474	97.3	72.5	..
1958	1869	123.4	95.9	..
1959	2033	134.2	100.0	..
1960	..	138.1	102.9	..
1961	..	140.8	104.9	..
1962	..	144.9	108.0	..
1963	..	150.1	111.9	..
1964	..	160.7	119.7	100.0
1965	..	163.6	122.0	101.8
1966	..	169.2	126.3	105.3
1967	..	175.2	129.5	109.0

In the postwar years, prices of farm machinery have risen at a rate quite similar to that of prices received by farmers for the products they sell. Comparison with index numbers in Table 18 which have the common base, 1954, show that machinery prices rose more rapidly in the late 1940's than did live animal or livestock product prices. However, since 1954 machinery prices have increased a little less in total than either of the other two.

With the basic data on annual investment, depreciation and appropriate price series, estimates of the stock of capital in the form of machinery and equipment in agriculture were constructed for this study. A set of accounts was established for each year since 1939. The capital outlay for each year in constant (1954) prices was then depreciated according to the prevailing rate at that time period. The depreciated value remaining from the investment in each previous year could then be added and a capital stock figure in constant prices resulted. The calculations for 1965 illustrate the procedure used:

Year of original investment	Depreciated value remaining
	mil. mks
1955	6.47
1956	19.00
1957	28.81
1958	34.10
1959	52.00
1960	79.58
1961	119.00
1962	132.58
1963	128.88
1964	138.62
1965	159.01
	898.05

The stock of capital in the form of machinery and equipment in constant prices is presented in Table 32. In real terms, stocks increased more than 3.5 times in the span of twenty years. Much of this increase occurred in the decade of the fifties and slowed some in the mid-sixties. The total increase in current prices is even more dramatic. In terms of rate of growth this has been the sector of the agricultural accounts which has demonstrated greatest change and perhaps has been most obvious as well. The substitution of capital in the form of horses for machines explains at least a part of this spectacular change and should not be ignored in making estimates in the future.

Table 32. Capital Stock of Farm Machinery and Equipment Finland, 1948-67

Year	1954 prices	Index	Current prices	Index	Estimates from book-keeping farms	Index
	Mil.marks	1948=100	Mil.marks	1948=100	Mil.marks	1948=100
1948	255.78	100	119.5	100	278.1	100
1949	275.36	108	151.5	127	330.0	119
1950	268.43	105	215.0	180	382.6	138
1951	293.86	115	262.1	219	488.9	176
1952	348.65	136	320.1	268	622.6	224
1953	361.04	141	370.4	310	699.1	251
1954	384.24	150	384.2	322	744.0	268
1955	434.40	170	438.3	367	794.3	286
1956	491.97	192	504.3	422	857.6	308
1957	530.68	207	516.4	432	914.1	329
1958	547.56	214	675.7	565	970.1	349
1959	579.54	227	777.7	651	1 042.8	375
1960	638.59	250	881.9	738	1 141.2	410
1961	729.61	285	1 027.3	860	1 281.9	461
1962	802.98	314	1 163.5	974	1 448.1	521
1963	842.53	329	1 264.6	1 058	1 597.6	574
1964	870.95	341	1 399.6	1 171	1 708.8	614
1965	898.05	351	1 469.2	1 229	1 663.2	598
1966	922.45	361	1 560.8	1 306	1 832.0	659
1967	909.81	356	1 594.0	1 334	1 944.9	699

In the last column of Table 32 aggregate estimates of investment in machinery and equipment based on the averages from the bookkeeping farms is presented for comparison purposes. In all of the 20 years the totals based on these bookkeeping averages are larger, although the percentage difference between the two sets of figures has been growing smaller through time. The weighted averagas for the bookkeeping farms gives a somewhat smaller total for the years after 1958, when they are available, but they are also larger than the ones constructed from the national income account data.

It is not difficult to rationalize the differences observed. One might argue that it was due to sample bias. After all, the Finnish bookkeeping farms are assumed to be above average and therefore should be better mechanized. In addition, the mechanization process began earlier on those farms, which explains the relatively larger difference

in figures in the beginning than at the end of period. There is also another consideration for some of the difference. By the very nature of the depreciation process in the national income accounts, there is no value left in a machine or piece of equipment after an average of 12 years. Thus, all equipment on farms which is over 15 years of age would be counted as worthless. Almost all horse-drawn equipment would by this time be fully depreciated. In 1967 the stock of capital value includes only machinery and equipment purchased since 1957 as the example on page 58 demonstrates.

In a sense then one could argue logically that the stock figures based on the national income accounts must understate the true value of machinery and equipment on Finnish farms. Many of the drills, plows, harrows, mowing machines, hay rakes, wagons, and spreaders which are in good working condition and are regularly used, especially on the many small farms, are not counted or valued. But how much are these older pieces of equipment worth and how might they be valued? It is easier to state the problem than to suggest a workable solution. The census data give some indication of the numbers of various pieces of equipment on farms in 1950 and 1959 but pricing would be very difficult. The bookkeeping farms continue to inventory such equipment at a nominal value. This may in large measure account for the consistent difference between the two series in Table 32. Nevertheless, the series based on the national income accounts is probably the most defensible one for general use and for this balance sheet. It must be remembered, however, that it undoubtedly understates the true stock of equipment by some amount each year, but probably the difference is not very significant.

26. Inventories

An important item in the balance sheet of any major business of corporation is inventories of supplies for production and goods in process or already completed. In some business this item may represent as much as 50 percent of total assets, especially where they are engaged in changing raw materials into finnished goods and where the raw product becomes available only once annually. Business primarily

engaged in retailing or wholesaling also have sizable items in their balance sheets for inventories. In fact, inventory control is a major concern of many businesses.

Agriculture too must maintain sizable inventories. This often requires that capital must be committed for many months from the time original expenditures are made. Such items as fertilizer or lime are converted first into crops and then reconverted by livestock into salable products. It is difficult to realize the importance of this capital in the total business enterprise because it is not as obvious as machines or buildings. While it is not "fixed" in the sense that it is easily moved or sold, it is a "required" asset without which farming could not go on, especially a livestock-based economy.

The concept of a balance sheet implies an annual accounting of assets and debts at some specific point of time. For most assets this creates no difficulty. The date chosen has relatively little effect on the figures except for livestock, and in Finland even this is not a problem where dairying is so important. But the point in time chosen for inventory of supplies and crops stored does make a difference. In general, inventories reach a peak at the end of the summer or early fall when harvest is completed. In contrast stocks are usually lowest in May or early June when livestock go on pasture and crops are just planted. Counting this form of assets on July 1 would yield very different results from a count made on November 1 or even January 1.

Because of the variability of inventories of stocks throughout the year, some effort will be made in this section to obtain an average value for the year rather than making an estimate at one specific date annually. That is why because the nature of these assets differs from all others. While the volume of other assets are either stable or changing smoothly in a given direction through time, the stores of crops have a typical seasonal variation. (As mentioned earlier, some types of livestock have a specific seasonal variation in assets). Although the average value of crops stored is not far from the value of December 31st[1)] it is, however, theoretically more correct to use the average value for the year, which was done in this study.

[1)] MÄKI's (1943, p.98-101) results indicate the average value of purchased supplies and stores for sale was reached on Feb. 1st and on Feb. 15th for supplies for processing on the farm.

While this complicates the accounting process somewhat it should lead to a more adequate expression of the relative importance of stocks in the asset structure of agriculture.

Before making any calculations one must establish more specifically the items which should be included in the inventory of supplies and crops stored on farms. As was pointed out above any goods, whether completed or in process, should be technically included in this account. Likewise basic raw materials used in production should be listed. Thus there are three categories: (1) crops in storage, (2) crops in production, and (3) supplies stored for use in production. There is a purpose to estimate each of these three categories in the following.

Crop production in Finland centers around cereals, silage and hay, pasture and potatoes (Table 3). It is primarily livestock feed and seed for the next year's crop which is stored on farms. Of the cereals, wheat and rye are grown primarily for human consumption. Barley and oats, however, are grown primarily for animal feed and hence are largely stored on farms. Hay and silage are essentially all fed on the farms where they are produced. Potatoes also have an important use as livestock feed as well as the share going for human consumption.

Annual inventories on bookkeeping farms were taken on July 1 each year until 1965 when the accounting year was changed to correspond to the calendar year. The effect of this change is demonstrated rather graphically in the summary figures in Table 33. In terms of capital invested per hectare, supplies amounted to a relatively small item, about equal to land improvements in the late 1940's but never as much as 100 marks per hectare even in the 1960's. The change of the accounting year increased this item by two and one-half times in one year. The real amount of these assets are, however, far bigger because supplies of home-grown hay and silage are not included in the bookkeeping values. Any estimates on growing crops are not included either.

Table 33. Inventories of Supplies and Crops Stored on Farms - Finnish Bookkeeping Farms, 1948-67

Year	Value per hectare: Simple average	Value per hectare: Weighted average	Estimated total value: Simple average	Estimated total value: Weighted average
	marks per hectare		million marks	
1948	28	..	72.5	..
1949	33	..	86.7	..
1950	33	..	84.4	..
1951	36	..	93.0	..
1952	41	..	107.6	..
1953	41	..	108.3	..
1954	36	..	96.0	..
1955	31	..	83.4	..
1956	37	..	100.1	..
1957	44	..	119.7	..
1958	43	..	117.6	..
1959	52	48	143.4	132.4
1960	59	53	161.7	145.3
1961	90	88	246.1	240.6
1962	85	77	233.0	211.0
1963	85	77	233.9	211.9
1964[a)]	126	113	348.1	312.2
1965[a)]	308	272	862.4	761.6
1966	338	306	945.4	855.9
1967	295	265	824.3	740.5

a) The bookkeeping year was changed from July 1 - June 30 to January 1-December 31.

Because of the problem of the accounting year the series from the bookkeeping farms does not provide much help in making national estimates. Even the changes through time are only evidence of the value of items which must have come largely as purchases off the farm. The rate of increase here might well be larger than for all items in this general category.

Some other sources of information are necessary besides the bookkeeping farm data. The national income accounts do not provide a ready basis for obtaining this kind of information. The annual agricultural statistics on crop production and the annual estimates for the national food balance sheet appear to be the best basic sources.

Estimates for the world food balance sheet prepared by the Food and Agriculture Organization of the United Nations are calculated each year in Finland. These estimates have as an objective the calculation of the quantity of food apparently consumed in each country in the world. They are constructed from aggregate data. Annual production within the country is corrected for exports, imports, and changes in stocks to provide a figure for "available supply". This supply is then distributed between final uses including seed, manufacture, animal feed and waste, and gross and net food supplies. Currently these estimates for Finland are made at the Agricultural Economics Research Institute.

From the annual calculations for the food balance sheet estimates of quantities used for seed and animal feed and human consumption are available for each of the cereal grains. Crop production statistics provide basic source material on hay and silage. These are the primary crops stored on farms.

261. Valuation of Crops Stored

Once a set of physical inventories of crops on farms have been constructed there remain two problems which must be solved before estimates of capital stocks can be prepared. First, a set of prices must be established. Secondly, the average quantities on hand in the selected case must be determined. In Finland there are good statistics on prices of agricultural commodities, including feeds except roughage. Therefore, this point does not raise any great problems.

There are no recent statistics available on the rates at which farmers use their stocks of feed in Finland. Common experience and knowledge is therefore used here when making the estimates of the rate of disappearance of feed stored during each month of the year after harvest. The same procedure has been used with crops stored for human consumption by the farm family. All the home-grown feed is assumed to be stored until May. The stores of wheat and rye for sale are estimated according to the information on the distribution of

farmers' sales published by the State Grain Storage. Table 34 presents the percentage share of each month of total sales of wheat and rye in the crop years 1956/57, 1961/62 and 1966/67.

Table 34. Percentage of the Annual Total Amount of Wheat and Rye Sold by Farmers, by Months, Crop Years 1956/57, 1961/62 and 1966/67[a)]

Month	Wheat				Rye			
	1956/57	1961/62	1966/67	Ave.	1956/57	1961/62	1966/67	Ave.
Sept.	24	34	25	27	21	32	23	25
Oct.	22	17	10	16	20	13	7	13
Nov.	14	14	6	11	12	12	9	11
Dec.	10	9	5	8	11	7	5	8
Jan.	7	4	5	5	9	5	4	6
Feb.	5	4	7	5	6	4	5	5
Mar.	5	5	8	6	6	6	7	6
Apr.	3	3	6	4	4	4	5	4
May	3	3	6	4	4	5	5	5
June	4	3	4	4	3	4	3	3
July	2	3	2	2	2	5	3	3
Aug.	1	1	16	6	2	3	24	10

a) Source: State Grain Storage, Annual Reports, 1957, 1962 and 1967.

The percentages sold each month in the three crop years are similar except August 1967 when, due to early harvest, much of the winter wheat and rye sold was the new crop.

In estimating the store of potatoes it is assumed that the total amount for farm families' food, seed and feed is stored on farms, but potatoes for other purposes are sold immediately after harvest. Potatoes for feed are assumed to be consumed until December 31st.

On the basis presented above, figures were constructed indicating the percentage of the total supply of each crop available for sale, seed, domestic consumption of farm families and feed, which could be expected to be on hand on the 15th of each month of the crop year. These percentages are presented in the following table.

Table 35. Estimated Percentage of Crops Available on Farms for Sale, Seed, Domestic Consumption and Feed, 15th of Each Month, Crop Year

Month	Oats, barley and mixed cereals	Wheat and rye		Hay and silage	Potatoes
		For sale, seed and consumption	For feed		
Sept.	95	85	90	100	10
Oct.	87	65	75	92.5	95
Nov.	79	55	60	80	85
Dec.	71	45	45	67.5	75
Jan.	63	35	30	55	60
Feb.	55	30	0	42.5	50
Mar.	45	30	0	30	45
Apr.	35	25	0	17.5	40
May	15	10	0	5	35
June	5	5	0	0	10
July	0	0	0	50	5
Aug.	0	0	0	80	0
Average	45	30	25	50	40

The purpose of constructing this series was to develop average percentages for each crop to be used in determining the average stocks on hand during the year. The figures in the last line are averages obtained from the monthly percentages. Thus, it is assumed that on the average 45 percent of the total stock of oats, barley, and mixed cereals originally stored on farms at the beginning of the crop year should be counted as the "average inventory". A corresponding assumption is made for other crops.

The total supply of each crop and sub-category is estimated using total yields, as published in the Annual Statistics of Agriculture; amounts used for human consumption, feed and seed, from the Food Balance Sheet prepared by the Agricultural Economics Research Institute; human consumption of potatoes on farms was estimated from Total Accounts of Finnish Agriculture also prepared by AERI.

Prices for each of the different cereals, for potatoes, and for hay and silage are necessary to calculate the values of stocks. In recent years feed prices are separated from the general market average for wheat, rye, oats and barley. In the case of oats this feed price can be extended back to the war years using Pellervo data. Because

prices of barley and oats followed a similar pattern in the years 1953-1956 it was assumed that the prices for feed oats from 1948-1953 could also be used for barley when a separate series was not available. Barley prices were also used for wheat and rye for feed.

Market prices for hay and silage are essentially non-existent. Some hay is sold annually but it is a very small portion of total production and does not reflect accurately its feeding value or its economic value in the view of the majority of farmers. As a mechanism to value hay, 30 percent of the feed barley price was used. The basis of this decision is somewhat artificial. Barley is the basic feed

Table 36. Value of Oats and Mixed Grains on Farms. Finland,1948-67

Year	Original supply of feed and seed[1]	Feed price[2]	Total value	Average value of stocks[3]
	thous, tons	p./kg.	--- million marks ---	
1948	615.0	10.72	65.9	29.7
1949	736.0	13.47	99.1	44.6
1950	702.0	20.06	140.8	63.4
1951	703.0	23.19	163.0	73.4
1952	808.0	19.20	155.1	69.8
1953	884.0	17.20	152.1	68.4
1954	796.0	21.12	168.1	75.7
1955	676.2	24.00	162.3	73.0
1956	667.2	23.95	159.8	71.9
1957	739.8	23.66	175.0	78.8
1958	820.3	26.69	218.9	98.5
1959	727.2	30.57	222.3	100.0
1960	987.4	27.70	273.5	123.1
1961	1 017.3	22.40	227.9	102.6
1962	708.5	24.33	172.4	77.6
1963	823.2	30.41	250.3	112.6
1964	784.4	37.09	290.9	130.9
1965	969.8	36.12	350.3	157.6
1966	942.0	32.88	309.7	139.4
1967	956.9	34.84	333.4	150.0

1) Based on estimates from the food balance sheet prepared for FAO including seed and animal feed and waste. For the years before 1949, the estimate = production + imports - gross food estimated to be 40,000 tons.

2) Pellerco series from 1946-55, A.E.R.I. series to date.

3) Total value x 45 percent.

Table 37. Value of Stocks of Barley on Farms, Finland, 1948-67

Year	Original supply of feed and seed[1]	Feed price[2]	Total value	Average value of stocks[3]
	thous. tons	p./kg.	million marks	
1948	148	10.72	15.9	7.1
1949	109	13.47	14.7	6.6
1950	117	20.06	23.5	10.6
1951	140	23.19	32.5	14.6
1952	159	19.20	30.5	13.7
1953	235	17.20	40.4	18.2
1954	204	21.66	44.2	19.9
1955	203	24.24	49.2	22.1
1956	235	23.98	56.4	25.4
1957	297	24.27	72.1	32.4
1958	334	27.47	91.7	41.3
1959	282	30.40	85.7	38.6
1960	322	28.50	91.8	41.3
1961	331	24.50	81.1	36.5
1962	256	27.26	69.8	31.4
1963	392	30.46	119.4	53.7
1964	371	36.83	136.6	61.5
1965	426	37.83	161.2	72.5
1966	578	34.37	198.7	89.4
1967	626	37.07	232.1	104.4

1) Based primarily on estimates from the food balance sheet prepared for FAO including aggregates for seed, animal feed and waste. For the years before 1949 the estimate equals production + imports - exports - gross food and manufactures estimated to be 65,000 tons annually.

2) For the years before 1954 it is based on the feed price of oats from Pellervo. After 1954 it is the feed price for barley calculated by A.E.R.I.

3) Total value x 45 percent.

around which the Scandinavian feed unit is constructed. It takes approximately 2.4 kilograms of average hay to equal one kilogram of barley in terms of feeding value. Because there is less dry matter in hay per feed unit and because concentrates have some additional price advantage because of their mobility and accessibility, the 30 percent figure was finally devised. Observation of this price series constructed for hay also indicates that it is not far out of line with what farm management research workers feel the price of roughage should be in relation to concentrate prices.

Table 38. Value of Stocks of Wheat and Rye for Sale, Seed and Home Consumption on Farms, Finland, 1948-67

Year	Original supply for sale, seed and consumpt.[1]		Price[2]		Total value			Average value of stocks[3]
	Wheat	Rye	Wheat	Rye	Wheat	Rye	Total	
	- thousand tons-		- p./kg. -		— million marks ----------			
1948	220	174	14.83	13.88	32.6	24.2	56.8	17.0
1949	260	178	18.27	17.68	47.5	31.5	79.0	23.7
1950	227	188	23.71	23.11	53.8	43.4	97.2	29.2
1951	165	163	28.44	27.78	46.9	45.3	92.2	27.7
1952	182	153	30.00	29.00	54.6	44.4	99.0	29.7
1953	175	112	30.47	30.10	53.3	33.7	87.0	26.1
1954	192	112	32.20	31.50	61.8	35.3	97.1	29.1
1955	153	93	33.10	32.70	50.6	30.4	81.0	24.3
1956	143	87	36.31	37.39	51.9	32.5	84.4	25.3
1957	151	96	39.13	39.88	59.1	38.3	97.4	29.2
1958	190	91	42.81	43.84	81.3	39.9	121.2	36.4
1959	233	133	48.25	47.99	112.4	63.8	176.2	52.9
1960	341	164	47.50	48.64	162.0	79.8	241.8	72.5
1961	424	116	46.60	49.20	197.6	57.1	254.7	76.4
1962	252	58	45.25	50.87	114.0	29.5	143.5	43.1
1963	346	89	51.57	53.02	178.4	47.2	225.6	67.7
1964	386	113	57.69	58.75	222.7	66.4	289.1	86.7
1965	386	155	59.33	60.19	229.0	93.3	322.3	96.7
1966	308	103	59.78	59.99	184.1	61.8	245.9	73.8
1967	344	95	57.94	58.43	199.3	55.5	254.8	76.4

[1] Production - use for animal feed. Source: Food Balance Sheet.
[2] Average producer price, Pellervo.
[3] Total value x 30 percent.

For all potatoes the food prices of this product have been used. This price overestimates the unit value of potatoes stored on farms because of the large proportions of feed and waste. On the other hand the stores of potatoes are larger than presented in this study because large amounts of potatoes for other than farm household contumption are also stored on-farms. Since there are no statistics on potato sales from farms the underestimation of physical stocks is compensated for by using higher prices.

Estimated values of the stock of oats, barley, wheat and rye, potatoes, and hay and silage on farms are presented in Tables 36 through 41. In each case the original physical stock of feed, seed and waste stored after harvest is listed along with the price series used and the resulting values estimated. The average value of stocks during the crop year is presented in the last column and is roughly equal to the value of stocks if inventories were taken on March 1 in the case of grains and February 1 in the case of roughage. These numbers are similar to the results obtained by MÄKI (1943, p.98-101).

Table 39. Value of Stocks of Wheat and Rye for Feed on Farms, Finland, 1948-67

Year	Original supply of feed[1]			Feed price[2]	Total value	Average value of stocks[3]
	Wheat	Rye	Total			
	--- thousand tons ----			p./kg.	--- million marks ---	
1948	45	25	70	10.72	7.50	1.9
1949	44	24	68	13.47	9.16	2.3
1950	69	27	96	20.06	19.3	4.8
1951	42	27	69	23.19	16.0	4.0
1952	45	30	75	19.20	14.4	3.6
1953	43	18	61	17.20	10.5	2.6
1954	43	20	63	21.66	13.6	3.4
1955	37	26	63	24.00	15.1	3.8
1956	56	37	93	23.95	22.3	5.6
1957	26	19	45	23.66	10.6	2.7
1958	25	19	44	26.69	11.7	2.9
1959	10	29	39	30.57	11.9	3.0
1960	27	22	49	27.70	13.6	3.4
1961	37	11	48	22.40	10.8	2.7
1962	170	43	213	24.33	51.8	13.0
1963	51	35	86	30.41	26.2	6.6
1964	77	50	127	37.09	47.1	11.8
1965	115	35	150	36.12	54.2	13.6
1966	61	16	77	32.88	25.3	6.3
1967	163	68	231	34.84	80.5	20.1

[1] Based primarily on estimates from the food balance sheet prepared for FAO including aggregates for animal feed and waste. For 1948 the estimate was made by using the quantity used for feed.

[2] The feed price of barley was used as constructed in Table 37.

[3] Total value x 25 percent.

The average capital value of stocks of grain and roughage on farms each year is summarized in Table 42. Hay and silage are consistently the largest component of the total, as is expected on the basis of land use. The rate of increase through time has been quite steady, values doubling between the mid-1950's and 1967. Oats and oat mixtures are the second most important item. Like hay, they have gradually increased over the years, but a little less rapidly.

Barley has become increasingly important in the total. Before 1950 it averaged about 5 percent of the total value of stocks. In the 1960's its share rose rapidly from less than 10 percent to 17 percent of the total. Compared with oats it is still a secondary

Table 40. Value of Stocks of Potatoes on Farms, Finland, 1948-67

Year	Original seed and human consumption on farms	Supply feed [1]	Total	Price [2]	Total value	Average value of stocks [3]
	thousand tons			p./kg.	mil.marks	
1948	553	319	872	5.01	43.7	17.5
1949	523	319	842	4.86	40.9	16.4
1950	555	510	1 065	6.15	65.5	26.2
1951	525	466	991	8.20	81.3	32.5
1952	524	597	1 121	6.70	75.1	30.0
1953	484	503	987	5.90	58.2	23.3
1954	454	323	777	9.80	76.1	30.4
1955	434	301	735	13.47	99.0	39.6
1956	454	764	1 218	8.39	102.2	40.9
1957	407	458	865	7.80	67.5	27.0
1958	428	559	987	10.57	104.3	41.7
1959	382	400	782	11.11	86.9	34.8
1960	373	608	981	8.65	84.9	34.0
1961	328	342	670	8.50	57.0	22.8
1962	322	279	601	13.78	82.8	33.1
1963	321	485	806	11.75	94.7	37.9
1964	300	202	502	13.51	67.8	27.1
1965	309	492	801	12.67	101.5	40.6
1966	291	383	674	12.39	83.5	33.4
1967	284	298	582	18.26	106.3	42.5

1) Estimates for seed and feed are taken from Food Balance Sheet. Estimate for human consumption is from total accounts of agriculture, A.E.R.I.

2) Average price of all potatoes, Pellervo.

3) Total value x 40 percent.

source of feed grain but on farms in southern Finland it has primary importance in many cases. If the increase in the area of barley cultivated continues, the value of stocks of barley will soon exceed that for oats.

The value of stocks of wheat and rye has also increased quite rapidly since the late 1950's. This has resulted from the relatively high prices of wheat and rye compared to feed grain prices. This favorable prices has also increased the area of bread grains planted. In some years, for example 1962 and 1967, poor quality decreased the total value of rather large stocks.

Potatoes have had the most stable value of stocks during the period studied because of the opposite fluctuations in quantities and prices.

Table 41. Value of Stocks of Hay and Silage on Farms, Finland,1948-67

Year	Total production[1]	Feed price[2]	Total value	Average value of stocks[3]
	thous.tons	p./kg.	-- million marks --	
1948	2 445.0	3.22	78.7	39.4
1949	2 950.5	4.04	119.2	59.6
1950	3 114.0	6.02	187.5	93.7
1951	3 047.2	6.96	212.1	106.0
1952	3 226.4	5.76	185.8	92.9
1953	3 515.4	5.16	181.4	90.7
1954	3 496.0	6.50	227.2	113.6
1955	3 292.6	7.27	239.4	119.7
1956	3 288.0	7.19	236.4	118.2
1957	3 771.1	7.28	274.5	137.3
1958	3 543.4	8.24	292.0	146.0
1959	3 385.7	9.12	308.8	154.4
1960	3 975.4	8.55	339.9	170.0
1961	4 090.2	7.35	300.6	150.3
1962	4 096.8	8.18	335.1	167.6
1963	3 754.4	9.14	343.2	171.6
1964	3 677.0	11.05	406.3	203.2
1965	3 815.9	11.35	433.1	216.6
1966	3 736.2	10.31	385.2	192.6
1967	3 771.6	11.12	419.4	209.7

[1] Annual production estimates for hay plus one-third of the weight of grass silage as reported in the agricultural statistics. Dry hay equivalent is reported.

[2] Calculated as 30 percent of the price of feed barley from Table 37.

[3] Total value x 50 percent.

In total the value of stocks of home produced crops has increased to more than 5 times the value in 1948 during the period of this study. A large share of this increase occurred in 1948-50 with the significant rise in prices; another increase in the late 1960's resulted from the rapid growth in yields. As a whole the increase in the total value of stocks is associated with increase in prices while the value of stocks in constant prices has grown only moderately, 54 percent higher than at the beginning of the period.

Table 42. Average Value of Stocks of Farm Products for Sale, Seed, Feed and Home Consumption on Farms, 1948-67

Year	Hay and silage	Oats and mixed grain	Barley	Wheat and rye	Potatoes	Total value	Index	Total value at constant (1954) prices	Index
	million marks						(1948=100)	Mil.mks	(1948=100)
1948	39.4	29.7	7.1	18.9	17.5	112.6	100	228.3	100
1949	59.6	44.6	6.6	26.0	16.4	153.2	136	255.4	112
1950	93.7	63.4	10.6	34.0	26.2	227.9	202	266.3	117
1951	106.0	73.4	14.6	31.7	32.5	258.2	229	253.9	111
1952	92.9	69.8	13.7	33.3	30.0	239.7	213	277.7	122
1953	90.7	68.4	18.2	28.7	23.3	229.3	204	291.5	128
1954	113.6	75.7	19.9	32.5	30.4	272.1	242	272.1	119
1955	119.7	73.0	22.1	28.1	39.6	282.5	251	247.4	108
1956	118.2	71.9	25.4	30.9	40.9	287.3	255	268.2	118
1957	137.3	78.8	32.4	31.9	27.0	307.4	273	288.1	126
1958	146.0	98.5	41.3	39.3	41.7	366.8	326	293.9	129
1959	154.4	100.0	38.6	55.9	34.8	383.7	341	274.8	120
1960	170.0	123.1	41.3	75.9	34.0	444.3	395	344.0	151
1961	150.3	102.6	36.5	79.1	22.8	391.3	348	343.1	150
1962	167.6	77.6	31.4	56.1	33.1	365.8	325	290.6	127
1963	171.6	112.6	53.7	74.3	37.9	450.1	400	316.7	139
1964	203.2	130.9	61.5	98.5	27.1	521.2	463	304.9	134
1965	216.6	157.6	72.5	110.3	40.6	597.6	531	349.7	153
1966	192.6	139.4	89.4	80.1	33.4	534.9	475	337.2	148
1967	209.7	150.0	104.4	96.5	42.5	603.1	536	352.1	154

262. Supplies Stored for Use in Production

One of the components of inventories is the stock of raw materials purchased for use in production. In agriculture this has traditionally been a relatively small capital item. In a few sectors of agriculture it is more important but not in terms of purchased from outside agriculture. In the case of broiler production, for example, nearly all supplies are purchased but the most important production item, feed, comes largely from within the agricultural sector unless feed is imported. As specialization in production continues the relative importance of purchased supplies as a capital requirement will also increase. To do business and pay the bills the cash commonly used each month must also be considered as part of the capital stock.

It is easier to speak about short term capital needs as a concept than it is to construct a series which covers capital in the form of cash and supplies on hand. A first step can be made by considering three of the major purchased items on nearly all farms, concentrate feeds, fertilizers and liquid fuels. For agriculture in the aggregate figures for purchased feed eliminate all internal transactions. Only net additions to costs for the agricultural sector are considered to avoid double counting. Annual estimates of the cost of purchased feedstuffs to agriculture are made by the Agricultural Economics Research Institute. These figures go back to the crop year 1951-52. Before that date there are the aggregate cost figures for the agricultural sector developed from the national income accounts by VIITA (1966). These figures have been adapted to the same crop year base by averaging annual totals.

Annual outlays for fertilizer are estimated in the same way as purchased feed but there are fewer problems. There are essentially no internal transactions to be concerned with and almost all fertilizers come from one large state concern. As a result these figures should be as reliable as any of the aggregate series used.

The third major item, especially in recent years, of raw materials stored on farms is liquid fuels like diesel fuel, petroleum and gasoline. Annual outlays for these items have been prepared by the Agricultural Economics Research Institute since 1951. For earlier years the outlays are estimated on the basis of the number of tractors on farms. In addition to the three items mentioned there are other important outlays for raw materials in Finnish agriculture, for example, skimmed milk and sprays. Because it is perishable skimmed milk cannot be stored and it is plausible that sprays are not purchased until time for their use. Fertilizers, feed concentrates and liquid fuels comprise the majority of purchased raw materials stored on farms.

The proportion of annual outlays tied up as assets in the form of supplies cannot be estimated accurately in the case of concentrates and liquid fuels because of lack of statistics. It was assumed that farmers hold about one month's supply of these items on hand. Based on this estimate approximately 8 percent of total outlays should be considered as average annual stocks.

Table 43. Percent of Fertilizer Purchased and in Storage on Farms, by Months

Month	Purchases in percent of annual total			Estimated stock at the 1. day of month in percent of total purchases
	1960-61	1966-67	Average	
July	10	9	10	0
Aug.	11	10	11	10
Sept.	8	11	9	15
Oct.	8	7	7	25
Nov.	6	6	6	32
Dec.	5	5	5	38
Jan.	8	11	9	43
Feb.	10	7	9	53
Mar.	11	5	8	62
Apr.	14	18	16	70
May	9	11	10	95
June	0	0	0	0
Total	100	100	100	
Average	-	-	-	35

In the case of fertilizers there are reliable statistics on monthly amounts sold by the state concern during recent years[1]. The percentage distribution of total sales (as value of nutrients) in the years 1960-61 and 1966-67 as well as the estimated share of the total outlays of fertilizers stored on farms on the first day of each month are presented in Table 43.

The distribution of fertilizer purchases is surprisingly smooth throughout the year. Price discounts have made it advantageous for farmers to store fertilizer as much as 8 to 10 months if capital and space are available. The estimated stocks as percent of total purchase show a constant increase until May 1st at which time it reaches 95 percent of the total. Five percent of the amount purchased was assumed to be used in August for winter cereals. The average of monthly figures approximates 35 percent of total outlays which was used when estimating the fertilizer stock for each year.

The estimates of value of stocks of purchased supplies are presented in Table 44. The stock of fertilizers represents about 90 percent of the total value of fertilizer-concentrates-liquid fuels on hand. The value on hand in 1967 was more than 10 times

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[1] Rikkihappo Oy = Väkilannoitteiden myyntitilasto.

Table 44. Value of Stocks of Purchased Fertilizers, Concentrates and Liquid Fuels, Finland, 1948-67

Year	Fertilizers		Concentrates		Liquid Fuels		Total value of stocks		Total value at constant (1954) prices	
	Annual outlay[1]	Value of stock[2]	Annual outlay[1]	Value of stock[3]	Annual outlay[1]	Value of stock				
	millions of marks							Index (1948=100)	Mil.of marks	Index (1948=100)
1948	27.9	9.8	34.3	2.7	3.0	0.2	12.7	100	15.0	100
1949	29.4	10.3	26.7	2.1	3.6	0.3	12.7	100	14.0	93
1950	35.8	12.5	41.6	3.3	4.6	0.4	16.2	127	17.2	115
1951	46.9	16.4	60.3	4.8	5.4	0.4	21.6	170	22.3	149
1952	49.7	17.4	40.5	3.2	6.6	0.5	21.1	166	21.8	145
1953	58.9	20.6	36.1	2.9	7.1	0.6	24.1	190	24.3	162
1954	56.6	19.8	65.1	5.2	9.6	0.8	25.8	203	25.8	172
1955	61.2	21.4	93.8	7.5	12.4	1.0	29.9	235	29.7	198
1956	79.9	28.0	109.5	8.8	16.8	1.3	38.1	300	33.7	225
1957	89.8	31.4	75.5	6.0	22.8	1.8	39.2	309	30.1	201
1958	111.3	39.0	77.2	6.2	24.9	2.0	47.2	372	33.5	223
1959	143.6	50.3	104.8	8.4	27.8	2.2	60.9	480	39.6	264
1960	142.2	49.8	81.5	6.5	30.4	2.4	58.7	462	39.2	261
1961	143.4	50.2	85.5	6.8	34.6	2.7	59.7	470	39.2	261
1962	144.8	50.7	192.9	15.4	38.7	3.1	69.2	545	44.5	297
1963	188.6	66.0	136.8	10.9	40.6	3.3	80.2	631	49.4	329
1964	241.0	84.4	139.6	11.2	47.7[4]	3.8	99.4	783	55.2	368
1965	246.3	86.2	146.6	11.7	37.4[4]	3.0	100.9	794	54.8	365
1966	253.6	88.8	144.6	11.6	38.7[4]	3.1	103.5	815	56.0	373
1967	296.8	103.9	155.1	12.4	49.2[4]	3.9	120.2	945	60.3	402

1) Source: Total accounts of agriculture. Prepared by the Agricultural Economics Research Institute.

2) Annual outlay x 35 percent.

3) Annual outlay x 8 percent.

4) Contains a special tax for diesoline tractors.

the value in 1948. The value of the stock of concentrates has increased more than 4 times while in 1967 the stock of liquid fuel was more than 16 times the 1948 level. The total value of purchased supplies in 1967 was about 9.5 times the 1948 level. In constant prices the value of stocks rose from 15 to 60 million marks. The volume of the stocks of fertilizers grew almost 4.5 times during the study period, of concentrates, only 1.8 times and liquid fuels, 12.5 times. The change in prices of fuels has been relatively small. A major part of the increase in stocks represents real physical growth. These increments are somewhat higher than those of the stocks of home-grown products and purchased supplies account for an increasing proportion of the total value and volume of inventories.

263. Capital Invested in Growing Crops.

Conceptually there are no difficulties in establishing that inventories should include the average value of "goods in process". In agriculture the goods in process are primarily investments of labor and raw materials during the year in preparing for crop production or the crops themselves. To a degree there are also some classes of livestock which could be considered "goods in process", such as pigs under 6 months of age, but there are automatically valued when livestock inventories are made. Thus the central question in setting up this balance sheet is how to evaluate growing crops, in which capital has been invested during the year. The validity of including some capital for this item should not be questioned. The issue is how much, and how one can make a reasonable and meaningful set of calculations.

Cost accountants have usually charges interest on the capital invested in growing crops by adding the value of all inputs each month and charging interest on this total until the crop is harvested. The value of inputs, including labor, are considered to be the value of the growing crop, following the long established accounting practice. But few cost accounts are kept on farms in Finland, and they are not usually kept on "average" farms.

One set of cost accounts for the experimental farm at Malminkartano, near Helsinki, has been studied in some detail by NIKKOLA (1968). It has been his thesis that the capital invested in growing crops is much more important than most farmers and economists recognize and that specific recognition should be given to this form of capital and the risk associated with it in farm planning and policy formation. He has calculated the average capital invested in each of the major crops on the Malminkartano farm for the years 1961 through 1963. His results (NIKKOLA 1968, p.67) for the three-year period are presented as averages in Table 45.

Investments in each crop are somewhat larger than one might first expect them to be. However, standard accounting procedures were followed and the average value is the sum of the value of inputs each month as they accumulated during the year, divided by 12. In general the intensive row crops like potatoes and sweded have the largest totals, the least intensive crops, like hay, have the smaller figures. To try to use these data in estimating averages for similar crops in Finland may be stretching things a bit far. However, these data were the only ones available and provided some basis for considering what such a set of calculations might look like for the country as a whole.

To get estimates of capital invested under more nearly average conditions, the Malminkartano farm accounts were considered in greater detail. It was found, for example, that fertilizer use per hectare exceeded average use in the country as a whole. In this case aggregate physical quantities could be checked on the farm and for the nation. Labor prices were higher on the farm but it was assumed that less labor was used per hectare because of the size of fields and mechanization. Overhead on the Malminkartano farm was also a large item, much larger than could be expected under average conditions. With this as background a set of adjustments were made as shown in the second column of Table 45. These were based on judgment and recalculation of the original physical quantities and prices. Five basic classes of cropland use were established and common capital investments estimated for each using the three-year averages in the Malminkartano farm records as a base. Fallow, hay and pasture, spring grains, winter grains, and row crops were treated as essentially different categories but all crops within each category were assumed to have the same or similar capital requirements.

Table 45. Average Annual Investment in Growing Crops Per Hectare - Malminkartano Farm 1961-63 and Estimates for Finland, 1961-63

Crop	Malminkartano, average for three years, 1961-63	Estimate for Finland average farms 1961-63
	----------marks per hectare--------	
Winter rye	279	250
Winter wheat	329	250
Winter rape	494	400
Spring wheat	190	150
Oats	199	150
Mixed grain	202	150
Barley	160	150
Lanttu - swedes	539	400
Potatoes	513	400
Hay	215	130
Pasture	191	130
Fallow	---	100
Other crops	---	150
Row crops	---	400

Source: NIKKOLA, A. 1968. Zur Wertbestimmung des Feldinventars, p.67.

In this manner a basis for calculating capital invested in growing crops in 1961-63 for all of Finland was constructed. It was built on limited information and personal judgment, but at least a method for considering the magnitude of the capital involved was established. To complete the calculations it is necessary to construct similar cost or capital figures for each of the five categories for years other than 1961-63. If one were willing to assume that the cost or capital relationships between the five groups had remained constant or approximately so during the 20-year period then one could adjust the 1961-63 averages by an index of costs in crops and obtain a set of numbers to apply to the hectares devoted to each of the five categories. Such an effort was made to complete the process.

In Finland there are no specific statistics available on the amount and development of the total costs of crop production. The total accounts of agriculture prepared by the Agricultural Economics Research Institute do provide reliable information on some particular cost items like fertilizers and plant protection chemicals. Similar information

is also available for bookkeeping farms. Both statistical sources further provide costs of machinery and equipment, liquid fuels and hired labor used in agriculture. The share of crop production in those cost items has not been clarified in these statistics because of the lack of very specific information needed for this kind of calculation. One important input in crop production is labor of the farm family. There is, however, an almost complete lack of information on this input. Only since 1966 have the bookkeeping farm statistics specified the sum of working hours in crop production, in animal production and in other purposes on the farm.

In a situation such as that described above only a rough estimate on the development of crop production costs can be obtained. In this study a cost index of crop production is constructed as follows: The costs of fertilizers and sprays are included as a whole; 70 percent of the costs of machinery and equipment[1)] as well as of liquid fuels[1)] are considered as crop production costs; labor costs in crops are estimated as a total without any separation between hired and family labor. As mentioned earlier, bookkeeping farm statistics since 1966 provide information on the working hours used in crop production. In 1967 the total hours[1)] per farm (the sum of family and hired labor) was about 2.5 times the total input of hired labor on same farms (Tutk.Suomen maat.kann.,tiliv. 1967, p.59-60). On all farms in the country the corresponding relationship is higher because of the relatively lower use of hired labor. When looking at the agriculture of the country as a whole it is therefore assumed that input of family and hired labor in crops would approximate 3 times the total hired labor input in agriculture. The cost of all hired labor in agriculture was about 105 million marks in 1967. The costs of total labor in crop production would approximate 300 million marks in the year in question. This sum is used for 1967. To establish the costs for previous years it is assumed first that the volume of labor in crops has declined to half the 1948 level. A linear decline is assumed and the volume for each year is taken from the trend line. Annual costs at current prices are obtained multiplying the volume of each year by the corresponding wage index of hired workers. The formation of the cost index of crop production is presented in Table 46.

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1) In agriculture.

Table 46. Construction of a Cost Index of Crop Production, Finland, 1948-67

Year	Cost of fertilizers	Cost of plant protect. chemicals	70 % of machinery and equip. costs	70 % of costs of liquid fuels	Labor costs of crop production	Total costs of crop production	Index of total costs	Index of costs at constant prices
	Millions of marks						1962=100	1962=100
1948[1]	27.9	0.0	26.2	2.1	146	202	40	84
1949[1]	29.4	0.2	28.5	2.5	164	224	44	85
1950[1]	35.8	0.3	31.0	3.2	176	246	49	85
1951	46.9	0.5	33.7	3.8	190	275	54	86
1952	49.7	0.8	37.3	4.6	188	280	55	85
1953	58.9	1.3	41.6	5.0	182	289	57	88
1954	56.6	1.0	45.0	6.7	183	292	58	88
1955	61.2	3.0	48.8	8.6	195	317	63	88
1956	79.9	3.2	55.2	11.8	212	362	72	92
1957	89.8	3.1	61.6	16.0	209	380	75	91
1958	111.3	3.4	68.2	17.5	212	412	81	92
1959	143.6	4.4	76.6	19.5	212	456	90	98
1960	142.2	5.8	88.2	21.3	215	473	93	100
1961	143.4	7.6	97.0	24.2	213	485	96	100
1962	144.8	10.0	106.5	27.1	218	506	100	100
1963	188.6	10.2	118.5	28.4	238	584	115	107
1964	241.0	11.4	129.1	33.4	263	678	134	112
1965	246.3	12.0	136.7	26.1	283	704	139	111
1966	253.6	14.0	163.0	27.1	294	752	149	113
1967	296.8	15.5	177.5	34.5	300	824	163	117

[1] Estimates

In 1967 the costs of crop production were about four times greater than the 1948 level. This is somewhat less than the increase in the gross domestic product of agriculture during the same period; (see Table 2, page 9). When looking at the individual cost items one readily notices the rapid rise in costs, especially in fertilizers, sprays and liquid fuels. Labor costs has increased relatively slowly, moderating the growth of total costs. Total costs at constant prices show a rise of only about 40 percent during the study period despite the nearly 400 percent increase in fertilizer costs, the rise in machinery and equipment costs of three times and that for liquid fuels of more than ten times. The 50 percent drop in labor costs has, due to its great weight in the total, influenced markedly the increase in total costs. This has risen somewhat more than the total yield of all crops (converted to feed units), which in 1967 was 25 percent higher than in early 1950's. This fact supports those often-made statements that yields have not increased at the same pace as inputs in crop production.

In this study it is assumed that the average annual investment per hectare in growing each crop has changed through time at the same pace as the cost index of crop production prepared in Table 46. The average values of inventory in each crop group estimated with the help of the study by NIKKOLA (1968) and presented earlier on p.77 are used here for 1962. The values for other years are calculated using 1962 as a base year. The resulting values per hectare are presented in Table 47.

The total capital invested in growing crops each year and the components of that investment are presented in Table 48. The average values per hectare in Table 47 were multiplied by hectares of each crop category to arrive at the data in Table 48. The total inventory in growing crops has increased by about 4.5 times from 1948 to 1967. This is somewhat more than the increase in the cost index of crop production presented in Table 46. This results from the relative increase in land area in cereals and relative decline in land in hay and fallow. So a larger area was used in 1967 than in 1948 for relatively high input crops.

Table 47. Estimates of Average Annual Investments in Growing Crops per Hectare, Finland, 1948-67

Year	Index of costs in crops	Annual investment in Winter wheat and rye	Spring grain and others [1]	All row crops	Hay, silage and pasture	Fallow
	1962=100	marks per hectare				
1948	40	100	60	160	52	40
1949	44	110	66	176	57	44
1950	49	123	74	196	64	49
1951	54	135	81	216	70	54
1952	55	138	83	220	72	55
1953	57	143	86	228	74	57
1954	58	145	87	232	75	58
1955	63	158	95	252	82	63
1956	72	180	108	288	94	72
1957	75	188	113	300	98	75
1958	81	203	122	324	105	81
1959	90	225	135	360	117	90
1960	93	233	140	372	121	93
1961	96	240	144	384	125	96
1962	100	250	150	400	130	100
1963	115	288	173	460	150	115
1964	134	335	201	536	174	134
1965	139	348	209	556	181	139
1966	149	373	224	596	194	149
1967	163	408	245	652	212	163

[1] The group "others" includes pea, hay for seed, flax and hemp, winter turnip rape and other oil plants.

To calculate the inventory in growing crops at constant prices a price index of inputs in crops is first calculated. This is obtained by dividing the cost index in Table 46 by the corresponding volume index. Then each year's total inventory at current prices is divided by the price index of that year and the final series of the volume of inventory is obtained. This volume shows an increase of 55 percent during the study period. The increase is also somewhat greater than that of crop production costs, which, like the above, is caused by a shift to higher input crops during the time span of this study.

The average annual value of all inventories on farms is presented in Table 49. This value in 1967 was approximately five times higher than in 1948 and nearly three times higher than in the early 1950's. The increase of the volume of all inventories was somewhat slower,

Table 48. Inventory in Capital Invested in Growing Crops, Finland, 1948-67

Year	Winter wheat and rye	Spring grains and others [1]	All row crops	Hay, silage and pasture	Fallow	Total inventory	Total at constant prices
	Million marks						
1948	16.0	46.3	21.6	63.8	5.0	152.7	210.7
1949	17.8	53.7	20.8	71.5	4.7	168.5	214.6
1950	18.0	60.4	24.5	81.0	3.8	187.7	213.3
1951	18.9	64.7	28.6	91.4	4.4	208.0	218.9
1952	18.7	69.6	28.9	95.2	3.9	216.3	218.5
1953	15.6	74.0	27.5	100.1	4.2	221.4	223.6
1954	16.5	76.3	28.2	101.8	4.1	226.9	226.9
1955	16.8	80.8	31.5	115.1	5.0	249.2	228.6
1956	20.4	93.6	37.1	132.0	4.8	287.9	244.0
1957	20.5	93.3	37.4	143.1	5.8	300.1	240.1
1958	17.2	107.7	38.2	152.4	6.0	321.5	241.7
1959	27.7	122.2	41.3	167.3	5.4	363.9	260.0
1960	34.4	129.6	44.7	170.0	5.3	384.0	274.3
1961	27.8	139.9	43.3	176.1	5.9	393.0	269.1
1962	26.6	150.7	45.2	181.7	6.5	410.7	272.0
1963	25.7	175.6	52.3	211.7	8.3	473.6	292.3
1964	44.2	209.4	60.4	237.9	8.4	560.3	307.9
1965	56.1	214.0	63.2	246.7	9.7	589.7	310.4
1966	38.2	241.4	61.9	267.3	11.8	620.6	308.8
1967	67.9	259.3	66.2	284.7	12.5	690.6	327.3

[1] See footnote to Table 47.

approximating 60 percent from 1948 to 1967. During all but the first two years of the study the share of growing crops in the total value of inventories has varied between 43 and 49 percent. When calculating the items at constant prices the variation ranged between 41 and 46 percent of the total. In the study by NIKKOLA (1968, p.83) growing crops approximated only about 35 percent of the total value of inventories in 1961-1963. It must be pointed out, however, that his study dealt with one large experimental farm which probably has more products and purchased supplies stored than average. On the other hand, the value of inventories excluding growing crops probably is better under- than overestimated.

In some studies attempts have been made to find specific relationships between average annual current assets (value of all inventories including growing crops) and other factors on farms.

Table 49. The Average Annual Value of all Inventories on Farms, Finland, 1948-67.

Year	Home grown products	Purchased supplies	Growing crops	Total	Growing crops of total	Total at constant prices	Growing crops of total
	--------- Million marks ----------				percent	Mil.mks	percent
1948	112.6	12.7	152.7	278.0	54	454.0	46
1949	153.2	12.7	168.5	334.4	50	484.0	44
1950	227.9	16.2	187.7	431.8	44	496.8	43
1951	258.2	21.6	208.0	487.8	43	495.1	44
1952	239.7	21.1	216.3	477.1	45	518.0	42
1953	229.3	24.1	221.4	474.8	47	539.4	41
1954	272.1	25.8	226.9	524.8	43	524.8	43
1955	282.5	29.9	249.2	561.6	44	540.8	42
1956	287.3	38.1	287.9	613.3	47	545.9	45
1957	307.4	39.2	300.1	646.7	46	558.3	43
1958	366.8	47.2	321.5	735.5	44	569.1	42
1959	383.7	60.9	363.9	808.5	45	574.4	45
1960	444.3	58.7	384.0	887.0	43	657.5	42
1961	391.3	59.7	393.0	844.0	47	651.4	41
1962	365.8	69.2	410.7	845.7	49	607.1	45
1963	450.1	80.2	473.6	1 003.9	47	658.4	44
1964	521.2	99.4	560.3	1 180.9	47	668.0	46
1965	597.6	100.9	589.7	1 288.2	46	714.9	43
1966	534.9	103.5	620.6	1 259.0	49	702.0	44
1967	603.1	120.2	690.6	1 413.9	49	739.7	44

It has been found that such a relatioship prevails between the current assets and the operating expenses of farms[1)]. The results obtained by WIEDERHOLD (1956, p.100) and NIKKOLA (1968, p.83) show that current assets make up about 40 percent of the operating expenses. In the study of BRANDKAMP (1967, p.11) this ratio varied from 33 to 53 percent, depending on the size and type of farm. WIEDERHOLD (1956, p.100) and NIKKOLA (1968, p.85) have also established a corresponding relationship to the cash expenses (without expenses to investments) of farms. This ratio has averaged 88 percent in WIEDERHOLD's and 66 percent in NIKKOLA's study.

Similar comparisons were made in this study. The weighted averages of operating and cash expenses on bookkeeping farms calculated per hectare were multiplied by the corresponding total area of arable land in four years and estimates for the agricultural industry as a whole were obtained. These numbers and the relationship of current assets (obtained in this study) to them are presented in Table 50.

1) Including the value of operator's and family labor and excluding the interests on debts and interest claim for operator's own capital.

Table 50. Operating Expenses, Cash Expenses and Current Assets, Selected Years

Year	Operating expenses, million marks	Cash expenses, million marks	Current assets, million marks	Current assets as a percent of: Operating expenses	Cash expenses
1955	1 571.6	783.1	561.6	36	72
1960	2 422.7	1 030.5	887.0	37	86
1965	3 919.9	1 721.9	1 288.2	33	75
1967	4 233.5	1 819.2	1 413.9	33	78

These ratios are similar to those of the earlier studies. Operating and cash expenses calculated from bookkeeping farm statistics are likely to be somewhat higher than those of average farms, but it is evident that the relationship between current assets and operating expenses in agriculture as a whole will be near the 40 percent obtained by WIEDERHOLD and NIKKOLA.

The numbers in Table 50 give some additional evidence to the fact that the results obtained in this study are probably not "too far from the truth". There are reasons enough, however, to emphasize that the process here was based on one single study in large measure and that the index of crop production costs developed here is also somewhat deficient. The changes in cost per hectare have not been equal among different crops as one had to assume in this study because of lack of appropriate information. Despite the uncertainty in the estimates obtained, there are arguments enough to include these numbers in the final balance sheets, anyhow. That is because omission of growing crops, on the other hand, would easily give a misleading picture on the amount of capital involved in production agriculture.

27. Receivables

The preceding sections considered the major types of physical assets generally associated with agricultural production, fixed assets first and the less permanent forms of property next. On a balance sheet of any firm there would be a final item included with current assets, that for cash and receivables. A certain amount of cash is necessary to operate any business and farming is no exception. At the turn of the century few items were regularly purchased, the amount was often small. But the larger and more specialized the farm, the more cash transactions take place. Some farms have a farm checking account, but this is the exception rather than the rule. The same source of cash for family needs is used for farm transactions. Thus it was assumed, at least for this study, that there was no way to estimate over time the cash requirements for farming and no way to make a separate estimate for cash in the balance sheet. Nevertheless, it should be recognized that this is an omission although in total it is probably a relatively small one.

In a dairy economy, the item of receivables is, however, one that should not be overlooked. It is also an item for which a farmer shipping fluid milk or cream to a dairy has an account receivable in the form of payment due for the milk or cream. The common practice is to receive payment for the deliveries made during one month about the 20th day of the following month. On the average there is a 35-day lag between delivery of production and payment. Looked at another way, if a farmer sold his dairy herd, he would have an account receivable for from 20 to 50 days production of milk or cream, depending on the day he sold the herd. Given this situation it should be relatively easy to calculate for agriculture in the aggregate the average amount of capital in the form of receivables due from dairies.

Estimates of accounts receivable from dairies are presented in Table 51. In 1951 about 60 percent of total milk production was sold to dairies or to consumers on contract. The rest was used on farms for human and animal food. By 1965 over 80 percent of milk production was sold to dairies because home production of butter and cheese declined and less was used for animal feed. The annual value of milk sales in 1967 had increased to more than four times the value fifteen years earlier. Milk prices and the physical quantity of milk sold have both doubled.

Table 51. Accounts Receivable for Milk Sales by Farms, Finland, 1948-67

Year	Milk sales to dairies	Milk to consumers on contract	Total sales[1]	Total weight[2]	Milk price[3]	Total value	Accounts receivable	At constant (1954) prices
	million liters			mil.kg.	p./kg.	million marks		
1948	669.0	194.0	863.0	890	17.76	158.0	15.8	18.4
1949	991.0	291.0	1 282.0	1 322	16.54	218.6	21.9	27.3
1950	1 209.0	243.0	1 452.0	1 497	17.25	258.2	25.8	30.9
1951	1 405.6	144.6	1 549.2	1 597	19.77	315.8	31.6	33.0
1952	1 514.4	156.6	1 671.0	1 723	20.36	350.8	35.1	35.6
1953	1 609.0	157.8	1 766.8	1 822	20.22	368.3	36.8	37.6
1954	1 653.0	150.4	1 803.4	1 859	20.65	383.9	38.4	38.4
1955	1 659.4	154.9	1 814.3	1 871	22.44	419.7	42.0	38.6
1956	1 976.3	151.6	2 127.9	2 194	28.85	632.9	63.3	45.3
1957	2 084.7	146.5	2 231.2	2 300	28.08	646.0	64.6	47.5
1958	2 101.8	147.1	2 248.9	2 319	29.93	694.0	69.4	47.9
1959	2 316.6	144.5	2 461.1	2 537	31.09	788.9	78.9	52.4
1960	2 493.5	172.3	2 665.8	2 748	32.27	886.9	88.7	56.7
1961	2 615.6	182.4	2 798.0	2 885	32.25	930.3	93.0	59.6
1962	2 661.4	186.0	2 847.4	2 936	32.59	956.7	95.7	60.6
1963	2 797.1	181.5	2 978.6	3 071	34.58	1 061.9	106.2	62.4
1964	2 885.8	188.8	3 074.6	3 170	39.33	1 246.7	124.7	65.5
1965	2 901.5	172.7	3 074.2	3 170	43.16	1 368.0	136.8	65.5
1966	2 876.1	162.3	3 038.4	3 133	43.64	1 367.2	136.7	64.7
1967	2 809.3	139.7	2 949.0	3 040	46.09	1 401.1	140.1	62.8

1) From Annual Statistics of Agriculture, milk to dairies and to consumers on contract estimated on different basis before 1951.

2) Conversion from liters, one liter = 1.031 kg.

3) Average annual price from Pellervo until 1959, and from official government statistics after 1959.

If on the average there is a 35-day lag between the time milk is sold and the time money is received for that milk, then accounts receivable on the average should equal 10 percent of the value of milk sales annually or the value of 35 days production[1]. The estimate in Table 51 was on the basis of a 35-day lag. Accounts receivable for milk sales are directly proportional to the value of that milk and have increased from about 31.6 million marks in 1951 to over 140.1 in 1967. Receivables will continue to grow in importance as a balance sheet item reflecting the commercial nature of agriculture as a business.

1) In sales directly to consumers the lag is probably shorter. On the other hand any lags have been taken into account in the case of other products. As a result, the total stock of receivables does not show a higher value than is a reality.

In addition to milk sales there are undoubtedly other items for which payment is regularly delayed for some period, usually less than one month. Sales of livestock through cooperatives would be a case in point. In recent years there have also been lags of several months for payment of part of the grain sold by farmers. One approach would be to take all cash sales in agriculture and try to estimate the time lag on the average between date of sale and date of payment. While such a process would be technically possible it has not been attempted. The relative importance of the item is not great enough to warrant the effort at this stage. Recognition of the existence of capital requirements in the form of receivables should be given. The major item in Finland, dairy receivables, calls attention to this type of asset.

28. Debts

The assets of a firm have been financed with a corresponding amount of capital. Commonly firms use both borrowed and ownership capital for their production activities; only a small minority operates entirely with their own capital. This is true also in agriculture where a varying proportion of borrowed capital or debt financing is used. In the balance sheet calculations the information on debts is necessary to estimate the amount of owner capital, or proprietor's equity, which is the difference between assets and debts.

For commercial firms there are generally no difficulties in determining debts. In this study, however, the situation is quite different. The agricultural sector as a whole consists of a large number of individual enterprises each of which is a part of the farm "firm". It is neither the agricultural enterprise nor the total farm, but the farmer who borrows money for various purposes. For instance, a short-term debt, while ostensibly for business purposes, may in fact allow purchase of the family's consumption goods. Long-term debt using, farm real estate as security may be directed to agriculture, forestry or to reconstruction of the residence. Statistics cannot show the

distribution among enterprises of debts of farmers. An attempt is made here to develop acceptable estimates of agriculture's share of farmers' debts. But it cannot be in any sense as accurate or appropriate as the estimate of assets.

In bookkeeping accounts there is information on total debts per farm and estimates of debts obtained for agricultural and forestry production. The first item includes all debts of farmers, the second one attempts to exclude the debts for personal purposes. It contains 1) farm real estate debts, 2) other farm debts, 3) capitalized value of pensions and 4) value of rented arable land. (The last item has been taken into account because it is included in the total value of land on the assets side). Total debts and debts for production purposes are presented in Table 52 as averages for all bookkeeping farms.

There are only minor differences between the two series. It seems clear that the debts taken for construction of farmers' residences are included among the debts for production in the table. This fact makes it still more difficult to estimate the purely agricultural share of total debt.

The Economics Research Institute of the Bank of Finland publishes annual statistics on the distribution of credit extended by different banking corporations and the state. A division among groups is made in these statistics with one group comprising agriculture, forestry and fisheries. The amount of credit distributed to this group is presented in Table 53. There are two series in the table, one includes all credit given to the group by the institutions mentioned, the other excludes the loans made by the state. Total credit extended by the banking corporations and the state is not available before 1959.

Table 52. Outstanding Debts on Bookkeeping Farms, 1948-67

Year	Total debts	Depts for production purposes	Year	Total debts	Debts for production purposes
	1 000 mks per farm			1 000 mks per farm	
1948	2.01	1.99	1958	7.41	7.31
1949	2.09	2.06	1959	8.29	8.19
1950	2.84	2.81	1960	9.50	9.39
1951	3.46	3.43	1961	10.86	10.72
1952	3.47	3.41	1962	11.65	11.46
1953	4.55	4.48	1963	13.75	13.52
1954	5.25	5.19	1964	13.25	12.97
1955	6.42	6.32	1965	17.05	16.84
1956	6.68	6.56	1966	18.10	17.99
1957	7.21	7.09	1967	19.90	19.74

Statistics from the Bank of Finland are considered reliable. But they do not include credit extended by private (marketing) firms and persons. It is difficult to evaluate the importance of these sources. They may not be very large as a transfer of assets to agriculture from other sectors. In addition these statistics do not give any clear information on the purely agricultural share of total credit extended. There are few means for calculating this share. Two of the banking corporations of most importance to farmers have, however, some limited information on the distribution of credit provided by them ostensibly for agriculture and forestry. The Cooperative Credit Societies reported on this distribution in 1953 and 1954 when only 0.4 percent of the total credit received by farmers was used directly for forestry purposes[1].

Table 53. Amount of Credit Extended to Agriculture, Forestry and Fisheries, 1948-67[1]

Year	Total credits	Total excluding credits from the state	Year	Total credits	Total excluding credits from the state
	--- Million marks -------			--- Million marks ---------	
1948	-	102.0	1958	-	595.0
1949	-	135.2	1959	969.3	673.3
1950	-	184.7	1960	1 133.2	767.4
1951	-	193.8	1961	1 328.0	892.6
1952	-	246.2	1962	1 495.1	969.2
1953	-	311.4	1963	1 651.2	1 041.7
1954	-	396.9	1964	1 808.8	1 121.1
1955	-	492.5	1965	1 951.4	1 214.2
1956	-	515.4	1966	2 189.1	1 339.2
1957	-	525.6	1967	2 364.1	1 412.7

[1] Source: The Economics Research Institute of Bank of Finland.

Saving banks have annual information on the distribution of credit provided for agriculture and forestry. At the end of 1965 saving bank loans were 33.8 percent of the total credit extended by banking corporations for agriculture and forestry. This share was distributed among purposes as follows (see LAAKSONEN, 1967, p.172-174):

[1] Information received from Central Bank of Cooperative Credit Societies.

	Percent
Construction of buildings	30.8
Purchase of real estate	22.5
Paying other inheritants' shares of real estate	13.4
Agricultural machinery	13.3
Land improvements	2.3
Other agricultural credit	14.9
Forestry	2.8
Total	100.0

Only 2.8 percent of the total was used directly for forest production. This does not necessarily mean that the remaining 97 percent was used for agriculture. Forests and residences are also included in purchases of real estate. So a given amount of these two items (22.5 and 13.4 percent respectively) must be considered a part of forestry and residences. If this share is similar to the proportion of total value made up by forestry and the residence in the total value of real estate on bookkeeping farms in 1965, it would constitute one-half of the amount, or approximately 17 percent of total debt. Further it is probable that the first item in the list also includes construction of farm residences. If one-third of this item were used for residences (on bookkeeping farms residences recently accounted for more than 40 percent of total value of farm buildings), about 10 percent of total debts would be for residential construction. When taking the direct share of forestry into account, the total non-agricultural proportion of debts approximates 30 percent (17+10+2.8).

Based on the statistics and assumptions presented it seems plausible that 70 percent of the total credit distributed to agriculture and forestry can be attributed to agriculture. It must be pointed out that this conclusion is based on one set of statistics representing about one-third of the total amount of credit for agriculture and forestry. It is, however, the only benchmark available which gives any information on the distribution by purpose of loans to farmers.

The final estimate of debts of agriculture are based on the statistics of the Bank of Finland, which cover the great majority of loans made to agriculture and forestry. The most complete series (see p.91) covers only years since 1959. The series with data since

1948 excludes the credit extended by the State. This made up about 30 percent of the total in 1959 but grew to 40 percent in 1967. Banking corporations were the source of about 70 percent of the total loans to agriculture in 1959, the same estimated to represent agriculture's share of all credit to agriculture and forestry. Although there is no accurate information on the share for the years before 1959 the series showing the credit extended by banking corporations have been used to describe the debts of agriculture for that period of time. Since 1959, 70 percent of the amounts in the Bank of Finland series have been used as agriculture's share. Estimates of agricultural debt, in both current and constant prices are presented in Table 54. The general wholesale price index was used as a deflator.

Table 54. The Debts of Agriculture, Finland, 1948-67

Year	At current prices				Wholesale price	At constant (1954) prices	
	Based on Bank of Finland stat.		Estimate on bookkeep. farms			Bank of Finland statistics	
	Amount	Index	Amount[1]	Index	Index[2]	Amount[3]	Index
	Mil.mks	1948=100	Mil.mks	1948=100	1954=100	Mil.mks	1948=100
1948	120.0	100	160.6	100	63	190.5	100
1949	135.2	113	197.1	123	64	211.3	111
1950	184.7	154	260.9	163	74	249.6	131
1951	193.8	161	317.6	198	104	186.3	98
1952	246.2	205	330.8	206	105	234.5	123
1953	311.4	259	441.2	275	101	308.3	162
1954	396.9	331	525.2	327	100	396.9	208
1955	492.5	410	659.3	411	98	502.6	264
1956	515.4	429	722.4	450	104	495.6	260
1957	525.6	438	783.4	488	113	465.1	244
1958	595.0	496	837.0	521	122	487.7	256
1959	678.5	565	923.9	576	122	556.1	292
1960	793.2	661	1 041.4	649	128	619.7	325
1961	929.6	774	1 178.4	734	128	726.3	381
1962	1 046.6	872	1 252.6	780	130	805.1	423
1963	1 155.8	962	1 453.1	905	135	856.1	449
1964	1 266.1	1 055	1 538.9	959	145	873.2	458
1965	1 366.0	1 138	1 733.1	1 080	151	904.6	475
1966	1 532.4	1 276	1 815.2	1 131	154	995.1	522
1967	1 654.9	1 379	2 012.0	1 253	159	1 040.8	546

1) 70 percent of debts for production purposes calculated per hectare of agricultural land and then multiplied by the total number of corresponding hectares in the country.

2) Based on 1949 weights and prices. See footnote of Table 5.

3) The first series in table deflated by wholesale price index.

Loans to agriculture have increased fairly rapidly and in 1967 were nearly 14 times the amount twenty years earlier. The growth was more rapid in the first than in the second half of the period studied. The figures on debts at constant prices indicate that the real increase during the last half of the study has been at least as rapid as in the preceding one, without the periodic increases evident during the first ten years.

Table 54 also includes a series estimated from bookkeeping farms data. This series, used as a benchmark, was constructed as follows: Production debts per farm were calculated per hectare of agricultural land. These values per hectare were then multiplied by the total amount of agricultural land in the country and 70 percent of the resultant value was considered as agriculture's share of debts. The method used is consistent with that applied to the series obtained from the Bank of Finland.

Both series show similar growth through time except in the early 1960's, when the series based on the data from the Bank of Finland had a somewhat more rapid increase. That is why the absolute level of the bookkeeping farm estimates, lying 30 to 40 percent above the Bank of Finland estimates in the early years, is only 20 to 25 percent above thereafter. General similarity of changes within the two series is, however, evidence that the series prepared based on the data of the Bank of Finland is acceptable, remembering that agriculture's share of all loans received by farmers is based on limited information.

3. SUMMARY AND EVALUATION OF BALANCE SHEETS

After considering the detailed problems of developing the separate parts of the balance sheets it is necessary to gain some perspective of the general changes which have occurred in the structure of Finnish agriculture using the results available from this study. This summary provides a general overview of growth and development in agricultural assets and debts during the postwar years. The reliability of results obtained are evaluated here as well.

In balance sheets any capital category consists of both volume and price components. Since more similarities prevail in a single component in separate capital groups than between two components within a capital group, the conclusions and evaluations are presented separately for each of components. Because of more reliable data on physical stock than current prices the former is treated first.

31. Capital Stock in Constant Prices

A summary balance sheet for Finnish agriculture in 1950, 1960 and 1967 is presented in Table 55. The effect of changing prices has been removed from these figures by expressing all of them in terms of 1954 prices. This has the effect of showing changes in the capital stock in real terms, and emphasizes physical changes rather than monetary ones.

Table 55. Balance Sheet of Agriculture for 1950, 1960 and 1967, at Constant (1954) Prices

Capital item	1950		1960		1967	
	Value	Percent of total	Value	Percent of total	Value	Percent of total
	Mil.mks		Mil.mks		Mil.mks	
Land	1 445.4	34.1	1 548.4	29.6	1 578.8	27.6
Land improvements	74.9	1.8	150.5	2.9	284.6	5.0
Buildings	1 187.6	28.0	1 431.7	27.4	1 387.2	24.3
Real estate	2 707.9	63.9	3 130.6	59.9	3 250.6	56.9
Machinery and equip.	268.4	6.3	638.6	12.2	909.8	15.9
Horses	168.7	4.0	103.4	2.0	58.5	1.0
Livestock	565.0	13.3	636.8	12.2	691.6	12.1
Inventories	496.9	11.8	657.5	12.6	739.7	13.0
Receivables	30.9	0.7	56.7	1.1	62.8	1.1
Working Capital	1 529.9	36.1	2 093.0	40.1	2 462.4	43.1
Total assets	4 237.8	100.0	5 223.6	100.0	5 713.0	100.0
Debts	249.6	5.9	619.1	11.9	1 040.8	18.2
Proprietor's equities	3 988.2	94.1	4 603.9	88.1	4 672.2	81.8

In 1950 about 64 percent of the capital invested in agriculture in Finland was in the form of real estate. Land made up more than one-third of the total. Buildings accounted for 28 percent. Working capital consisting of machinery and equipment, livestock, horses, and crops in storage, amounted to about 36 percent of the total. Livestock was the most important component of working capital. Horses and machinery together accounted for only 10 percent of total agricultural capital.

By 1967 some important changes had occurred in both the volume of capital invested in agriculture and the distribution of capital in various uses. Total assets increased from 4,237.8 million marks in 1950 to 5,713.0 million in 1967. This increase of about 35 percent in a span of 17 years was impressive although not unusual compared to many industries. There was expansion in both real estate and working capital but the changes were much more striking in working capital. Additional land has gradually been added to the productive total as well as the capital required to improve that land in the form of ditching, tiling, and other improvements. Modest investments have

been made in buildings so that the total stock has increased and new investment has more than equalled depreciation and obsolescence, except in the most recent four years. The proportion of total capital in the form of real estate decreased from 64 to 57 percent reflecting the increased use of new technology in agricultural production during the 17 years.

Changes in the volume of working capital invested were most impressive. In real terms there was an increase of about 60 percent in the 17 years. The shift from reliance on animal power to tractors and trucks is most important. Horses declined to one percent of the total capital in agriculture between 1950 and 1967. At the same time machinery and equipment investment increased three and a half times in physical terms. This category now makes up about one-sixth of agricultural assets and has been the most important area of change in the balance sheet statistics. This change is of further significance in that it represents highly depreciable assets in contrast to capital in the form of land and buildings. There have been modest increases in the stock of productive livestock even though the proportion of assets in this form has decreased from 13 to 12 percent in the 17 years. Larger inventories of crops are now maintained on farms in the country but the changes in general have followed other increases in capital investment.

One additional evidence of the growing commercialization of production of agriculture in Finland is the asset to debt information at the end of Table 55. As is true in most countries where owner-operated farms predominate and relatively small farms are the rule, the amount of agriculturally related debt in 1950 was small as a proportion of assets. In the postwar years farmers have increasingly borrowed money to finance improvements in their land and equipment. The increase in debt from about 250 million marks in 1950 to 1 041 million in 1967 reflects a net addition of capital generated outside of agriculture itself to this basic industry. Some of the net addition was generated internally as the growth in equities suggests. Net additions came about equally from internal and external sources during these 17 years.

A brief summary of annual changes in the major balance sheet items is presented in Table 56. Real estate and working capital are contrasted in real or physical terms as components of total investment in the agricultural industry. Estimates of agricultural debt are listed concurrently. Total assets in agriculture have increased in each of the 20 years from 1948 through 1967. An increase of 45 percent occurred in the 20 years. Rates of increase were more rapid in the first seven years. Since 1965 net additions to capital have been modest and there is some reason to believe that growth may well be leveling out in real terms. In the same three years debt increased more rapidly than assets so that proprietor's equities actually decreased (see also appendix 2).

Table 56. The Growth of Agricultural Assets and Debts at Constant (1954) Prices, 1948-1967

Year	Real estate		Working capital		Total assets		Debts	
	Value	Index	Value	Index	Value	Index	Value	Index
	Mil.marks	1948=100	Mil.marks	1948=100	Mil.marks	1948=100	Mil.marks	1948=100
1948	2 613.5	100	1 319.1	100	3 932.6	100	190.5	100
1949	2 696.0	103	1 437.4	109	4 133.4	105	211.3	111
1950	2 707.9	103	1 529.9	116	4 237.8	108	249.6	131
1951	2 787.8	107	1 564.5	119	4 352.3	111	186.3	98
1952	2 892.4	111	1 657.5	126	4 549.9	116	234.5	123
1953	2 957.7	113	1 667.2	126	4 624.9	118	308.3	162
1954	3 018.6	115	1 691.7	128	4 710.3	120	396.9	208
1955	3 064.0	117	1 750.7	133	4 814.7	122	502.6	264
1956	3 072.6	118	1 804.5	137	4 877.1	124	495.6	260
1957	3 088.8	118	1 863.4	141	4 952.2	126	465.1	244
1958	3 108.3	119	1 901.8	144	5 010.1	127	487.7	256
1959	3 136.2	120	1 935.9	147	5 072.1	129	556.1	292
1960	3 130.6	120	2 093.0	159	5 223.6	133	619.7	325
1961	3 126.7	120	2 205.7	167	5 332.4	136	726.3	381
1962	3 129.7	120	2 266.3	172	5 396.0	137	805.1	423
1963	3 148.5	120	2 364.0	179	5 512.5	140	856.1	449
1964	3 170.5	121	2 404.2	182	5 574.7	142	873.2	458
1965	3 206.7	123	2 443.0	185	5 649.7	144	904.6	475
1966	3 227.9	123	2 448.4	186	5 676.3	144	995.1	522
1967	3 250.6	124	2 462.4	187	5 713.0	145	1 040.8	546

There have been steady increases in the volume of capital throughout the 20 years in the form of real estate and working capital. The net increases in each category are quite different but decreases as such in real terms have not occurred. In the 1950's working capital was increased by 50 percent. Recent changes suggest that net additions have been and may well be at slower rates as expansion in agriculture is controlled by public policy, numbers of farms decrease and consolidation of holdings is effected. This kind of adjustment process is quite different from that of the immediate postwar years when the food supply was much more of a national and international issue.

In summary, capital invested in production agriculture in Finland has steadily increased during the postwar years. Real estate has decreased in importance relative to working capital during the last 20 years. While most of the capital invested has been generated internally by the owners of agricultural assets, an increasing amount of debt, attributable to agriculture, is included in the balance sheet. This debt does not reflect financial instability in agriculture but rather increasing commercialization of this industry as individual production units become larger and require machines and new technology generated outside of the agricultural industry itself.

32. Current Values of Assets and Debts

The picture of changes in the balance sheet is somewhat different when the price changes are taken into account. Table 57 shows the growth and changes in structure of capital stock in three selected years at current prices.

When comparing the balance sheet at current prices (Table 57) with the balance sheet at constant prices (Table 55) it will be noted that land comprises an increasing share of total real estate through time when current prices are used. This results from the more rapid increase in the price of land than in the prices of other assets. Land improvements, while increasing in importance in the balance sheet showed a much more rapid gain at constant prices than at current

Table 57. Balance Sheet of Agriculture for 1950, 1960 and 1967 at Current Prices

Capital item	1950		1960		1967	
	Value	of total	Value	of total	Value	of total
	Mil.marks	percent	Mil.marks	percent	Mil.marks	percent
Land	1 189.6	34.4	2 737.9	36.0	4 398.4	36.4
Land improvements	74.1	2.1	144.2	1.9	377.7	3.1
Buildings	869.3	25.1	1 729.5	22.7	2 508.1	20.8
Real estate	2 133.0	61.6	4 611.6	60.6	7 284.2	60.3
Machinery and equip.	215.0	6.2	881.9	11.6	1 594.0	13.2
Horses	180.1	5.2	160.3	2.1	126.4	1.0
Livestock	476.2	13.8	985.2	12.9	1 511.8	12.5
Inventories	431.8	12.5	887.0	11.6	1 413.9	11.8
Receivables	25.8	0.7	88.7	1.2	140.1	1.2
Working capital	1 328.9	38.4	3 003.1	39.4	4 786.2	39.7
Total assets	3 461.9	100.0	7 614.7	100.0	12 070.4	100.0
Debts	184.7	5.3	793.2	10.4	1 654.9	13.7
Proprietor's equities	3 277.2	94.7	6 821.5	89.6	10 415.5	86.3

prices. Buildings declined as a percent of total assets in both constant and current prices. The real estate portion of the balance sheet remained about the same when calculated at current prices. At constant prices real estate became a somewhat less important part of assets with the passage of time.

With the exception of machinery and equipment, changes in the percent of total assets in the working capital category were parallel at current and constant prices. The rapid increase in importance of machinery and equipment at constant prices was not duplicated at current prices.

Debt has become increasingly important in agriculture since 1950. At current prices debts rose from less than 6 percent of total assets to nearly 14 percent in 1967. At constant prices the increase is even more striking, from less than 6 percent to more than 18 percent.

The growth of assets and debts in current prices and indexes of these prices is presented in Table 58. The value of agricultural real estate, at current prices, rose from 1900 million marks in 1948

Table 58. The Growth of Assets and Debts in Agriculture at Current Prices, 1948-67

Year	Real estate		Working capital		Total assets		Debts	
	Value	Index	Value	Index	Value	Index	Value	Index
	Mil. marks	1948=100	Mil. marks	1948=100	Mil. marks	1948=100	Mil. marks	1948=100
1948	1 910.1	100	1 015.9	100	2 926.0	100	120.0	100
1949	1 819.0	95	1 090.6	107	2 909.6	98	135.2	113
1950	2 133.0	112	1 328.9	131	3 461.9	118	184.7	154
1951	2 773.2	145	1 498.2	147	4 271.4	146	193.8	161
1952	2 966.3	155	1 591.8	157	4 558.1	156	246.2	205
1953	2 962.7	155	1 610.1	158	4 572.8	156	311.4	259
1954	3 018.6	158	1 691.7	166	4 710.3	161	396.9	331
1955	3 334.9	175	1 847.2	182	5 182.1	177	492.5	410
1956	3 806.8	199	2 166.5	213	5 973.3	204	515.4	429
1957	3 915.6	205	2 202.2	217	6 117.8	209	525.6	438
1958	4 189.5	219	2 526.2	249	6 715.7	230	595.0	496
1959	4 329.0	227	2 744.8	270	7 073.8	242	678.5	565
1960	4 611.6	241	3 003.1	296	7 614.7	260	793.2	661
1961	4 691.7	246	3 150.5	310	7 842.2	268	929.6	774
1962	4 884.0	256	3 350.7	330	8 234.7	281	1 046.6	872
1963	5 289.7	277	3 700.3	364	8 990.0	307	1 155.8	962
1964	6 162.1	323	4 195.8	413	10 357.9	354	1 266.1	1 055
1965	6 559.2	343	4 457.5	439	11 016.7	377	1 366.0	1 138
1966	6 728.3	352	4 535.3	446	11 263.6	385	1 532.4	1 276
1967	7 284.2	381	4 786.2	471	12 070.4	413	1 654.9	1 379

to 7 300 million marks in 1967, an increase of nearly 300 percent. Working capital increased at a somewhat faster rate, 371 percent from 1 000 million marks to 4 800 million marks in 1967. Total assets, i.e. real estate and working capital, at 12.1 billion marks was slightly more than 4 times, or 300 percent above, the 1948 level. Debts increased at a much faster rate than assets and in 1967 totalled 1 654.9 million marks, nearly 14 times the 1948 amount. With the exception of 1951, percentage increases over the preceding year were greatest, about 25 percent, in the years prior to 1956. The rate of increase has slowed down and in the last five years averaged about 10 percent per year.

In any study there is a need for evaluation of results obtained. This is especially true in this study where basic statistics for a nation's agriculture have been accumulated and presented for the first time. Separate comments are made here for each group of assets.

In the case of agricultural land the data available on the physical stock used for agriculture in Finland are very reliable. On the other hand, there are no continuous series on land prices in Finland and only a few other individual studies are available for comparison. That is why a new price series has been developed here assuming a change of 1.5 times the increase in agricultural product prices. This set of prices is, of course, somewhat artificial and based partly on personal judgment but the results obtained coincide fairly well with those of some other studies and also to the reappraised values per hectare of bookkeeping accounts in 1968. One must, however, admit that there may be good reason to continue to work on better price series for land but that the physical data on land is excellent. The series on land values at constant prices are more reliable than those at current prices and moreover, the nature of changes from year to year should be quite reliable. The only source of error in constant-price-series may occur in the absolute level of values, if the price in the base year (1954) is judged inaccurate. This possible error is, however, probably small.

For land improvements - limited in this study to include drainage and tiling only - quite reliable data are available both for physical stock and prices. The results obtained likely give a good estimate of the absolute level of capital stock in given years as well as changes in value from year to year.

The physical stock of buildings derived from reliable data on investments by the Central Statistical Office is acceptable. But a possible source of error may appear in the price series before 1961. Altogether the current values presented for buildings are not as good as those for land improvements, but carefully derived and certainly as good as those available in most Western countries.

The reliability of the results obtained for machinery and equipment at constant prices is fairly comparable to that for buildings. Although several different base periods were used when constructing price indices, the many variations and changes in types, designs and structure of machinery may well have caused some inaccuracy to the current values especially in the years most distant from the base periods. On the average, the figures at current prices should give a good picture of actual conditions.

Excellent statistics are available in Finland on the numbers of livestock and horses. This provides the basis for an accurate series of capital stock at constant prices. Expecially in the case of dairy cattle, however, the influence of the rapid rise in production per cow on true value at constant prices cannot be ignored. To resolve the problem one-half of the total increase in production per head was considered a result of improved feeding and management practices whereas the other half was assumed to be the result of higher quality animals achieved by breeding and selection. The latter factor was taken into account in the series of dairy cattle at constant prices. As a result, for instance, a cow of 1967 quality equals 1.46 cows of 1948 quality. The procedure followed here may, of course, raise some criticism. On the other hand, ignoring the existence of improved quality and a consequent increase in real value would lead to much larger errors than might have appeared through the process used in this study.

In Finland there is a lack of series on live animal prices. That is why new price series were established in this study for dairy cattle and hens based on the changes in milk price and the price of eggs respectively. A new price series was also constructed for horses based on the changes in agricultural product price index, which was considered to represent best the general price level in agriculture. The values per animal estimated here for 1968 approximate the live animal prices reappraised in bookkeeping accounts in 1968. This fact gives some more evidence of the general credibility of values for capital stock at current prices as developed in this study.

In contrast to the preceding categories of assets, the price component of most inventories is more reliable than the data on physical stock. For hay and silage only where lack of price data is the rule not only in Finland but also in most Western countries - an estimate was developed on the basis of their feeding values in ratio those of barley. To establish each series on physical stocks several sources of statistics were used to estimate at first the total amounts of farm products and purchased supplies stored on farms. Some of these sources provided evidence on average annual stocks. Nevertheless, it was sometimes necessary to use very limited data to provide national estimates. Such assumptions, of course, will include some error but the results obtained generally stood the test of reasonableness and were included in the presentation.

Only a single study was available for the estimation of the value of growing crops. Based on that study, careful evaluations were made to establish the average pattern of inputs in crop production in Finland for 1961-63 (years of study above). A cost index of crop production was then constructed to adjust the basic figures for all the years covered in this study. The capital stock at constant prices was calculated using the price component of the index as a deflator. The procedure followed was based on limited information and personal judgment in large measure and is therefore subject to differing opinions. Capital stock in growing crops - probably estimated here the first time on a national basis - was, however, considered important enough not to be ignored regardless of possible errors. It should be emphasized also that an error of even 50 percent affects only around 2 percent of the total assets. Hopefully, the error is much less.

The estimates of capital stock in the form of receivables - limited to milk sales only - are based on excellent statistics both on physical amounts and prices. The results obtained are therefore reliable ones, although a somewhat increasing bias may occur in recent years because of a slow shift from milk to other farm products in the structure of agricultural production.

In summary, the separate capital groups when totalled to describe capital investment in Finnish agriculture seem to provide a quite reliable picture at constant prices. Somewhat more uncertainty prevails in the same totals at current prices. This is mostly due to the lack of data on land prices although some other minor sources of error may exist as well. Establishment of official data on land prices is becoming continuously more important, not only for national statistics such as these but for considering national policy issues of concern to agriculture and the rest of the economy. Regardless, the totals in the balance sheet provide a comprehensive basis for looking at only the nation's major industries and changes that have occurred within it.

Somewhat more uncertainty exists in the statistics presented for debts than in those for assets. In spite of fairly good data available on the total amount of credit extended to the agricultural sector and to forestry, it is difficult to know how much of the credit was used exclusively for agricultural purposes. The estimates made are therefore inconclusive partly based on personal judgment and

evaluation. The resulting picture of debts is less reliable than that for assets. This uncertainty, of course, affects the reliability of figures presented for net worth. But again the trends presented for change from year to year should be reasonably reliable. As indicators of structural changes in Finnish agriculture the balance sheet estimates overall should be as good as most of those used and reported in the rest of the Western World.

Throughout the detailed study aggregate estimates from bookkeeping data were used as a benchmark. In Table 59 balance sheets are prepared using those estimates and are compared with the results obtained in this study. Comparisons are made for the years 1954 and 1967. The former year has been chosen because it was the last one without underestimation in live animal prices in bookkeeping accounts. To avoid this underestimation reappraised livestock values of 1968 are used for bookkeeping farms in 1967. For same reason the resulted land values of this study are also used for bookkeeping farms in each year. Also some other adjustments have been done to add the mutual comparability of figures (see footnotes to table).

Table 59. Results of This Study Compared With Estimates Derived From Bookkeeping Farms in 1954 and 1967

Item		1954		1967		
		This study	Bookkeeping farms, simple ave.	This study	Bookkeeping farms Simple average	Bookkeeping farms Weighted average
Land	mil.marks	1506.3	1506.3	4398.4	4398.4	4398.4
Land improv.	"	98.2	192.0	377.7	609.2	505.8
Buildings	"	1414.1	1706.2	2508.1	3073.8	3722.1
Machinery & eq.	"	384.2	814.5	1594.0	1944.9	1872.2
Livestock[1)]	"	743.8	607.8[5)]	1638.2	1517.3	1925.3
Inventories[2)]	"	297.9	336.0	723.3	824.3	740.5
Total I[3)]	mil.marks	4445.0	5162.8	11239.7	12367.9	13164.3
Total II[4)]	"	4710.3	5469.1	12070.4	13298.8	14155.2
Real estate, percent of total		64.1	62.2	60.3	60.8	60.9
Debts	mil.marks	396.9	659.3	1654.9	2012.0	2138.0
Debts, percent of total		8.4	12.1	13.7	15.1	15.1

[1)] Including horses.

[2)] Excluding growing crops.

[3)] Sum of column numbers.

[4)] Including growing crops and receivables, which have been estimated for bookkeeping farms as a same percent of total assets as obtained in this study

[5)] 3.5 times the value of inventories on July 1st.

The two groups of figures in Table 59 relate rather logically. The aggregates derived from bookkeeping farms show higher values in the cases of land improvements, machinery and equipment and also buildings. The last fact is somewhat surprising because having larger average size than all farms in the country bookkeeping farms would have been expected to own less capital in buildings per hectare than all farms on an average and so to lead to lower aggregate numbers than obtained in this study. The bookkeeping aggregates on total assets show about 16 percent higher level in 1954 and a little more than 10 percent higher in 1967 than estimates of this study. There is, however, a difference of about 17 percent in 1967 if the weighted averages of bookkeeping farms are used, which averages correspond better to circumstances in average farms in the country. When considering that land values probably are higher in bookkeeping farms than in average farms the actual difference likely is larger than shown by the figures of Table 59. Larger part of assets has been financed by debts in bookkeeping farms than in all farms of the country in both two years. The difference has, however, decreased while the average farms have been going through the mechanization process which bookkeeping farms almost have passed by. Anyhow the logical relatioship of the two aggregates in Table 59 obviously gives some more support to the reliability of results obtained in this study.

4. FUTURE PROSPECTS

Some rather marked structural changes will likely occur in Finnish agriculture in the future. The total number of farms as well as agricultural population will decline while the average size of farms will increase. These changes have been slow to take effect in Finland, but the preliminary data from the 1969 census of agriculture suggest a more rapid change in the years ahead. This will simultaneously bring about some changes in the structure of capital stock in agriculture. In this chapter an effort is made to project future trends for individual assets categories and for assets and debts as a total. The projections almost exclusively relate to the volume of capital stock because price forecasts are much too uncertain. Projections are presented in Charts 1 through 3.

Minor changes occurred in the total area of agricultural land through the 1960's. The downward trend which began in 1966 will continue slowly in the future, aided in part by the new procedures of agricultural land policy. It is forecasted that the total land in agricultural uses will approximate 2 650 thousand hectares in 1975 compared with the 2 794 thousand in 1967. The decrease is relatively small, but all uncultivated areas included in the field bank system are considered part of the total. The net decrease reflects land moving permanently out of farming into either forestry or urban and suburban uses.

The slowly falling capital stock in the form of agricultural buildings is expected to continue although a slight rise occurred in 1965-1967. While the average farm size is increasing there is less need to replace all old buildings in agriculture with new ones. This assumes depreciation will more than equal new capital investment during the next 5 to 10 years. Projections to 1975 place investments in buildings at a level somewhat less than 1 350 million marks, down from the 1 390 million in 1967.

Chart I. Changes in Capital Stock in Real Estate at Constant Prices from 1948 to 1967 and Projections to 1975

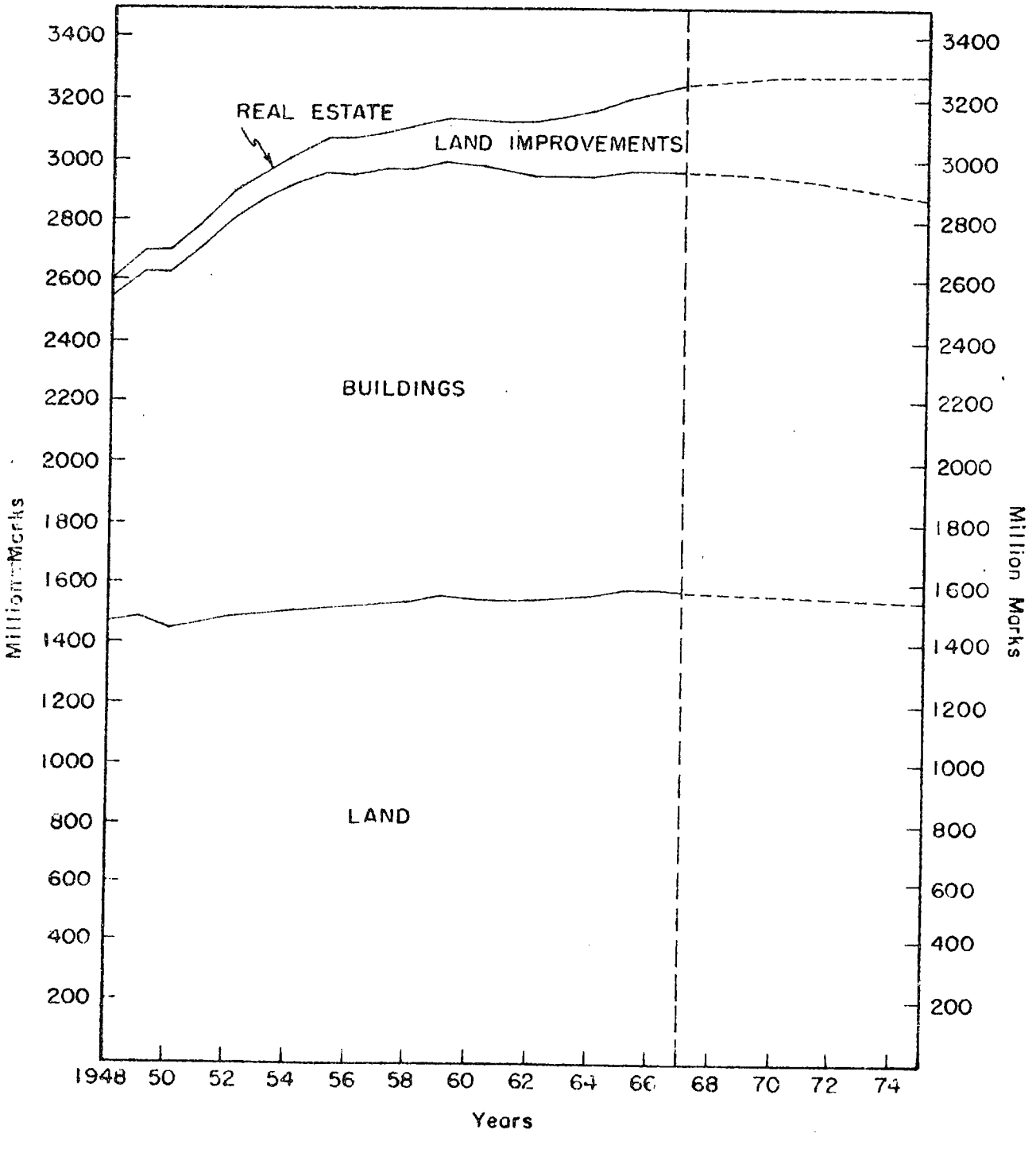
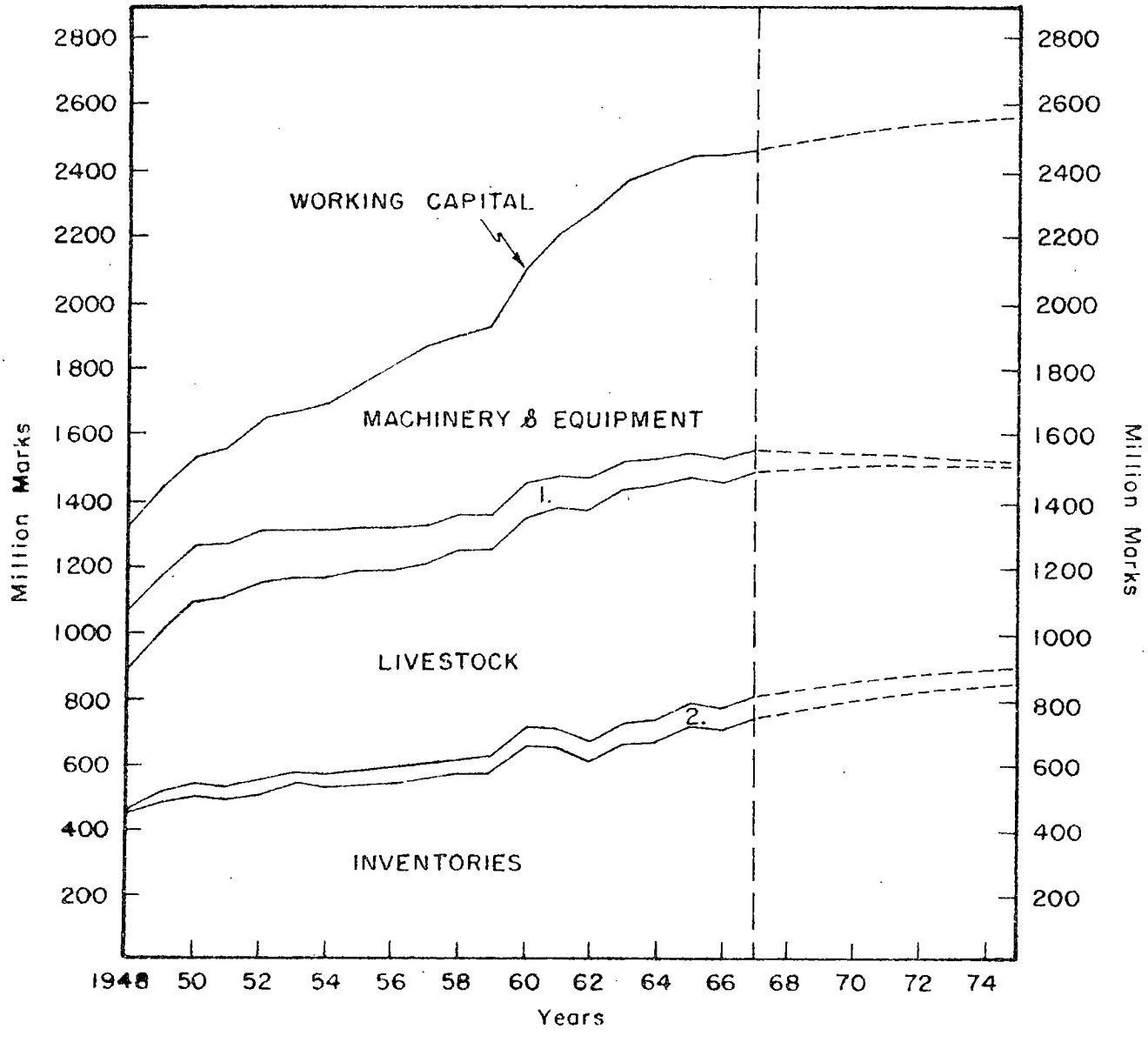
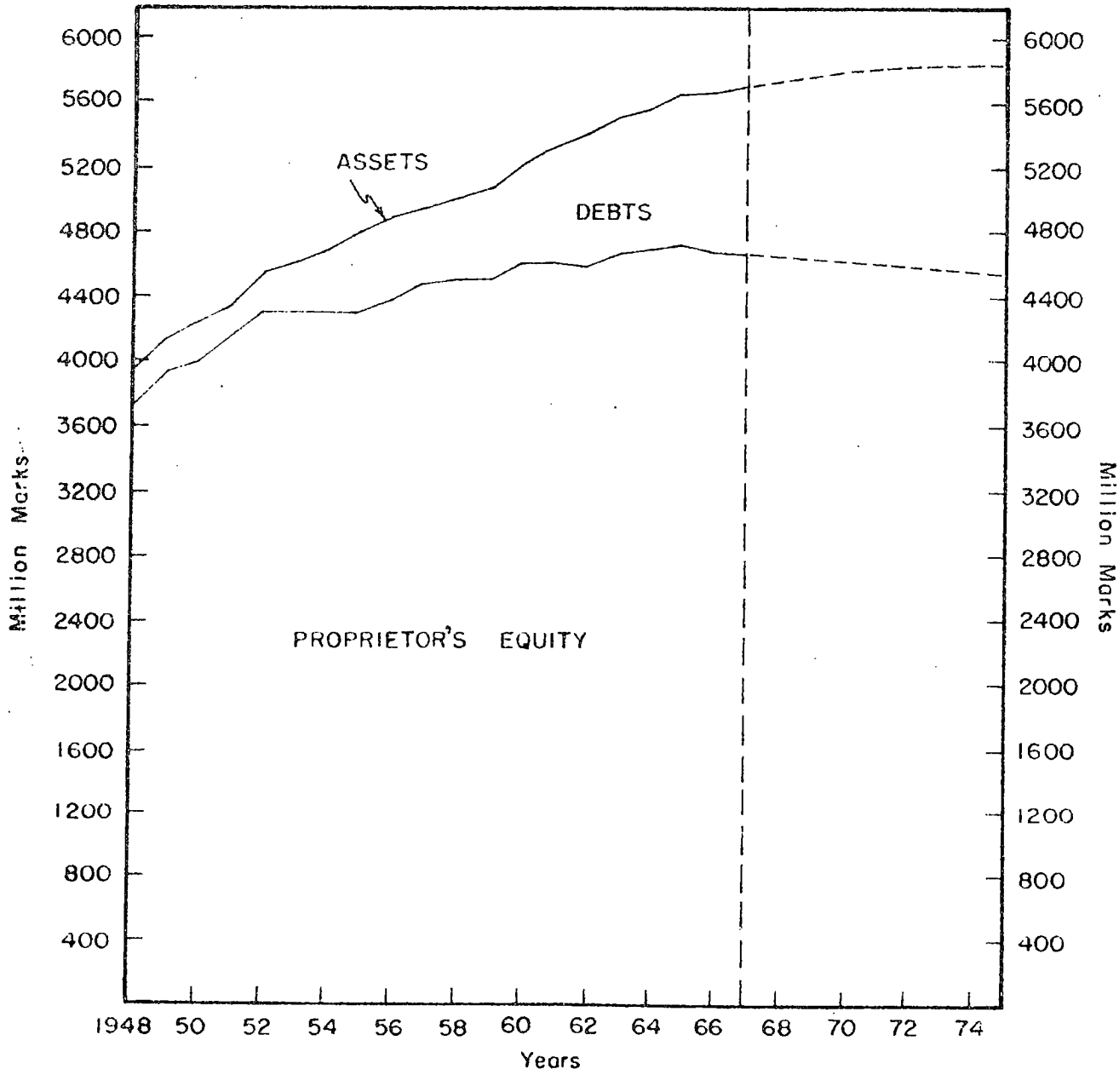


Chart 2. Changes in Capital Stock in Working Capital at Constant Prices from 1948 to 1967 and Projections to 1975



1. = HORSES
2. = RECEIVABLES

Chart 3. Changes in Assets and Debts at Constant Prices from 1948 to 1967 and Projections to 1975



If farm consolidation should increase, it is possible that the trend will reverse during the late 1970's. If this happens, larger barns with quite different facilities will probably be built so fast that investments in new buildings might exceed depreciation and obsolescence. This phase is not, however, expected to occur in the period projected in this study.

The rapid rise in the volume of capital stock in land improvements will likely continue but at a diminishing rate in the mid 1970's. It is assumed that the new area tiled annually will remain constant. The total capital stock will not grow as fast as previously because of the increasing effect of depreciation. The estimate for 1975 is almost 400 million marks or about 35 percent higher than in 1967.

As a result of opposite changes for land and buildings on one hand and land improvements on the other, a small change seems likely in the amount of capital stock in real estate. The capital stock of 3 250 million marks in 1967 will reach 3 280 million around 1971-72 and remain constant thereafter.

Capital stock in the form of machinery and equipment showed a slight drop in 1967, the first since 1950. It is likely that capital investment in machinery and equipment will continue to increase because of growing average farm size and the declining farm labor force. The projected curvilinear trend for machinery and equipment investment in 1954 prices reaches 1 050 million marks in 1975, 15 percent higher than in 1967.

In the case of horses and livestock the preliminary data from the 1969 census of agriculture provide additional benchmarks for projections. The total number of horses more than one year old in 1969 was 99 000, a decline of 40 000 from 1967. Because more than one-half of horses in 1969 were over 17 years old, it is assumed that the rate of decline will continue to be rapid. Accordingly, the total number of horses in 1975 is estimated at approximately 25 000. The capital in the form of horses will be about one-sixth the 1967 level.

The number of dairy cows decreased by 100 000 between 1967 and 1969, a more rapid decline than in the preceding two years. Meanwhile, the number of heifers and calves increased and the physical stock of animals other than dairy remained constant. It is assumed here that

the number of milk cows will continue to decline until 1975 at about the same absolute rate as occurred from 1965 to 1969 and will approximate 650 000. The number of calves is expected to rise by five percent and the number of heifers by 20 percent from the level of 1969. These rises reflect the shift from milk to meat production. Production per cow is assumed to increase at the same rate as occurred in the 1960's. The improved quality of milk cows will slow the decrease in the volume of capital stock in dairy cattle.

The number of hens is expected to remain fairly constant while the drop in the number of sheep will be overcompensated by the increase in number of pigs. Capital in livestock other than dairy will grow to 90 million marks by 1975 making up more than 15 percent of total instead of the 7 to 9 percent of the 1960's. The value of all livestock at constant prices will decline to around 610 million marks in 1975 against 690 million in 1967.

Capital stock in inventories is forecast to approximate 840 million marks in 1975, an increase over the 740 million in 1967. The growth observed from 1963 to 1967 was assumed to continue but at a somewhat diminishing rate. By 1975, the value of purchased supplies will be 50 percent higher than in 1967. The use of fertilizers and liquid fuels will grow and an increasing proportion of fertilizers will be stored on farms because of price discounts which are advantageous for farmers. The amount of crops stored on farms is expected to continue to rise but at slower rate than previously. Crop yields per hectare will increase but the influence of the field bank system will prevent total yields from rising proportionally. The real value of crops stored is assumed to grow 352 million marks in 1967 to around 400 million in 1975. The real stock in growing crops is projected to increase at a diminishing rate reaching 360 million marks in 1975, 10 percent higher than in 1967. This projection is based on an expectation that only the inputs in fertilizers, liquid fuels and possibly in plant protection chemicals, will increase whereas a slower rate of increase in the input of machinery and equipment will be balanced by the decrease in the human labor input.

In this study capital stock in receivables results from milk sales. Thus, the projection for receivables is based on total milk production projections. The total number of cows was projected to be around 650 thousand in 1975. If production per cow rises further at the same rate as in 1958-1967 or 2.5 percent annually, production per cow will approximate somewhat more than 4 100 kg in 1975. Total milk production will drop to 2 650 million kg from over 3 400 million in 1967. Because the use of milk on farms is decreasing, the capital stock in receivables will decline proportionally less than total production and will approximate 54 million marks in constant prices in 1975 compared with 63 million in 1967.

Because reduction in the national dairy herd is strongly encouraged by current public policy, it is possible that production per cow will increase more than forecast. The preliminary data for 1969 milk production seem to support this idea. To reach the same total production as in the late 1960's with the projected number of cows above, production per cow in 1975 would have to exceed 4 459 kg, improbable but not impossible.

Future changes in the volume of total assets seem to be fairly small ones. As can be seen from Chart 3, the total capital stock in production agriculture will increase from 5 713 million marks in 1967 to about 5 800 million in 1970 and will remain fairly steady thereafter. A slowly falling trend will start soon after 1975 when slower rates of growth in capital in the form of machinery and equipment, land improvements and inventories do not compensate for decreases especially in land and livestock.

Regardless of the general stability in the volume of total assets in farming, some structural changes will occur. According to projections the proportion of land improvements will grow from five percent of total assets in 1967 to nearly seven percent in 1975. The corresponding change in machinery and equipment is from 16 to 18 percent and in inventories from 13 to over 14 percent of total assets. The shares of other capital groups will contract. The largest relative drops occur in horses and livestock (from 1.0 to 0.2 and from 12 to 10 percent, respectively) while land and buildings show a rather moderate decrease. Working capital as a total will increase in relation to real estate; the net change, however, will be slight.

A continuously growing share of assets is expected to be financed by debts. The projection in Chart 3 based on the changes in 1962-1967 shows a slightly diminishing rate of increase in the volume of debts, rising to almost 1 300 million marks in 1975 from 1 040 million in 1967. Although there will be a growing need to finance the increase in the average size of farm it is assumed that decreasing share of outside financing will be used for mechanization. As the proportion of total capital in the form of debts increases from 18 to 22 percent of assets, proprietors' equity will show an absolute decline from over 4 670 million marks in 1967 to around 4 550 million in 1975. This decline does not mean that farmers individually will be decreasing net worth because the number of farms will decline even more rapidly.

Making projections in current prices is much more uncertain. Two rough forecasts for 1975 are presented in Table 60, one representing an expected annual inflation of 2 percent and the other at a 4 percent rate. Each forecast is based on the volume of capital stock at constant prices projected for 1975 above. In the case of agricultural land it is assumed that land prices will rise 1.5 times more rapidly than the general price level, or 3 and 6 percent in the two examples. For land improvements the price component is forecast to rise at a little slower rate than the general price level because of improved technology. For all other groups of assets as well as debts the 2 and 4 percent annual rates are used consistently.

The results show that total assets will grow by 18 percent in one case and 36 percent in the other. The structural changes occur in the same manner in projections on real volume in all categories except land. In this case land makes up a larger proportion of the total the faster the inflation occurs. This fact also results in the smaller share of debts in the latter than in the former case. Net worth also increases more than proportionately.

Table 60. The Value and Structure of Capital Stock at Current Prices in 1967 and Forecasts for 1975 Based on 2 (I) and 4 percent (II) Annual Inflation

Group of Capital	1967		1975 I		1975 II	
	Value	of total	Value	of total	Value	of total
	mil.mks	percent	Mil.mks	percent	Mil.mks	percent
Land	4 398.4	36.4	5 280	37.0	6 240	38.0
Land improvements	377.7	3.1	570	4.0	640	3.9
Buildings	2 508.1	20.8	2 780	19.5	3 140	19.1
Real estate total:	7 284.2	60.3	8 630	60.5	10 020	61.0
Machinery and equipment	1 594.0	13.2	2 110	14.8	2 390	14.6
Horses	126.4	1.0	25	0.2	30	0.2
Livestock	1 511.8	12.5	1 530	10.7	1 730	10.5
Inventories	1 413.9	11.8	1 840	12.8	2 080	12.7
Receivables	140.1	1.2	140	1.0	160	1.0
Working capital total:	4 786.2	39.7	5 645	39.5	6 390	39.0
Total assets	12 070.4	100.0	14 275	100.0	16 410	100.0
Debts	1 654.9	13.7	2 340	16.4	2 640	16.1

The forecast presented in Table 60 must be considered as rough. It is probable that the prices of separate assets categories will change at different rates, even with moderate inflation. But these estimates provide some information on the direction and nature of changes which may occur in production agriculture.

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Appendix 1. Balance Sheets, 1948-1967 at Current Prices, Million Marks

Item	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Land	1186.3	1053.6	1189.6	1441.0	1519.9	1492.7	1506.3	1770.7	2159.0	2200.6	2396.2	2509.6
%			34.4					34.2				
Land improvements	59.7	65.3	74.1	95.0	94.9	96.2	98.2	99.3	104.7	114.8	133.1	139.4
%			2.1					1.9				
Buildings	664.1	700.1	869.3	1237.2	1351.5	1373.8	1414.1	1464.9	1543.1	1600.2	1660.2	1680.0
%			25.1					28.3				
Real estate	1910.1	1819.0	2133.0	2773.2	2966.3	2962.7	3018.6	3334.9	3806.8	3915.6	4189.5	4329.0
%	65.3	62.5	61.6	64.9	65.1	64.8	64.1	64.4	63.7	64.0	62.4	61.2
Machinery	119.5	151.5	215.0	262.1	320.1	370.4	384.2	438.3	504.3	516.4	675.7	777.7
%			6.2					8.5				
Livestock	395.8	394.1	476.2	558.8	599.6	581.8	609.6	663.1	822.0	821.2	893.5	929.2
%			13.8					12.8				
Horses	206.8	188.7	180.1	157.9	159.9	146.3	134.7	142.2	163.6	153.3	152.1	150.5
%			5.2					2.7				
Inventories	278.0	334.4	431.8	487.8	477.1	474.8	524.8	561.6	613.3	646.7	735.5	808.5
%			12.5					10.8				
Receivables	15.8	21.9	25.8	31.6	35.1	36.8	38.4	42.0	63.3	64.6	69.4	78.9
%			0.7					0.8				
Working capital	1015.9	1090.6	1328.9	1498.2	1591.8	1610.1	1691.7	1847.2	2166.5	2202.2	2526.2	2744.8
%	34.7	37.5	38.4	35.1	34.9	35.2	35.9	35.6	36.3	36.0	37.6	38.8
Assets total	2926.0	2909.6	3461.9	4271.4	4558.1	4572.8	4710.3	5182.1	5973.3	6117.8	6715.7	7073.8
1948=100	100	99	118	146	156	156	161	177	204	209	230	242
Debts	120.0	135.2	184.7	193.8	246.2	311.4	396.9	492.5	515.4	525.6	595.0	678.5
%	4.1	4.6	5.3	4.5	5.4	6.8	8.4	9.5	8.6	8.6	8.9	9.6
Proprietors' equity	2806.0	2774.4	3277.2	4077.6	4311.9	4261.4	4313.4	4689.6	5457.9	5592.2	6120.7	6395.3
1948=100	100	99	117	145	154	152	154	167	194	199	218	228

Appendix 1. (continued)

Item	1960	1961	1962	1963	1964	1965	1966	1967
Land	2737.9	2731.5	2875.2	3131.8	3776.9	3984.3	4041.5	4398.4
%	36.0					36.2	35.9	36.4
Land improvements	144.2	161.0	179.8	213.0	252.5	283.7	336.9	377.7
%	1.9					2.6	3.0	3.1
Buildings	1729.5	1799.2	1829.0	1944.9	2132.7	2291.2	2349.9	2508.1
%	22.7					20.7	20.8	20.8
Real estate	4611.6	4691.7	4884.0	5289.7	6162.1	6559.2	6728.3	7284.2
%	60.6	59.8	59.3	58.8	59.5	59.5	59.7	60.3
Machinery	881.9	1027.3	1163.5	1264.6	1399.6	1469.2	1560.8	1594.0
%	11.6					13.3	13.9	13.2
Livestock	985.2	1035.7	1100.3	1177.5	1337.9	1412.0	1437.5	1511.8
%	12.9					12.8	12.8	12.5
Horses	160.3	150.5	145.5	148.1	152.7	151.3	141.3	126.4
%	2.1					1.4	1.3	1.0
Inventories	887.0	844.0	845.7	1003.9	1180.9	1288.2	1259.0	1413.9
%	11.6					11.8	11.1	11.8
Receivables	88.7	93.0	95.7	106.2	124.7	136.8	136.7	140.1
%	1.2					1.2	1.2	1.2
Working capital	3003.1	3150.5	3350.7	3700.3	4195.8	4457.5	4535.3	4786.2
%	39.4	40.2	40.7	41.2	40.5	40.5	40.3	39.7
Assets total	7614.7	7842.2	8234.7	8990.0	10357.9	11016.7	11263.6	12070.4
1948=100	260	268	281	307	354	377	385	413
Debts	793.2	929.6	1046.6	1155.8	1266.1	1366.0	1532.4	1654.9
%	10.4	11.9	12.7	12.9	12.2	12.4	13.6	13.7
Proprietors' equity	6821.5	6912.6	7188.1	7834.2	9091.8	9650.7	9731.2	10415.5
1948=100	243	246	256	279	324	344	346	371

Appendix 2. Balance Sheet, 1948-1967 at Costant (1954) Prices, Million Marks.

Item	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Land	1463.4	1484.5	1445.4	1459.1	1483.1	1492.7	1506.3	1520.5	1528.6	1536.9	1545.5	1558.2
%			34.1					31.6				
Land improvements	68.5	71.2	74.9	79.0	84.3	91.2	98.2	107.3	115.2	121.9	130.4	140.9
%			1.8					2.2				
Buildings	1081.6	1140.3	1187.6	1249.7	1325.0	1373.8	1414.1	1436.2	1428.8	1430.0	1432.4	1437.1
%			28.0					29.8				
Real estate	2613.5	2696.0	2707.9	2787.8	2892.3	2957.7	3018.6	3064.0	3072.6	3088.8	3108.3	3136.2
%	66.5	65.2	63.9	64.0	63.6	63.9	64.1	63.6	63.0	62.4	62.0	61.8
Machinery	255.8	275.4	268.4	293.9	348.7	361.0	384.2	434.4	492.0	530.7	547.6	579.5
%			6.3					9.0				
Livestock	436.9	488.5	565.0	584.6	603.0	588.7	609.6	607.7	598.2	612.4	628.7	625.0
%			13.3					12.6				
Horses	154.0	162.2	168.7	157.9	152.2	140.5	134.7	129.2	123.1	114.5	108.5	104.6
%			4.0					2.7				
Inventories	454.0	484.0	496.9	495.1	518.0	539.4	524.8	540.8	545.9	558.3	569.1	574.4
%			11.8					11.3				
Receivables	18.4	27.3	30.9	33.0	35.6	37.6	38.4	38.6	45.3	47.5	47.9	52.4
%			0.7					0.8				
Working capital	1319.1	1437.4	1529.9	1564.5	1657.5	1667.2	1691.7	1750.7	1804.5	1863.4	1901.8	1935.9
%	33.5	34.8	36.1	36.0	36.4	36.1	35.9	36.4	37.0	37.6	38.0	38.2
Assets total	3932.6	4133.4	4237.8	4352.3	4549.9	4624.9	4710.3	4814.7	4877.1	4952.2	5010.1	5072.1
1948=100	100	105	108	111	116	118	120	122	124	126	127	129
Debts	190.5	211.3	249.6	186.3	234.5	308.3	396.9	502.6	495.6	465.1	487.7	556.1
%	4.8	5.1	5.9	4.3	5.2	6.7	8.4	10.4	10.2	9.4	9.7	11.0
Proprietors' equity	3742.1	3922.1	3988.2	4166.0	4315.4	4316.6	4313.4	4312.1	4381.5	4487.1	4522.4	4516.0
1948=100	100	105	106	111	115	115	115	115	117	120	121	121

Appendix 2. (continued)

Item	1960	1961	1962	1963	1964	1965	1966	1967	Projection for 1975
Land	1548.4	1544.8	1548.6	1554.9	1561.0	1581.9	1580.2	1578.8	1550
%	29.6					28.0	27.8	27.6	26.5
Land improvements	150.5	163.0	176.3	195.4	219.2	241.2	263.8	284.6	390
%	2.9					4.3	4.6	5.0	6.7
Buildings	1431.7	1418.9	1404.8	1398.2	1390.3	1383.6	1383.9	1387.2	1340
%	27.4					24.5	24.5	24.3	22.9
Real estate	3130.6	3126.7	3129.7	3148.5	3170.5	3206.7	3227.9	3250.6	3280
%	59.9	58.6	58.0	57.1	56.9	56.8	56.9	56.9	56.1
Machinery	638.6	729.6	803.0	842.5	871.0	898.1	922.5	909.8	1050
%	12.2					15.9	16.3	15.9	18.0
Livestock	636.8	668.0	701.6	708.9	713.9	688.2	690.6	691.6	610
%	12.2					12.2	12.2	12.1	10.4
Horses	103.4	97.1	94.0	90.8	85.8	76.3	68.6	58.5	10
%	2.0					1.4	1.2	1.0	0.2
Inventories	657.5	651.4	607.1	658.4	668.0	714.9	702.0	739.7	840
%	12.6					12.5	12.3	13.0	14.4
Receivables	56.7	59.6	60.6	63.4	65.5	65.5	64.7	62.8	50
%	1.1					1.2	1.1	1.1	0.9
Working capital	2093.0	2205.7	2266.3	2364.0	2404.2	2443.0	2448.4	2462.4	2560
%	40.1	41.4	42.0	42.9	43.1	43.2	43.1	43.1	43.9
Assets total	5223.6	5332.4	5396.0	5512.5	5574.7	5649.7	5676.3	5713.0	5840
1948=100	133	136	137	140	142	144	144	145	148
Debts	619.7	726.3	805.1	856.1	873.2	904.6	995.1	1040.8	1280
%	11.9	13.6	14.9	15.5	15.7	16.0	17.5	18.2	21.9
Proprietors' equity	4603.9	4606.1	4590.9	4656.4	4701.5	4745.1	4681.2	4672.2	4560
1948=100	123	123	123	124	126	127	125	125	122