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# Structural Changes in West European Agriculture, 1950-70

ECONOMIC RESEARCH SERVICE  
UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREIGN AGRICULTURAL ECONOMIC REPORT NO. 101

THE UNITED STATES DEPARTMENT OF AGRICULTURE  
WASHINGTON, D. C. 20250  
BUREAU OF PLANT INDUSTRY  
WASHINGTON, D. C. 20250

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# EXPLANATORY NOTES

EC = European Community. The original EC, formed on January 1, 1958, consisted of Belgium, Luxembourg, France, the Netherlands, West Germany, and Italy. The EC expanded to include Denmark, Ireland, and the United Kingdom on January 1, 1973.

1 hectare = 2.47 acres.

1 kilogram = 2.2 pounds.

Tonnages used in this report are metric (2,204.6 pounds).

## Exchange Rates Foreign currency per U.S. dollar 1/

Country - Unit	1950	1955	1960	1965	1970
Austria - schilling. . . . .	21.5	26.1	26.0	25.9	25.9
Belgium - franc. . . . .	50.0	50.0	49.7	49.6	49.7
Denmark - krone. . . . .	6.9	6.9	6.9	6.9	7.5
Finland - markka. . . . .	231.0	231.0	320.5	2/3.2	4.2
France - franc. . . . .	3.5	3.5	4.9	4.9	5.5
Germany - mark. . . . .	4.2	4.2	4.2	4.0	3.6
Italy - lira. . . . .	624.8	624.8	620.6	624.7	623.0
Ireland - 1 pound. . . . .	2.8	2.8	2.8	2.8	2.4
Luxembourg - franc. . . . .	50.0	50.0	49.7	49.6	49.7
Netherlands - guilder. . . . .	3.8	3.8	3.8	3.6	3.6
Norway - krone. . . . .	7.2	7.2	7.2	7.2	7.1
Portugal - escudo. . . . .	28.9	28.9	28.8	28.8	28.8
Spain - peseta. . . . .	11.2	11.2	3/60.1	60.0	69.7
Sweden - krona. . . . .	5.2	5.2	5.2	5.2	5.2
Switzerland - franc. . . . .	4.3	4.3	4.3	4.3	4.3
United Kingdom - 1 pound. . . . .	2.8	2.8	2.8	2.8	2.6
Greece - drachma. . . . .	--	30.0	30.0	30.0	30.0

1/ For the United Kingdom and Ireland, figures are for dollars per pound.

2/ Change from old markka to new markka.

3/ Currency exchange system was altered.

## SUMMARY

Fundamental changes occurred in West European agriculture during 1950-70. Gross Agricultural Product (GAP) more than doubled, while the percentage of Gross Domestic Product (GDP) originating in agriculture declined in all countries. Agricultural employment declined 44 percent from 33.8 million to 18.9 million workers. Gross agricultural output more than doubled for most countries. Average farm size increased from 7 to 12 hectares, and use of farm inputs--machinery, chemicals, and irrigation--increased many times over.

The growth in the agricultural sector was the result of technical advancement, increased capital investment, and reduction of the disguised unemployment frequently found in family enterprises. GAP as a percentage of GDP ranged from 3 to 20 percent in 1970. The wide variation can be explained by differences in the extent of economic and industrial development and in the degree to which land is suited to agriculture.

Agricultural employment, except in Greece, has been declining throughout Western Europe both in absolute numbers and as a share of total employment. The percentage of hired workers in agriculture has decreased in most countries as the share of family workers, especially women, has increased. The decline in the agricultural labor force is due primarily to greater earnings in other economic sectors. It has occurred most quickly in areas of greatest or expanded economic development.

Agricultural employment as a percentage of total civilian employment ranged from 47 percent in Greece to 3 percent in the United Kingdom in 1970. Hired workers as a share of agricultural employees are decreasing in most countries. In 1970, the percentage of hired agricultural workers varied from 54 percent in the United Kingdom to 6 percent in Luxembourg.

During the 1950's and 1960's, agricultural output per capita increased rapidly as technological innovations were applied to agriculture. Crop yields and livestock output multiplied while the agricultural labor force declined. However, the value of agricultural output and income still did not catch up with the value of nonagricultural income. In fact, for some cases the disparity actually grew.

Value of agricultural output by commodity share follows a definite regional trend in Western Europe. The northern and central areas depend heavily on livestock output while the southern region stresses crop production. The primary reasons for this geographic split are the differences in climate, soils, and economic atmosphere.

In current prices the value of agricultural output increased for all West European countries during 1950-70, although the relative shares of the value of agricultural output changed little. The countries with the greatest increases in agricultural output tend to be livestock-based and, in general, economically prosperous. Output value tripled in France, West Germany, and the Netherlands during the past two decades.

Western Europe in 1970 devoted over half its total land area to agriculture. Of the agricultural area, a little more than half was arable land and orchards. In Western Europe, the United Kingdom had the largest proportion of agricultural land to total land (80 percent in 1969) while Norway had the smallest (3 percent in 1970).

Farm size in most areas of Western Europe has been increasing steadily as the number of farms has been declining. Average farm size in Western Europe ranged from approximately 3 hectares in Greece in 1969 to 56 hectares in the United Kingdom in 1970.



At the same time, the number of small farms is decreasing and the number of larger farms is increasing, due to migration out of agriculture and consolidation of farms. In many instances government policy and programs have been the catalyst for this movement. For most countries the total area in farms has changed little in the past two decades. In Western Europe as a whole, the majority of farms are of less than 10 hectares in size. However, these holdings account for only one-third of the total area. The majority of the area in farms is in holdings of 10 to 50 hectares.

Land tenure in Western Europe consists of various combinations of three basic types: owner-operated, rented, and sharecropped. Owner-operated family farms have traditionally been preferred in Europe since the fall of the feudal system.

Mechanization of farming in Western Europe has progressed rapidly during the past two decades, varying by country and type of machinery. The degree of mechanization depends on wage levels, machinery costs, and availability of labor. The movement of labor out of agriculture has been extensive, providing a prime motivation for the expansion of mechanization.

Use of chemicals in agriculture has increased many times over during the past two decades and has contributed to the greater yields in recent years. Consumption of fertilizers tends to be higher in Western Europe than in the United States. Due to their limited land area and high population density, Europeans practice a more intensive agriculture than in the United States. However, use of insecticides and herbicides is not as extensive in Western Europe as in the United States.

Although there are irrigation facilities throughout Western Europe, development has been most advanced in the south. Italy has the greatest proportion of irrigated land to total area. From 1948 to 1970, the area equipped for irrigation in Italy increased by 55 percent to total 3.4 million hectares.

Governmental policy and legislation have also brought about changes, such as most of the farm consolidation and enlargement. Programs to improve agricultural structure have existed for many years, but most were not comprehensive enough to accomplish the goals of the plans. Agricultural leaders and other government personnel are now striving to correct a faulty foundation without crumbling the entire agricultural structure. In 1968, the EC Commission proposed a massive structural reform program for the European Community (EC) member countries, designed to reduce agricultural employment by 5 million between 1970 and 1980 and bring about consolidation of the land area. Public reception to these policies at that time was not favorable. However, since then the EC legislated a less comprehensive structural reform plan designed to reduce farm population and farm numbers and to increase the average farm size. In addition to these EC programs, most countries have their own national reform program.

# Structural Changes in West European Agriculture, 1950-70

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## INTRODUCTION

There have been spectacular changes in the agricultural economies of all West European countries during recent years due to shifts in population, allocation of natural resources, capital expenditures, and new technology.

The total productivity, as measured by Gross Domestic Product (GDP), of all the countries in Western Europe has been rising significantly, while agriculture's share in the total economy has been diminishing as would be expected for countries that are becoming increasingly industrialized and prosperous. The agricultural labor force has been declining both in absolute numbers and as a percentage of the total labor force. However, in most countries the share of workers employed in agriculture is higher than the contribution they are making to aggregate productivity of the economy. Thus, the income derived from farming alone is lower than that derived from other economic sectors, and in some cases the disparity is growing.

The problem of low incomes in agriculture is a complex situation involving farm structure and its relationship to the efficiency of agricultural production. Farm structure, as applied in this report, includes the land and pattern of land use, the number and size of farms, the farm labor force, the farm management system, and farm practices and production technology.

The major problems of farm structure in Western Europe are the small size of the numerous, often fragmented family farms and the underemployment of labor caused by the lack of mobility of the agricultural population. The amount of capital available for investment in inputs to intensify production--such as irrigation, fertilizer and other chemicals, and buildings--is limited since farm income must support so many people. Concurrently, the inflexibility of labor hinders the reduction of production costs.

Reform of the farm structure must be handled cautiously. It has met with much resistance because changing the structure of agriculture necessitates changing a traditional way of life for the farming community. Auge Laribe, referring to France during the late 1800's, stated: "The agricultural population almost in its entirety and in practically every region did not want to make progress. Its aim was self-preservation: it wanted to maintain itself and its environment unchanged. It did not realize that not to advance is to retreat, that what remains stagnant and does not adapt, in a world in evolution, risks its own extinction." (61). 1/

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1/ Underscored numbers in parentheses refer to items in References on p. 46

Until recently, this opposition to reform existed throughout Western Europe. But farm structure is increasingly being recognized as the root of the problems of agriculture and thus the area in which to encourage change. Reform has already begun in most West European countries. Thus far, efforts to assist farmers have overwhelmingly taken the form of price support and subsidy systems. This practice creates an artificial atmosphere which aggravates the basic structural problems. The European Community's Common Agricultural Policy, the most extensive "harmonized policy" in Western Europe, has shown the ineffectiveness of these price-oriented programs in solving the problem of farm income. It has fostered the realization that more fundamental changes are called for and that more effort should be expended toward long-range reform. Other reform measures now in effect or being considered include technical aid to the farmer, retraining programs for those leaving or wanting to leave the agricultural sector, and legislation to quicken the pace of land consolidation. Although changes have taken place, in certain areas much more restructuring is necessary.

Although the EC since its inception has allocated funds (the European Guidance and Guarantee Fund) toward restructuring agriculture within the Community, it lacked a comprehensive program until 1972. Between 1958 and 1970, the EC had little influence in the realm of structural reform. The EC's primary focus was on agricultural prices, trade and marketing. Structural reform was handled by the individual member countries through national programs.

This report examines the changes related to farm structure that took place in Western Europe during 1950-70, and compares and contrasts these changes among the various countries and regions. The countries covered are: Austria, Belgium, Denmark, Finland, France, West Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. Unfortunately, comparable data for all countries and for the 20-year timespan were not always available. This report does not deal with the reform policies in effect. <sup>2/</sup>

Data in this report are given only on 5- and 10-year intervals for the period 1950-70 for two reasons: (1) change has been relatively slow for some aspects of the agricultural structure, such as land area devoted to agriculture; and (2) the timing of agricultural censuses of structural data in most countries is on a 5- or 10-year basis.

#### AGRICULTURE IN THE ECONOMY

Agriculture's share of the GDP declined steadily throughout Western Europe during the 20-year study period, although both the value of GDP and Gross Agricultural Product (GAP) rose (table 1).

The growth in the agricultural sector was the result of technical advancement, increased capital investment, and reduction of the disguised unemployment frequently found in family enterprises, the mainstay of West European agriculture. Although disguised unemployment is difficult to measure, its presence is indicated by the fact that productivity in agriculture rose as large numbers of workers left agriculture. This phenomenon was least pronounced in the United Kingdom, Belgium, and the Netherlands, where the productivity of agriculture did not differ greatly from that of the other economic sectors (40).

GAP as a percentage of GDP varied widely in West European countries in 1970 due to differences in the extent of economic and industrial development and in the suitability of land to agriculture. In the industrialized areas of central and most of northern Western Europe, agriculture accounted for only a small share of the total product.

<sup>2/</sup> For information about reform policies see (47), (49).

Table 1--Gross domestic product and gross agricultural product in current prices at factor cost 1, selected years 1950-70

Country and item	1950	1955	1960	1965	1970
Billion dollars					
Austria:					
GDP. . . . .	2.2	3.6	5.4	8.1	14.3
GAP. . . . .	.4	.6	.6	.7	1.0
Percent GAP/GDP. . . . .	18	17	11	9	7
Belgium: . . . . .					
GDP. . . . .	2/7.4	8.3	10.2	15.1	22.6
GAP. . . . .	2/.6	.7	.7	.9	1.0
Percent GAP/GDP. . . . .	2/8	8	7	6	4
Denmark: . . . . .					
GDP. . . . .	2.8	3.7	5.2	8.9	13.1
GAP. . . . .	.7	.8	.8	1.1	1.2
Percent GAP/GDP. . . . .	25	22	15	12	9
Finland: . . . . .					
GDP. . . . .	1.5	2.8	4.4	7.2	7.9
GAP. . . . .	.4	.7	.9	1.3	1.3
Percent GAP/GDP. . . . .	27	25	20	18	16
France: . . . . .					
GDP. . . . .	20.5	34.9	61.5	99.8	148.8
GAP. . . . .	3.0	4.0	5.3	7.4	9.0
Percent GAP/GDP. . . . .	15	11	9	7	6
Germany: . . . . .					
GDP. . . . .	23.3	42.9	71.1	113.3	185.7
GAP. . . . .	2.4	3.5	4.3	5.0	5.9
Percent GAP/GDP. . . . .	10	8	6	4	3
Greece: . . . . .					
GDP. . . . .	1.0	2.2	3.1	5.1	3/7.0
GAP. . . . .	.3	.7	.8	1.3	1.4
Percent GAP/GDP. . . . .	30	32	26	25	20
Italy: . . . . .					
GDP. . . . .	15.6	21.4	31.1	52.2	82.7
GAP. . . . .	3.6	4.3	4.3	6.9	8.5
Percent GAP/GDP. . . . .	23	20	14	13	10
Ireland: . . . . .					
GDP. . . . .	1.3	1.6	2.3	2.3	2.8
GAP. . . . .	n.a.	4/.4	.4	.5	.5
Percent GAP/GDP. . . . .	n.a.	25	17	22	18
Luxembourg: . . . . .					
GDP. . . . .	5/0.34	0.36	0.47	0.63	6/0.84
GAP. . . . .	5/0.03	0.03	0.04	0.04	6/0.05
Percent GAP/GDP. . . . .	5/9	8	9	6	5/6

See footnotes at end of table.

Continued

Table 1--Gross domestic product and gross agricultural product in current prices at factor cost <sup>1/</sup>, selected years 1950-70--Continued

Country and item	1950	1955	1960	1965	1970
<u>Billion dollars</u>					
Netherlands:					
GDP . . . . .	4.4	7.0	10.3	17.3	28.0
GAP . . . . .	.6	.8	1.1	1.4	1.7
Percent GAP/GDP . .	14	11	11	8	6
Norway:					
GDP . . . . .	2.4	3.1	4.1	6.4	9.4
GAP . . . . .	.3	.4	.4	.6	.6
Percent GAP/GDP . .	12	13	10	9	6
Portugal:					
GDP . . . . .	1.3	1.6	2.3	3.4	5.6
GAP . . . . .	.4	.5	.6	.7	1.0
Percent GAP/GDP . .	31	31	26	21	18
Spain:					
GDP . . . . .	n.a.	9.1	10.9	20.0	29.8
GAP . . . . .	n.a.	2.0	2.3	3.6	4.0
Percent GAP/GDP . .	n.a.	22	21	18	13
Sweden:					
GDP <sup>3/</sup> . . . . .	5.8	9.1	13.0	20.5	32.6
GAP . . . . .	.6	.9	.9	1.2	1.3
Percent GAP/GDP . .	10	10	7	6	4
Switzerland:					
GDP . . . . .	n.a.	n.a.	n.a.	n.a.	6/22.0
GAP . . . . .	n.a.	n.a.	n.a.	n.a.	1.1
Percent GAP/GDP . .	n.a.	n.a.	n.a.	n.a.	5
United Kingdom:					
GDP . . . . .	31.8	47.1	63.2	86.6	101.2
GAP . . . . .	1.9	2.3	2.6	3.0	3.0
Percent GAP/GDP . .	6	5	4	3	3

n.a. = not available.

<sup>1/</sup> Definition of factor cost or factor values--in the case of gross output of commodities, industries, etc., the producers' value less the sum of the indirect taxes, net, in respect of the commodities, industries, etc., and the direct and indirect intermediate inputs into the production of the commodities, industries, etc.; or the accumulation of the primary inputs; that is, compensation of employees, consumption of fixed capital and operating surplus, in respect of the commodities, industries, etc., and the direct and indirect intermediate inputs. The value added of industries at true factor values is equal to the true factor value of their gross output less the true factor value of their intermediate inputs (consumption).

<sup>2/</sup> 1953.

<sup>3/</sup> GDP given at market prices rather than at factor cost.

<sup>4/</sup> 1957.

<sup>5/</sup> 1952.

<sup>6/</sup> 1969.

Sources: (13), (51), (18).

GAP accounted for only 3 percent of GDP in both West Germany and the United Kingdom in 1970. Both of these countries were major importers of agricultural commodities. Agriculture was more important in southern Europe and in Ireland--it comprises approximately 20 percent of GDP in 1970 in both Greece and Ireland. These areas were less developed economically than their northern neighbors.

GAP in France, the largest in Western Europe, grew steadily to \$9 billion in 1970, a threefold increase since 1950. Agriculture's share of GDP dropped from 15 to 6 percent. GAP in the Netherlands at \$1.7 billion in 1970 also nearly tripled in two decades, while the share of GDP represented by agriculture dropped sharply from 14 to 6 percent.

Between 1950 and 1970 the Greek GAP increased more than four times, from \$300 million to \$1.4 billion, the largest increase in Western Europe. The growth rate was much quicker between 1950-55 and 1960-65 than at other times during 1950-70. The percent of GDP represented by GAP declined 10 percentage points during the same period.

### AGRICULTURAL LABOR FORCE

Agricultural employment declined throughout Western Europe both in absolute numbers and as a share of total employment during 1950-70. Paralleling this trend, the percentage of hired workers in agriculture decreased in most countries as the share of family workers, especially women, increased. As mentioned earlier, due to the presence of disguised unemployment, the diminishing labor force did not hinder agricultural output but productivity actually increased. The primary reason for the decline in the agricultural labor force was the lure of greater earnings in other economic sectors. However, the speed of this movement varied from region to region. It occurred more quickly in those areas experiencing greatest economic development expansion.

If the various West European governments had not protected domestic agriculture through restrictions on foreign trade in order to increase agricultural production in the early postwar years, the decline in the labor force might have been sharper. During the immediate postwar period, most countries tried to expand output to supplement low food supplies. They also needed to conserve foreign exchange by keeping imports as low as possible. Thus, they followed policies designed to provide farmers with incomes comparable to those in the other economic sectors. Pro-farmer policies were especially strong in West Germany, France, and Austria (57).

Agricultural employment as a percentage of total civilian employment ranged from 3 percent in the United Kingdom to 47 percent in Greece in 1970. In contrast, in 1950 Spain had the highest share, 50 percent, and the United Kingdom had the lowest share, 6 percent (table 2). Agricultural employment as a percentage of total civilian employment declined 25 percentage points in Italy, 23 percentage points in Finland, and 20 percentage points in Spain between 1950 and 1970. All three countries started out with large agricultural labor forces as a percentage of total labor and in 1970 still had relatively high percentages.

Although the ratio of agricultural labor to total labor did not increase in any country, in Greece it declined only 1 percentage point. The ratio increased during the 1950's and began to decline in the early 1960's.

Hired workers as a share of agricultural employment decreased in most countries, with the exception of Sweden. Attractive opportunities elsewhere coaxed workers away from agriculture. Concurrently more machinery was used, making agriculture less labor intensive. With fewer hired workers available and fewer needed, a larger percentage of self-employed farmers with unpaid family labor accounted for much of the labor in some areas.

Table 2--Total civilian employment and agricultural employment 1/,  
selected years 1950-70

Country and item	1950	1955	1960	1965	1970
	1,000 workers				
Austria:					
Total employment	3,270	3,310	3,239	3,235	2/3,142
Agricultural employment	1,078	950	796	681	574
Percent agricultural	33	29	25	21	18
Belgium:					
Total employment	3,306	3,348	3,447	3,621	3,747
Agricultural employment	368	310	264	230	181
Percent agricultural	11	9	8	6	5
Denmark:					
Total employment	n.a.	2,025	2,150	2,270	2,325
Agricultural employment	427	505	455	385	265
Percent agricultural	n.a.	25	21	17	11
Finland:					
Total employment	1,984	n.a.	2,087	2,159	2,142
Agricultural employment	911	n.a.	760	645	486
Percent agricultural	46	n.a.	36	30	23
France:					
Total employment	18,752	18,504	18,712	19,560	20,410
Agricultural employment	5,631	4,996	4,189	3,480	2,865
Percent agricultural	30	27	22	18	14
Germany:					
Total employment	20,365	23,210	25,954	26,699	26,705
Agricultural employment	5,020	4,285	3,623	2,966	2,406
Percent agricultural	25	18	14	11	9
Greece:					
Total employment	3/2,839	3,205	4/3,401	3,610	5/3,718
Agricultural employment	1,367	1,878	1,928	1,810	1,743
Percent agricultural	48	59	57	50	47
Ireland:					
Total employment	1,212	1,236	1,046	1,061	1,058
Agricultural employment	496	442	390	340	291
Percent agricultural	41	36	37	32	28
Italy:					
Total employment	19,098	19,701	20,002	19,011	18,774
Agricultural employment	8,510	7,624	6,567	4,956	3,683
Percent agricultural	45	39	33	26	20
Luxembourg:					
Total employment	6/135	n.a.	134	140	144
Agricultural employment	35	26	22	19	16
Percent agricultural	26	n.a.	16	14	11
Netherlands:					
Total employment	3,727	3,989	4,052	4,382	4,567
Agricultural employment	533	489	465	388	330
Percent agricultural	14	12	11	9	7
Norway:					
Total employment	1,418	1,430	1,395	1,435	1,497
Agricultural employment	334	281	301	251	208
Percent agricultural	24	20	22	17	14

See footnote at end of table.

Continued

Table 2--Total civilian employment and agricultural employment 1/,  
selected years 1960-70 -- Continued

Country and item	1950	1955	1960	1965	1970
	<u>1,000 workers</u>				
Portugal:					
Total employment	3,155	3,130	3,126	3,069	3,030
Agricultural employment	1,523	1,446	1,338	1,112	1,001
Percent agricultural	48	46	43	36	33
Spain:					
Total employment	10,476	10,433	11,474	11,827	12,372
Agricultural employment	5,217	4,681	4,856	3,969	3,662
Percent agricultural	50	45	42	34	30
Sweden:					
Total employment	3,424	3,533	3,690	3,749	3,854
Agricultural employment	795	584	485	432	314
Percent agricultural	23	17	13	12	8
Switzerland:					
Total employment	2,147	2,412	2,488	2,255	2,900
Agricultural employment	355	316	283	229	195
Percent agricultural	17	13	11	10	7
United Kingdom:					
Total employment	22,539	23,477	24,256	25,327	24,709
Agricultural employment	1,262	1,154	1,028	846	707
Percent agricultural	6	5	4	3	3

n.a. = not available

1/ Includes forestry, fishing, and hunting.

2/ Includes armed forces.

3/ 1951

4/ 1961

5/ 1967

6/ 1947

Sources: (11), (37), (48).



Although the family-operated farm has been criticized, it has some advantages as far as labor is concerned. Family workers adapt much more easily than hired workers to the sporadic needs of farming, such as Sunday work and the longer working hours necessary during planting and harvesting. To a certain extent, the seasonal nature of agriculture contributes to disguised unemployment, since it is difficult to avoid having either too many workers during slow periods or not enough during peak work loads.

Hired workers as a share of all agricultural workers varied from 54 percent in the United Kingdom to 6 percent in Luxembourg in 1970, while in 1950 the figures were 65 percent in the United Kingdom and 9 percent in Greece (table 3). It is difficult to tell which country had the highest percentage of unpaid family workers since several countries put unpaid family workers and persons working on own account in the same category. However, of those countries separating the two categories, Luxembourg had the highest percentage of unpaid family workers--62 percent in 1970.

The share of women in agriculture in 1970 varied widely by country, from 10 percent in Ireland to over half in Germany and Austria (table 4). The general trend has been one of increasing percentages of women to men employed in agriculture (this has also been the trend in nonagricultural employment). The number of women employed is a factor of a country's individual culture. It is also influenced by the number of households receiving only part of their income from agriculture. In Germany, for example, many part-time farmers divide their efforts between agriculture and other employment. Thus, the wife and children farm while the husband works elsewhere.

#### AGRICULTURAL OUTPUT

##### Productivity

During the 1950's and 1960's, agricultural output per person increased tremendously due to technological innovations in agriculture. Crop yields and livestock output multiplied while the agricultural labor force declined. However, the value of agricultural output and income was still not catching up with the value of nonagricultural income, which began at a higher level. In some cases the disparity actually grew rather than declined.

The severity of the productivity or income problem in West European agriculture, except in a few countries, is closely related to when the Industrial Revolution reached each country and how much it affected the agricultural sector. During the 19th century labor was abundant in Europe and, for most countries, capital and arable land were not. The population growth during the 19th century was more than could be absorbed by the growing industries and thus rural areas had to accept the remainder (except for emigration). The excess population could at least survive on the farms, while it could not in the city. This led to disguised unemployment in practically all countries (66).

Great Britain was the primary exception to this trend. Due to circumstances that will be explained later, the population supported by agriculture was smaller in Britain than on the continent when the Industrial Revolution began. With larger farms and wealthier owners than on the continent more capital was available for investment in the new technology produced by the Industrial Revolution. In later years, the agricultural labor force continued to decrease and the importance of producing on optimum land was stressed. The result is that agricultural productivity in the United Kingdom is as high as or possibly higher than productivity in other economic sectors (61).

Table 5 shows gross agricultural product per agricultural worker (a), nonagricultural gross domestic product per nonagricultural worker employed (b), and (a) as a percentage of (b). These figures were calculated from data in tables 1 and 2.

Table 3--Agricultural employment 1/ by type of worker,  
1950, 1960, and 1970

Country and type of worker	1950	1960	1970	Country and type of worker	1950	1960	1970
	Percent				Percent		
Austria:				Luxembourg:			
Wage earners and salaried employees	21	16	9	Wage earners and salaried employees	2/15	9	6
Employers and persons working on own account	29	36		Employers and persons working on own account	2/31	36	32
Unpaid family workers	50	48	[91]	Unpaid family workers	2/54	55	62
Belgium:				Netherlands:			
Wage earners and salaried employees	2/11	3/12	8	Wage earners and salaried employees	25	26	24
Employers and persons working on own account	2/55	3/66	68	Employers and persons working on own account	[75	54	
Unpaid family workers	2/44	3/22	24	Unpaid family workers		20	[76
Denmark:				Norway:			
Wage earners and salaried employees	42	41	23	Wage earners and salaried employees	17	18	12
Employers and persons working on own account	31	[59	53	Employers and persons working on own account	46	64	75
Unpaid family workers	17		24	Unpaid family workers	37	18	13
Finland:				Portugal:			
Wage earners and salaried employees	22	20	18	Wage earners and salaried employees	25	27	6/24
Employers and persons working on own account	32			Employers and persons working on own account	53	61	6/61
Unpaid family workers	46	[60	[82	Unpaid family workers	22	12	6/45
France:				Spain:			
Wage earners and salaried employees	4/47	22	20	Wage earners and salaried employees	48	40	31
Employers and persons working on own account	4/53	[78	[80	Employers and persons working on own account	32		
Unpaid family workers				Unpaid family workers	20	[60	[69
Germany:				Sweden:			
Wage earners and salaried employees	20	15	12	Wage earners and salaried employees	30	34	36
Employers and persons working on own account	26	32	34	Employers and persons working on own account	55	52	45
Unpaid family workers	54	53	54	Unpaid family workers	15	14	19
Greece:				Switzerland:			
Wage earners and salaried employees	9	3/8	n.a.	Wage earners and salaried employees	n.a.	50	7/48
Employers and persons working on own account	59	3/41	n.a.	Employers and persons working on own account	n.a.		7/46
Unpaid family workers	32	3/51	n.a.	Unpaid family workers	n.a.	[50	7/41
Ireland:				United Kingdom:			
Wage earners and salaried employees	18	3/15	12	Wage earners and salaried employees	65	62	54
Employers and persons working on own account	48	3/57	[88	Employers and persons working on own account			
Unpaid family workers	34	3/28		Unpaid family workers	[35	[38	[46
Italy:							
Wage earners and salaried employees	5/33	26	33				
Employers and persons working on own account	5/31	37	43				
Unpaid family workers	5/36	37	24				

n.a. = not available.

1/ Includes forestry, hunting, and fishing. 2/ 1947. 3/ 1961. 4/ 1946. 5/ 1951. 6/ 1968. 7/ 1969.

Sources: (17), (24), (48).

Table 4--Civilian and agricultural employment by sex,  
1950, 1960, and 1970

Country and employment category	1950	1960	1970	Country and employment category	1950	1960	1970
		Percent				Percent	
Austria:				Luxembourg:			
Total				Total			
Men. . . . .	1/61	2/60	61	Men. . . . .	3/71	73	4/73
Women. . . . .	1/39	2/40	39	Women. . . . .	3/29	27	4/27
Agriculture				Agriculture			
Men. . . . .	1/48	2/47	8/48	Men. . . . .	3/59	67	4/64
Women. . . . .	1/52	2/53	8/52	Women. . . . .	3/41	33	4/36
Belgium:				Netherlands:			
Total				Total			
Men. . . . .	3/76	69	67	Men. . . . .	3/76	77	74
Women. . . . .	3/24	31	33	Women. . . . .	3/24	23	26
Agriculture				Agriculture			
Men. . . . .	3/86	72	76	Men. . . . .	3/77	90	74
Women. . . . .	3/14	28	24	Women. . . . .	3/23	10	26
Denmark:				Norway:			
Total				Total			
Men. . . . .	68	69	61	Men. . . . .	76	71	69
Women. . . . .	32	31	39	Women. . . . .	24	29	31
Agriculture				Agriculture			
Men. . . . .	88	91	5/87	Men. . . . .	93	77	77
Women. . . . .	12	9	2/13	Women. . . . .	7	23	23
Finland:				Portugal:			
Total				Total			
Men. . . . .	59	55	55	Men. . . . .	76	82	76
Women. . . . .	41	45	45	Women. . . . .	24	18	24
Agriculture				Agriculture			
Men. . . . .	60	51	56	Men. . . . .	85	n.a.	n.a.
Women. . . . .	40	49	44	Women. . . . .	15	n.a.	n.a.
France:				Spain:			
Total				Total			
Men. . . . .	5/62	7/66	8/55	Men. . . . .	84	80	n.a.
Women. . . . .	6/38	7/34	8/45	Women. . . . .	16	20	n.a.
Agriculture				Agriculture			
Men. . . . .	6/56	7/67	8/55	Men. . . . .	92	88	n.a.
Women. . . . .	6/44	7/33	8/45	Women. . . . .	8	12	n.a.
Germany:				SSweden:			
Total				Total			
Men. . . . .	64	62	64	Men. . . . .	78	72	61
Women. . . . .	36	38	36	Women. . . . .	22	28	39
Agriculture				Agriculture			
Men. . . . .	45	46	47	Men. . . . .	96	91	77
Women. . . . .	55	54	53	Women. . . . .	4	9	23
Greece:				Switzerland:			
Total				Total			
Men. . . . .	1/82	2/67	n.a.	Men. . . . .	67	70	65
Women. . . . .	1/18	2/33	n.a.	Women. . . . .	33	30	35
Agriculture				Agriculture			
Men. . . . .	1/85	2/60	n.a.	Men. . . . .	96	92	59
Women. . . . .	1/15	2/40	n.a.	Women. . . . .	4	8	41
Ireland:				United Kingdom:			
Total				Total			
Men. . . . .	1/74	2/74	4/74	Men. . . . .	1/69	66	63
Women. . . . .	1/26	2/26	4/26	Women. . . . .	1/31	34	37
Agriculture				Agriculture			
Men. . . . .	1/87	2/89	4/90	Men. . . . .	1/90	88	86
Women. . . . .	1/13	2/11	4/10	Women. . . . .	1/10	12	14
Italy:							
Total							
Men. . . . .	1/75	70	73				
Women. . . . .	1/25	30	27				
Agriculture							
Men. . . . .	1/75	67	69				
Women. . . . .	1/25	33	31				

n.a. = not available.

1/ 1951. 2/ 1961. 3/ 1947. 4/ 1966. 5/ 1971. 6/ 1946. 7/ 1962. 8/ 1968.

Sources: (19), (2), (23), (24), (48), (60).

Table 5--Gross agricultural product per agricultural worker, nonagricultural gross domestic product per nonagricultural worker 1/ employed, and ratios for 1950, 1960, and 1970

Country and year	GAP per agricultural employee	GDP per nonagricultural employee 2/	Ratio of column 1 to column 2
	Dollars		
Austria:			
1950 . . . . .	360	830	43
1960 . . . . .	780	1,960	40
1970 . . . . .	1,700	5,500	31
Belgium:			
1950 . . . . .	n.a.	n.a.	n.a.
1960 . . . . .	2,805	2,970	94
1970 . . . . .	5,525	5,945	93
Denmark:			
1950 . . . . .	1,520	n.a.	n.a.
1960 . . . . .	1,845	2,595	71
1970 . . . . .	4,415	5,790	76
Finland:			
1950 . . . . .	n.a.	n.a.	n.a.
1960 . . . . .	1,145	2,635	43
1970 . . . . .	2,675	4,010	67
France:			
1950 . . . . .	535	1,335	40
1960 . . . . .	1,390	3,830	36
1970 . . . . .	3,125	7,970	39
Germany:			
1950 . . . . .	480	1,360	35
1960 . . . . .	1,175	2,995	39
1970 . . . . .	2,450	7,395	33
Greece:			
1950 . . . . .	225	460	49
1960 . . . . .	395	1,575	25
1970 . . . . .	805	2,835	28
Italy:			
1950 . . . . .	420	1,130	37
1960 . . . . .	645	1,995	32
1970 . . . . .	2,335	4,925	47
Ireland:			
1950 . . . . .	n.a.	n.a.	n.a.
1960 . . . . .	1,025	2,895	35
1970 . . . . .	1,720	3,010	57
Luxembourg:			
1950 . . . . .	855	3,100	28
1960 . . . . .	1,820	3,840	47
1970 . . . . .	3,125	6,170	51

See footnotes at end of table.

Continued

Table 5--Gross agricultural product per agricultural worker, nonagricultural gross domestic product per nonagricultural worker <sup>1/</sup> employed, and ratios for 1950, 1960, and 1970--Continued

Country and year	GAP per agricultural employee	GDP per nonagricultural employee <sup>2/</sup>	Ratio of column 1 to column 2
	----- Dollars -----		
Netherlands:			
1950 . . . . .	1,165	1,175	99
1960 . . . . .	2,320	2,560	91
1970 . . . . .	5,150	6,210	83
Norway:			
1950 . . . . .	1,015	1,890	54
1960 . . . . .	1,460	3,355	44
1970 . . . . .	2,885	6,855	42
Portugal:			
1950 . . . . .	380	525	72
1960 . . . . .	435	980	44
1970 . . . . .	970	2,270	43
Spain:			
1950 . . . . .	n.a.	n.a.	n.a.
1960 . . . . .	465	1,310	35
1970 . . . . .	1,065	2,600	44
Sweden:			
1950 . . . . .	740	1,975	37
1960 . . . . .	1,940	3,755	52
1970 . . . . .	4,205	8,835	48
Switzerland:			
1950 . . . . .	n.a.	n.a.	n.a.
1960 . . . . .	n.a.	n.a.	n.a.
1970 . . . . .	5,550	7,835	71
United Kingdom:			
1950 . . . . .	1,535	1,400	110
1960 . . . . .	2,490	2,610	95
1970 . . . . .	4,245	4,090	104

n.a. = not available.

<sup>1/</sup> Excludes military.

<sup>2/</sup> Average calculated after subtraction of GAP from total GDP.

Sources: Tables 1 and 2.

Data presented in table 5 should be used as a guideline or indication of what changes have occurred and what type of problem is present. One should be most careful in comparing the data among countries, because the national prices used to compute GAP and GDP differ among countries and official exchange rates were used which do not always accurately reflect purchasing power. Also, in some countries, for instance West Germany, large numbers of farmers are only part-time farmers. They derive much of their income from nonagricultural activities, so that their total income is much higher than the data would indicate.

Switzerland had the highest GAP per agricultural worker (\$5,550) and Greece the lowest (\$805) in 1970. Only in the United Kingdom was GAP per agricultural worker higher than GDP per nonagricultural worker. In 1950 the productivity of agriculture was 10 percent higher than that of other areas, in 1960 it dropped below, and by 1970 it was 4 percent higher than in nonagricultural activities.

Other countries with similar productivity in the agricultural and nonagricultural sectors were Belgium, Denmark, and the Netherlands. In Belgium per capita GAP as a percentage of per capita GDP declined slightly between 1960 and 1970 to 93 percent. The gap between per capita GAP and per capita GDP decreased in Denmark between 1960 and 1970, while in the Netherlands, between 1950 and 1970 the situation was reversed.

The productivity gap between agricultural and nonagricultural sectors is quite pronounced in West Germany, France, Austria, and Greece, where the ratio of per capita GAP to per capita GDP is about 1 to 3. The gap is somewhat less severe in the remainder of Scandinavia, southern Europe, Luxembourg, and Ireland. The gap is widening in Austria, Norway, and Portugal.

It is not entirely clear why West Germany, France, and Austria have low ratios of agricultural productivity to nonagricultural productivity while Belgium, the Netherlands, and Denmark have high ratios. The countries with most severe problems have all followed highly protectionist government policies which encourage farmers to remain on the land through price measures and subsidies. In addition, Germany and Austria suffer from fragmentation and small farm size, while France is beset with regional contrasts which make policy difficult to legislate. Finally, innovation is not as readily accepted in some countries as in others.

On the other hand, farming in Denmark, Belgium, and the Netherlands has been more productive. Danish farming has historically been efficient and well managed. Labor is economized--there is little or no underemployment since most farms are large enough to provide full employment. In Belgium, industrialization began earlier than in the other countries on the continent. Agriculture here, as in the Netherlands, has had to be intensive to counteract the problem of high population density. The Dutch have benefited from agricultural training and maintain excellent schools and well trained extension workers.

Climate and geography are the primary hinderances to agricultural productivity in most of Scandinavia. Winters are long and severe, summers are short, soils are poor and drainage is a problem. Consequently, many Scandinavians engage in more profitable work. The Finns stress forestry, while the Norwegians have turned to the maritime and fishing industries. Sweden has a climate more favorable to agriculture and, in the south, farms compare favorably with those in Denmark.

Southern Europe is also plagued with adverse climatic conditions (dry, hot weather), except in northern Italy. But probably a greater obstacle to agricultural progress has been the low level of industrial and economic development which has slowed the labor flow from the farm.

## Value

Value of agricultural output by commodity share follows a definite regional trend in Western Europe due to the differences in climate, soils, and economic atmosphere among the countries. 3/ The northern and central areas depend heavily on livestock output while southern regions stress crop production. The cool, damp air and mountainous terrain of the north are conducive to livestock production. On the other hand, the south's warm, semitropical climate and longer growing season make fruit, vegetable, and grain production much more profitable. In poorer regions the farmer's choice of output may be influenced by his need to acquire income quickly or secure low-cost nutrition. Such regions are unlikely to produce livestock, which can be considered a secondary product since it requires forages, feedgrains, and protein supplements to produce the meat or other product for human consumption.

In current prices the value of agricultural output increased for all the countries of Western Europe during 1950-70 (table 6). The relative shares of the value of agricultural output changed little. Agricultural output tended to increase the most in countries which were livestock-based and, in general, economically prosperous. Output value more than tripled in France, West Germany, and the Netherlands and doubled in Belgium, Finland, Italy, and Norway during the past two decades.

Approximately three-fourths of Scandinavian output originates in the livestock sector. In Denmark the figure increased somewhat to 89 percent in 1970, the largest percentage of any country in Western Europe. Milk is the primary source of income in Norway and Finland, accounting for 52 percent of total livestock value in Norway and percent in Finland in 1970. Animals and meat are more important in Sweden and Denmark, providing 58 and 72 percent of the total livestock product in 1970.

The situation in Austria and Switzerland is similar to that in Scandinavia, with three-fourths of total value originating in the livestock sector. However, the dairy sector is not as crucial. Meat and animals account for half of the total livestock value in both countries.

Livestock products are the predominant source of income for farmers in the United Kingdom and Ireland. Ireland draws around 80 percent of total agricultural value from livestock compared with 70 percent for the United Kingdom. Animals and meat account for a greater share of total animal products than does milk. In the United Kingdom between 1950 and 1970, animals and meat as a share of total animal products rose from 35 to 48 percent and milk as a share declined from 43 to 31 percent. Grains and horticulture each account for a little more than one-third of the total value of crop output in the United Kingdom.

West Germany, Belgium, Luxembourg, and the Netherlands follow a pattern similar to that in the United Kingdom. They derive much of their income from livestock. Meat and animals together outweigh the value derived from dairying. The Benelux countries differ from other northern countries in that the majority of plant value stems from vegetables and fruit rather than grains and tubers.

France divides the northern and southern parts of Western Europe in terms of the importance of animals and plants in overall agricultural value. About 60 percent of total value is animal, but grains are quite important--France is the major grain producer in Western Europe. Grain's share in the total plant value increased from 25 percent in 1950 to 31 percent in 1970. Vegetables, fruits, and industrial plants together account for about half of total plant value.

3/ There is a certain amount of double-counting in the figures for value of agricultural output, since grains and other feeds fed to livestock are not completely discounted in the livestock value figures.

Table 6--Value of agricultural output 1/ and distribution by commodity groups, by country, selected years, 1950-70

Country and commodity	1950		1955		1960		1965		1970	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
	mil. dol.	Pct.	mil. dol.	Pct.	mil. dol.	Pct.	mil. dol.	Pct.	mil. dol.	Pct.
<b>Austria:</b>										
Total plant. . . . .	146.5	39	203.5	34	241.2	32	290.3	30	324.6	28
Grains . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	46.7	16	78.3	24
Sugarbeets and potatoes . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	55.2	19	49.5	15
Vegetables and fruit . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	155.0	53	183.2	57
Other . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	33.4	12	13.6	4
Total animal . . . . .	230.2	61	390.6	66	516.4	68	670.7	70	815.3	72
Meat and animals . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	338.5	50	431.5	53
Milk . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	231.4	35	251.1	31
Eggs . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	45.5	7	50.2	6
Other . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	55.3	8	82.5	10
Grand total 3/ . . . . .	376.7	100	594.1	100	757.6	100	961.0	100	1,139.9	100
<b>Belgium:</b>										
Total plant. . . . .	262.2	36	324.0	36	344.0	35	481.7	34	548.9	30
Grains . . . . .	44.0	17	69.8	22	87.5	25	88.2	18	84.9	15
Sugarbeets and potatoes . . . . .	72.3	28	71.8	22	72.0	21	102.7	21	109.3	20
Vegetables and fruit . . . . .	125.1	47	155.4	48	154.8	45	285.7	59	263.3	48
and industrial plants . . . . .	20.8	8	27.0	8	29.7	9	5.1	2	91.4	17
Other . . . . .										
Total animal . . . . .	475.3	64	577.5	64	647.5	65	948.9	66	1,278.2	70
Meat and animals . . . . .	236.0	50	289.7	50	337.8	52	516.8	54	858.7	67
Milk . . . . .	171.0	36	221.7	38	243.6	38	354.3	37	335.1	26
Eggs . . . . .	56.7	12	66.1	12	66.1	10	77.4	8	84.5	7
Other . . . . .	11.6	2	n.a.	n.a.	n.a.	n.a.	.4	1	.4	---
Grand total 3/ . . . . .	737.5	100	901.5	100	991.5	100	1,430.6	100	1,827.7	100
<b>Denmark:</b>										
Total plant. . . . .	108.7	14	87.8	9	116.3	11	131.9	10	149.9	11
Grains . . . . .	48.4	45	29.1	33	53.1	46	67.9	51	72.2	48
Other . . . . .	60.3	55	58.7	67	63.2	54	64.0	49	77.7	52
Total animal . . . . .	643.4	86	854.6	91	954.5	89	1,167.5	90	1,173.1	89
Meat and animals . . . . .	395.1	61	573.8	67	677.7	71	817.0	70	840.2	72
Milk . . . . .	248.3	39	280.8	33	276.8	29	350.5	30	332.9	28
Grand total 3/ . . . . .	752.1	100	942.4	100	1,070.8	100	1,299.4	100	1,323.0	100
<b>Finland:</b>										
Total plant. . . . .	n.a.	n.a.	54.6	12	90.5	16	140.4	17	159.8	16
Grains . . . . .	n.a.	n.a.	38.2	63	56.8	63	99.0	71	120.1	75
Sugarbeets and potatoes . . . . .	n.a.	n.a.	18.8	34	27.6	30	38.1	27	34.3	21
Other . . . . .	n.a.	n.a.	1.6	3	6.1	7	3.3	2	5.4	4
Total animals . . . . .	n.a.	n.a.	382.6	88	465.9	84	672.6	83	816.0	84
Meat and animals . . . . .	n.a.	n.a.	94.2	25	102.7	22	158.0	23	310.1	38
Milk . . . . .	n.a.	n.a.	268.0	70	331.0	71	472.6	70	447.3	55
Other . . . . .	n.a.	n.a.	20.4	5	32.2	7	42.0	7	58.6	7
Grand total 3/ . . . . .	n.a.	n.a.	437.2	100	556.4	100	813.0	100	975.8	100
<b>France:</b>										
Total plant. . . . .	1,438.8	41	1,918.4	38	2,942.2	40	3,993.6	32	5,000.0	42
Grains . . . . .	364.3	25	539.8	28	876.9	30	1,281.0	32	1,642.1	31
Sugarbeets and potatoes . . . . .	214.3	15	222.4	12	422.2	14	433.1	11	510.5	10
Vegetables and fruits . . . . .	714.3	50	1,059.2	55	1,560.0	53	2,112.9	53	2,860.5	54
and industrial plants . . . . .	145.9	10	97.0	5	83.1	3	166.6	4	306.7	4
Other . . . . .										
Total animals . . . . .	2,081.6	59	2,085.7	62	4,423.3	60	6,238.0	61	7,202.4	58
Meat and animals . . . . .	1,825.5	59	1,846.7	60	2,721.4	62	3,896.9	62	4,562.9	63
Milk . . . . .	663.2	32	953.1	30	1,411.6	32	1,922.6	31	2,218.7	31
Eggs . . . . .	173.4	8	265.3	9	280.4	6	352.2	6	374.9	5
Other . . . . .	19.5	1	20.4	1	9.9	---	66.3	1	45.8	1
Grand total 3/ . . . . .	3,520.4	100	5,004.1	100	7,365.5	100	10,231.6	100	12,522.4	100

See footnotes at end of table.

Continued



Table 6--Value of agricultural output 1/ and distribution by commodity groups, by country, selected years, 1950-70 --Continued

Country and commodity	1950		1955		1960		1965		1970	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.
<b>Germany:</b>										
Total plant. . . . .	222.9	29	1,289.3	29	1,571.0	27	2,307.7	29	3,190.3	31
Grains . . . . .	289.3	31	472.6	37	547.1	35	577.0	25	675.6	21
Sugarbeets and potatoes . . . . .	285.7	31	429.5	33	445.0	28	452.0	20	600.5	19
Vegetables and fruits . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
and industrial plants . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	839.5	36	1,306.4	41
Other . . . . .	347.9	38	387.2	30	568.9	37	439.2	19	607.7	19
Total animal . . . . .	2,255.2	71	3,111.7	71	4,197.6	73	5,771.0	71	7,222.5	69
Meat and animals . . . . .	1,179.8	52	1,786.7	57	2,332.4	56	3,241.0	56	4,298.6	60
Milk . . . . .	759.0	34	1,090.7	35	1,430.2	34	1,959.0	33	2,286.1	32
Eggs . . . . .	162.0	7	254.0	8	342.6	8	554.0	10	610.8	8
Other . . . . .	154.4	7	n.a.	n.a.	92.4	2	17.0	1	26.9	0
Grand total 3/ . . . . .	3,178.1	100	4,420.0	100	5,768.6	100	8,078.7	100	10,412.6	100
<b>Greece: 4/ 5/</b>										
Total plant. . . . .	n.a.	n.a.	712.9	75	677.1	72	947.2	73	n.a.	n.a.
Cereals . . . . .	n.a.	n.a.	218.5	31	207.2	30	252.7	27	n.a.	n.a.
Vegetables and fruit . . . . .	n.a.	n.a.	309.9	43	287.3	42	435.6	46	n.a.	n.a.
Fodder . . . . .	n.a.	n.a.	72.7	10	78.3	12	107.3	11	n.a.	n.a.
Industrial crops . . . . .	n.a.	n.a.	97.5	14	85.0	13	132.6	14	n.a.	n.a.
Other . . . . .	n.a.	n.a.	16.5	2	20.1	3	19.0	2	n.a.	n.a.
Total animal . . . . .	n.a.	n.a.	243.4	25	266.9	28	351.5	27	n.a.	n.a.
Meat and animals . . . . .	n.a.	n.a.	100.4	41	109.3	40	158.7	45	n.a.	n.a.
Milk . . . . .	n.a.	n.a.	74.3	30	82.4	31	101.8	29	n.a.	n.a.
Eggs . . . . .	n.a.	n.a.	28.4	12	31.1	12	48.1	14	n.a.	n.a.
Other . . . . .	n.a.	n.a.	40.8	17	44.1	17	42.9	12	n.a.	n.a.
Grand total 3/ . . . . .	n.a.	n.a.	956.8	100	944.0	100	1,298.7	100	n.a.	n.a.
<b>Ireland:</b>										
Total plant. . . . .	86.9	23	123.4	24	114.4	22	109.4	18	157.7	21
Grains . . . . .	28.8	33	44.1	36	51.2	45	44.5	41	66.5	44
Sugarbeets and potatoes . . . . .	33.5	39	40.1	32	33.1	29	45.7	42	46.3	29
Other . . . . .	24.6	28	39.2	32	29.2	26	19.5	17	44.9	27
Total animal . . . . .	285.9	77	383.0	76	421.5	78	515.2	82	786.5	80
Meat and animals . . . . .	1,092.2	52	1,650.0	43	2,259.1	65	3,246.6	63	5,666.7	72
Milk . . . . .	80.0	28	103.6	27	104.4	26	152.3	30	192.0	24
Eggs . . . . .	36.0	13	36.4	10	26.9	7	29.5	6	22.8	3
Other . . . . .	20.7	7	78.0	20	5.3	2	8.8	1	5.0	1
Grand total 3/ . . . . .	372.8	100	506.4	100	535.9	100	625.0	100	745.6	100
<b>Italy:</b>										
Total plant. . . . .	2,413.4	60	3,301.3	67	3,345.6	61	5,281.6	64	6,267.2	62
Grains . . . . .	892.8	37	1,256.5	38	889.0	27	1,267.7	24	1,322.3	21
Sugarbeets and potatoes . . . . .	153.6	6	230.3	7	224.8	7	364.8	7	386.7	6
Vegetables and fruit . . . . .	1,201.6	50	1,641.3	50	2,053.9	61	3,381.2	64	3,818.1	61
Other . . . . .	165.4	7	173.2	5	177.9	5	267.9	5	740.1	12
Total animals . . . . .	1,587.8	40	1,628.3	33	2,108.6	39	2,983.5	36	3,871.5	38
Meat and animals . . . . .	800.0	50	755.0	46	1,131.9	54	1,675.9	56	2,388.5	62
Milk . . . . .	505.1	32	580.0	36	674.6	32	914.8	31	1,079.3	28
Eggs . . . . .	246.6	16	267.8	16	279.7	13	371.6	12	386.8	10
Other . . . . .	36.1	2	25.5	2	22.4	1	21.2	1	17.0	0
Grand total 3/ . . . . .	4,001.2	100	4,929.6	100	5,454.2	100	8,265.1	100	10,138.7	100
<b>Luxembourg:</b>										
Total plant. . . . .	n.a.	n.a.	4.9	12	7.5	18	13.7	24	13.7	22
Grains . . . . .	n.a.	n.a.	3.4	69	5.5	73	5.5	40	4.6	32
Potatoes . . . . .	n.a.	n.a.	1.5	31	2.0	27	1.8	13	1.8	13
Vegetables and fruit . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.4	47	9.5	55
Total animal . . . . .	n.a.	n.a.	34.6	88	34.7	82	43.6	76	42.5	78
Meat and animals . . . . .	n.a.	n.a.	17.9	52	17.6	51	22.8	52	23.9	50
Milk . . . . .	n.a.	n.a.	14.3	41	15.0	43	18.1	42	20.8	44
Eggs . . . . .	n.a.	n.a.	1.8	5	2.0	6	2.7	6	2.8	6
Other . . . . .	n.a.	n.a.	.6	2	.1	n.a.	n.a.	n.a.	n.a.	n.a.
Grand total 3/ . . . . .	n.a.	n.a.	39.5	100	42.2	100	57.3	100	61.2	100

See footnotes at end of table

Continued

Table 6-- Value of agricultural output 1/ and distribution by commodity groups, by country, selected years, 1950-70--Continued

Country and commodity	1950		1955		1960		1965		1970	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.
<b>Netherlands:</b>										
Total plant . . . . .	292.9	32	425.8	35	607.6	37	802.8	34	1,062.5	33
Grains . . . . .	41.9	14	60.8	15	83.7	14	109.7	14	111.3	10
Sugarbeets and potatoes . . . . .	84.7	29	91.3	21	128.4	21	170.5	21	246.1	23
Vegetables and fruit . . . . .	167.1	57	273.7	64	395.5	65	349.7	43	409.4	39
and industrial plants . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	172.9	22	295.5	28
Other . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total animal . . . . .	623.2	68	806.3	65	1,023.4	63	1,561.4	66	2,204.7	67
Meat and animals . . . . .	233.2	37	357.1	44	488.4	48	748.3	47	1,099.7	50
Milk . . . . .	279.2	45	320.5	40	372.9	36	558.9	36	794.7	36
Eggs . . . . .	68.9	11	128.7	16	146.1	14	136.1	9	100.0	5
Other . . . . .	41.9	7	n.a.	n.a.	16.0	2	118.1	8	210.3	9
Grand total 3/ . . . . .	916.1	100	1,232.1	100	1,631.0	100	2,364.2	100	3,267.2	100
<b>Norway:</b>										
Total plant . . . . .	n.a.	n.a.	72.0	28	92.8	27	119.9	24	184.7	28
Grains . . . . .	n.a.	n.a.	19.2	27	32.5	35	39.4	33	77.6	42
Potatoes . . . . .	n.a.	n.a.	14.6	20	16.5	18	24.6	18	26.5	14
Vegetables and fruit . . . . .	n.a.	n.a.	37.7	52	43.3	46	58.5	49	80.1	44
and industrial plants . . . . .	n.a.	n.a.	.5	1	.5	1	.4	n.a.	.5	--
Other . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total animal . . . . .	n.a.	n.a.	186.0	72	252.3	73	305.0	76	463.2	72
Meat and animals . . . . .	n.a.	n.a.	54.0	29	66.8	26	94.3	25	152.8	33
Milk . . . . .	n.a.	n.a.	111.0	59	155.9	62	196.1	52	239.7	52
Eggs . . . . .	n.a.	n.a.	16.3	9	23.7	9	27.5	8	37.2	8
Other . . . . .	n.a.	n.a.	4.7	3	5.9	3	57.1	15	33.4	7
Grand total 3/ . . . . .	n.a.	n.a.	258.0	100	345.1	100	494.9	100	647.5	100
<b>Portugal: 6/</b>										
Total plant . . . . .	176.7	49	172.5	44	174.4	54	217.2	48	248.5	44
Grains . . . . .	89.8	51	75.2	44	69.2	39	83.5	38	51.7	21
Pulses . . . . .	46.7	26	38.8	22	35.9	21	46.8	22	60.3	24
Vegetables and fruit . . . . .	38.1	22	57.0	33	68.1	39	81.9	38	126.2	51
Other . . . . .	2.1	1	1.5	1	1.2	1	5.0	2	10.3	4
Total animal . . . . .	180.4	51	221.6	56	148.8	46	227.8	52	300.9	56
Meat and animals . . . . .	41.2	23	77.1	35	100.3	67	166.5	73	228.0	74
Milk . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Eggs . . . . .	28.1	16	31.6	14	37.6	25	43.5	19	59.5	19
Other . . . . .	111.1	61	112.9	51	10.9	8	17.8	9	22.4	7
Grand total . . . . .	357.1	100	394.1	100	323.2	100	445.0	100	549.4	100
<b>Spain: 7/</b>										
Total plant . . . . .	n.a.	n.a.	n.a.	n.a.	1,142.0	55	1,545.2	49	1,808.6	49
Grains . . . . .	n.a.	n.a.	n.a.	n.a.	352.4	31	508.7	33	600.3	33
Vegetables and fruit . . . . .	n.a.	n.a.	n.a.	n.a.	735.5	64	971.2	63	1,122.3	62
Pulses . . . . .	n.a.	n.a.	n.a.	n.a.	54.1	5	65.3	4	71.2	5
Other . . . . .	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	14.8	n.a.
Total animal . . . . .	n.a.	n.a.	n.a.	n.a.	917.6	45	1,626.3	51	1,880.5	51
Meat and animals . . . . .	n.a.	n.a.	n.a.	n.a.	537.4	58	1,023.8	62	1,202.7	64
Milk . . . . .	n.a.	n.a.	n.a.	n.a.	197.3	22	286.4	18	422.8	22
Eggs . . . . .	n.a.	n.a.	n.a.	n.a.	157.7	17	291.1	18	240.1	13
Other . . . . .	n.a.	n.a.	n.a.	n.a.	25.2	3	25.0	2	14.9	1
Grand total . . . . .	n.a.	n.a.	n.a.	n.a.	2,049.6	100	3,171.5	100	3,689.1	100
<b>Sweden: 8/</b>										
Total plant . . . . .	n.a.	n.a.	n.a.	n.a.	239.3	25	305.0	26	362.6	29
Grains . . . . .	n.a.	n.a.	n.a.	n.a.	170.2	71	216.2	71	266.3	73
Sugarbeets and potatoes . . . . .	n.a.	n.a.	n.a.	n.a.	64.6	27	83.0	27	86.9	24
Vegetables . . . . .	n.a.	n.a.	n.a.	n.a.	4.2	2	5.6	2	n.a.	n.a.
Other . . . . .	n.a.	n.a.	n.a.	n.a.	.3	n.a.	.2	n.a.	9.4	3
Total animal . . . . .	n.a.	n.a.	n.a.	n.a.	729.2	75	882.8	74	864.	71
Meat and animals . . . . .	n.a.	n.a.	n.a.	n.a.	367.8	50	411.0	47	517.3	58
Milk . . . . .	n.a.	n.a.	n.a.	n.a.	328.4	44	350.4	40	338.1	38
Eggs and poultry . . . . .	n.a.	n.a.	n.a.	n.a.	34.9	5	39.4	4	38.6	4
Other . . . . .	n.a.	n.a.	n.a.	n.a.	8.1	1	82.0	9	n.a.	n.a.
Grand total 3/ . . . . .	n.a.	n.a.	n.a.	n.a.	968.5	100	1,187.8	100	1,256.7	100

See footnotes at end of table

Continued

Table 6--Value of agricultural output 1/ and distribution by commodity groups, by country, selected years, 1950-70--Continued

Country and commodity	1950		1955		1960		1965		1970	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.	mil. dol.	2/ Pct.
<b>Switzerland:</b>										
Total plant . . . . .	142.5	29	150.9	28	181.6	28	199.8	26	245.2	25
Grains . . . . .	30.5	22	41.8	28	53.6	30	55.1	28	51.0	21
Sugarbeets and potatoes . . . . .	24.2	17	20.1	13	25.8	14	28.5	14	35.5	14
Vegetables . . . . .	82.0	58	82.9	55	97.7	54	110.5	55	148.0	60
Other . . . . .	5.8	4	6.1	4	4.5	2	5.7	3	10.7	4
Total animal . . . . .	353.3	71	387.4	72	456.9	72	579.4	74	727.6	75
Meat and animal . . . . .	144.3	41	161.9	42	200.7	44	260.2	45	374.4	52
Milk . . . . .	186.1	53	203.6	53	230.4	50	287.5	49	322.9	44
Eggs . . . . .	20.6	6	20.8	5	20.9	5	22.8	4	25.0	3
Other . . . . .	2.3	0	1.1	0	4.9	1	8.9	2	5.3	1
Grand total 3/ . . . . .	495.8	100	538.3	100	638.5	100	779.2	100	972.8	100
<b>United Kingdom . . . . .</b>										
Total plant . . . . .	817.6	31	1,107.4	30	1,171.8	29	1,461.7	30	1,683.7	30
Grains . . . . .	245.0	30	383.6	35	448.0	38	589.4	40	632.5	38
Horticulture . . . . .	267.4	33	397.6	36	396.2	34	516.7	35	660.0	39
Other . . . . .	305.2	37	326.2	29	327.6	28	355.6	25	391.2	23
Total animal . . . . .	1,836.8	69	2,591.4	70	2,920.4	71	3,410.4	70	3,895.2	70
Meat and animal . . . . .	638.3	35	1,080.8	41	1,205.4	41	1,540.0	45	1,833.6	48
Milk . . . . .	788.2	43	949.2	37	981.4	34	1,118.6	32	1,226.4	31
Eggs . . . . .	301.0	16	401.8	16	476.0	16	469.0	14	477.6	12
Poultry . . . . .	77.0	4	110.6	4	205.6	7	229.6	7	326.4	8
Other . . . . .	32.2	2	49.0	2	51.8	2	53.2	2	31.2	1
Grand total 3/ . . . . .	2,654.4	100	3,698.8	100	4,092.2	100	4,872.1	100	5,578.9	100

n.a. = not available.

1/ Essentially, the value of marketed production, although varying adjustments are made in each country. Thus grain or other feeds grown and fed on the farm would not be counted while marketed produce which is then fed would be included. Values are at current prices and exchange rates.

2/ The value of total plant and animal production as a percentage of total value; other items as a percentage of total plant or animal products value.

3/ Total of the value of animal and plant output. EC accounts adjust this figure by deducting certain subsidies and making certain other adjustments.

4/ Greek figures are not comparable with the other figures in this table. They are on a basis of constant 1958 prices and include the value of nonmarketed production.

5/ Excludes the value of changes in livestock numbers.

6/ Data given under 1970 are actually for 1969.

7/ Data given under 1960 are actually for 1962; those given under 1965 are for 1966.

8/ Data given under 1960 are actually for 1962; those given under 1965 are for 1966.

Sources: (30), (9), (11), (22), (26), (12), (25), (7), (60).

In the southern part of Western Europe, the data reveal a different structure. Plant output value predominates in Italy and Greece and output value is roughly divided between plants and animals in Spain and Portugal. Fruits and vegetables are the most important items in all southern European countries. In Italy and Portugal their share of total plant value has been increasing steadily, as grains have declined in importance in value terms. Fruit and vegetables accounted for nearly one-third of total value in Italy and nearly one-fourth in Portugal in 1970 and 1969, respectively.

## THE LAND

### Land Utilization

Patterns of land use are determined by an area's climate and topography, population density, and income. The pattern of land use in Western Europe is complex in that there are many small areas of different usage types, rather than great belts of forest or large tracts of cropland. In general, forests tend to be on the higher and poorer land and crops on the lowland areas. Within the different countries and regions the proportion of agricultural land devoted to crop production or livestock pasture varies considerably (66).

Western Europe in 1970 devoted more than half of its total land area to agriculture (table 7). Of the agricultural area, a little more than half was arable land and orchards. Except in Greece, Ireland, Portugal and the United Kingdom, agricultural area as a proportion of total land area stabilized or declined. The United Kingdom has the largest proportion of agricultural land to total land with 80 percent in 1969, while Norway with 3 percent in 1970 has the smallest. Except for Finland, Norway, and Sweden, all West European countries devote half or more of their land to agriculture.

Switzerland has the least amount of arable land and orchards with only 18 percent of total agricultural area in 1965, and consequently the most area on a percentage basis devoted to pastures. Denmark, Finland, and Portugal have the highest percentages of arable land with around 90 percent of total agricultural area, and thus little area in pasture or meadows. In Austria, Greece, Ireland, the Netherlands, Spain, and the United Kingdom, meadows and pastureland account for more than half of the agricultural area.

In Scandinavia, where the growing season is short, much of the land is devoted to forests (except in Denmark) and the agricultural area is used mainly for crops rather than permanent pastureland. In Norway, one-quarter of the land is above the Arctic Circle, and agriculture would be practically impossible in much of Scandinavia without the warming influence of the Gulf Stream. Denmark has a large area of crops, especially livestock feed, partly because of its important export market in agricultural commodities, particularly meat.

In central Western Europe, land use is more evenly divided between arable land and orchards and permanent meadows and pastures. Topography and climate vary more than in the north and south of Europe.

A belt of grassland extends up the western coast from Bordeaux through Brittany, Wales, Ireland, west Scotland, Norway, and the northern portion of Sweden and Finland. This area is too humid for cereals in the west and too cold in the north. Covering Northern Ireland and England and central Scandinavia is an area of oats, barley, and potatoes. A winter wheat and sugarbeet belt covers southern England, most of France, Belgium, and the Netherlands, and much of Germany and Austria. A poor sandy plain reaches from northeast Belgium through northern Germany which grows primarily rye and potatoes. In the south a corn belt reaches from Portugal to northern Spain, southern France, and northern Italy to the Danube valley. The far south is a zone of spring wheat, wine, olives, and fruit (66).

Table 7--Land utilization and percentage of land area devoted to agriculture,  
selected years 1950-70

Country and year	Total land area	Agricultural area				Forests	Other	Total agricultural area as a percentage of total land area
		Total	Arable land and orchards	Permanent meadows and pastures				
1,000 hectares								Percent
Austria:								
1950	8,262	4,176	1,848	2,328	3,057	1,121	51	
1959	8,263	4,052	1,755	2,297	3,142	1,191	49	
1970	8,269	3,896	1,681	2,215	3,206	1,283	47	
Belgium:								
1950	2/3,051	1,792	1,034	758	576	701	59	
1959	2/3,051	1,734	963	771	591	726	57	
1970	2/3,051	1,599	850	749	601	851	52	
Denmark:								
1950	4,232	3,163	2,702	461	348	782	75	
1959	2/4,304	3,142	2,777	365	438	724	73	
1970	4,237	2,975	2,676	299	472	860	70	
Finland:								
1950	30,545	2,949	2,481	468	21,670	9,082	10	
1959	30,545	2,911	2,633	278	21,874	8,916	10	
1970	30,540	2,810	2,722	3/88	19,452	11,439	9	
France:								
1950	2/55,160	33,465	21,187	12,278	11,400	10,295	61	
1959	2/55,121	34,633	21,511	13,122	11,582	8,906	63	
1969	54,703	33,173	19,265	13,908	13,930	7,600	61	
Germany:								
1950	4/23,944	14,126	8,552	5,574	6,950	3,298	59	
1959	24,283	14,332	8,640	5,692	7,103	3,257	59	
1970	24,357	13,575	8,075	5,500	7,162	4,060	56	
Greece:								
1950	13,156	8,654	3,476	5,178	1,958	2,644	66	
1959	12,844	8,871	3,686	5,185	2,454	1,767	69	
1966	13,906	5/8,870	5/3,631	5,239	2,608	1,716	64	
Ireland:								
1950	6,889	4,688	1,305	3,383	119	2,221	68	
1959	6,889	4,715	1,376	3,339	159	6/2,154	68	
1969	6,889	4,817	1,151	3,666	216	6/1,955	70	
Italy:								
1950	29,377	21,778	16,612	5,166	5,980	2,345	74	
1959	29,401	20,965	15,851	5,114	5,812	3,346	71	
1970	29,404	20,180	14,930	5,250	6,162	3,781	69	
Luxembourg:								
1950	258	144	83	61	74	41	56	
1959	258	138	76	62	86	35	53	
1970	258	135	66	69	86	38	52	

See footnotes at end of table.

Continued

Table 7--Land utilization and percentage of land area devoted to agriculture,  
selected years 1950-70-- Continued

Country and year	Total land area	Agricultural area					Total agricultural area as a percentage of total land area
		Total	Arable land	Permanent	Forests	Other	
			and orchards	meadows and pastures			
<u>1,000 hectares</u>							<u>Percent</u>
Netherlands:							
1950	3,292	2,399	1,058	1,281	243	901	71
1959	3,245	2,310	7/1,035	1,275	268	667	71
1970	3,378	2,193	867	1,320	298	1,171	65
Norway:							
1950	30,883	1,045	813	232	7,500	23,877	3
1959	30,827	1,030	839	191	8,030	24,332	3
1970	30,833	954	814	140	8,330	23,138	3
Portugal:							
1939	8,862	3,380	3,380		2,467	3,059	38
1959	8,839	4,130	4,130		2,500	2,253	47
1969	8,842	4,900	4,370	530	2,500	1,486	55
Spain: 8/							
1947	50,276	42,714	19,175	9/23,539	5,000	2,592	85
1959	2/50,475	41,277	20,903	9/20,385	4,856	4,322	82
1968	2/50,475	42,191	20,155	9/22,036	11,500	2,534	84
Sweden:							
1950	41,057	4,694	3,752	942	22,970	17,256	11
1958	41,111	4,350	3,666	10/684	10/22,505	18,111	11
1970	41,141	3,443	3,053	390	22,794	18,738	8
Switzerland:							
1950	3,999	2,186	11/489	1,697	1,011	932	55
1959	3,993	2,172	11/445	1,727	981	976	54
1965	3,993	2,178	11/404	1,774	981	970	55
United Kingdom:							
1950	24,100	19,517	12/7,428	13/12,089	1,532	3,351	81
1959	24,102	19,907	12/7,187	13/12,720	1,681	2,814	83
1969	24,093	19,368	12/7,261	13/12,107	1,879	3,154	80

1/ Includes lakes, rivers, etc.

2/ Total area.

3/ In agricultural holdings.

4/ Excluding the Saar.

5/ 1968.

6/ Includes rough grazing.

7/ Excludes some orchard areas which are included under permanent meadows and pastures.

8/ Includes Balearic and Canary Islands.

9/ Includes wooded pasture lands--7.5 million hectares in 1968.

10/ 1956.

11/ Arable land only.

12/ Data refer to land belonging to agricultural holdings exceeding 1 acre.

13/ Includes rough grazing area not belonging to holdings--estimated at 7.4 million hectares in 1959.

Source: (4).

Grain area in Western Europe slowly increased during 1950-70, varying slightly by country and year. With the exception of West Germany and the Netherlands, total grain area decreased slightly in the EC. Outside the EC, Portugal and Greece were the only countries with a decline. As far as individual grains are concerned the area in wheat was stable, rye and oats areas declined considerably, barley area increased at a swift pace, and corn area increased rapidly in the main producing countries of France, Italy, and Spain during the above timespan.

#### Average Farm Size and Distribution of Agricultural Holdings by Size

Average farm size in Western Europe ranged from approximately 3 hectares in Greece to 56 hectares in the United Kingdom in 1969 and 1970, respectively (table 8). <sup>4/</sup> Western Europe can be divided into three segments by average farm size: 0-9 hectares, 10-20 hectares, and 20 hectares and over. In the first category are Belgium, Greece, Italy, Norway, Portugal, and Switzerland. (If forest land were subtracted from area, Finland would probably also be in this category.) In the second group are Austria and Germany, with an average farm size of about 10 hectares each, and Finland (with the above qualification), Ireland, the Netherlands, Spain, and Sweden. The third category contains Denmark, France, and Luxembourg, with approximately 21 hectares each, and the United Kingdom.

Farm size in most areas of Western Europe has been increasing as the number of farms has been declining. Between 1950 and 1970, the average farm size expanded by about two-fifths in Denmark and France, approximately grew by about half in Sweden and the United Kingdom, and more than doubled in Italy and the Netherlands. Although the average farm size in Italy increased remarkably there are still more farms there than in any other country in Western Europe. In Belgium, Greece, Norway, and Switzerland, there has been little change in the average farm size.

Running parallel with increasing farm size is the fact that the number of small farms is decreasing and the number of larger farms is increasing. This phenomenon is due to migration out of agriculture and consolidation of farms. In many instances government policy and programs have been the catalyst for this movement. For most countries the total area in farms has changed little in the past two decades.

In Western Europe, the majority of farms are less than 10 hectares in size; however, these holdings account for only approximately one-third of the total area. The majority of the farm area is in holdings of between 10 and 50 hectares. The United Kingdom has a greater share of farms over 50 hectares in size than elsewhere in Western Europe, while the southern countries have a larger share of farms of less than 5 hectares. (table 9).

The division of Western Europe's agricultural land into numerous small, fragmented holdings resulted from two factors: the breakdown of the medieval feudal system when the estates were divided among the tenants and serfs and, more importantly, the inheritance laws in many countries.

In Britain the powerful aristocracy was never really overthrown and actually was responsible for the fact that Britain has fewer and larger farms than elsewhere in Europe. After feudal times, the aristocracy continued to hold the land and lease it to tenant farmers. Through this process a group of landless farmers emerged. In addition, under British inheritance laws land passed from father to eldest son avoiding the continuous division of the land.

<sup>4/</sup> In calculating average farm size in table 8, total agricultural area was used for some countries since the area in farms was not available. For table 9 it was felt that percentages were better than absolute figures due to the varied number of sources from which the data were taken and the lack of comparability among countries.

Table 8--Number and area of agricultural holdings and average farm size,  
selected years 1950-70

Country and year	Number	Area	Average size	Country and year	Number	Area	Average size
	1,000	1,000 ha.	Hectares		1,000	1,000 ha.	Hectares
Austria:				Luxembourg:			
1951	432.8	1/4,176.2	9.6	1950	3/11.4	1/144.0	12.6
1960	396.5	1/4,052.9	10.2	1958	3/9.5	1/138.0	14.5
1970	2/380.6	2/4,012.4	2/10.5	1970	3/6.4	1/135.0	21.1
Belgium:				Netherlands:			
1950	248.2	1,711.8	6.9	1950	338.6	2,335.3	6.9
1959	195.1	1,625.4	8.3	1959	205.8	2,309.8	11.2
1970	179.5	1,540.3	8.6	1970	118.1	2,142.6	18.1
Denmark:				Norway:			
1951	205.8	3,139.3	15.3	1949	213.4	1,045.6	4.9
1960	190.1	3,049.1	15.5	1959	198.3	1,033.2	5.2
1970	140.1	2,941.3	21.0	1969	155.0	953.6	6.2
Finland:				Portugal:			
1950	3/261.7	1/2,949.0	11.3	1950	n.a.	n.a.	n.a.
1959	3/270.0	1/2,911.0	10.8	1960	801.0	4,114.9	5.1
1969	3/263.5	1/2,811.0	10.7	1970	n.a.	n.a.	n.a.
France:				Spain:			
1955	2,134.0	32,339.0	15.2	1950	n.a.	n.a.	n.a.
1963	1,604.3	32,137.0	20.0	1962	3,007.6	44,650.1	14.8
1970	1,460.6	31,683.0	21.7	1970	n.a.	n.a.	n.a.
Germany:				Sweden:			
1949	1,193.6	13,487.3	11.3	1955	282.2	3,526.5	12.5
1960	1,617.7	12,772.0	7.9	1965	232.9	3,296.5	14.2
1970	1,243.8	12,760.5	10.3	1969	3/155.4	3/3,032.4	19.5
Greece:				Switzerland:			
1950	1,156.2	3,079.7	2.7	1955	206.0	1,059.2	5.1
1961	1,139.4	3,673.3	3.2	1965	162.4	985.5	6.1
1969	1,111.4	3,556.6	3.2	1969	149.3	970.8	6.5
Ireland:				United Kingdom:			
1951	316.6	1/4,688.0	14.8	1950	523.0	19,517.0	37.3
1960	290.4	1/4,715.0	16.2	1960	476.0	19,664.0	41.3
1965	283.5	1/4,817.0	17.0	1970	335.0	18,902.0	56.4
Italy:							
1947	9,515.0	21,573.0	2.3				
1961	4,293.9	26,571.6	6.2				
1970	3,620.8	25,091.3	5.9				

n.a. = not available.

1/ Figure used is agricultural area taken from land distribution table 7.

2/ Estimated using sample data.

3/ Numbers refer to total farms over 2 hectares.

Sources: (30), (4), (5), (9), (11), (22), (26), (12), (25), (45).



Table 9--Distribution of number and area of holdings by farm size classes, selected years 1950-70

Country and year:	Number of farms					Area in farms (hectares)				
	0-5	5-10	10-20	20-50	Over 50	0-5	5-10	10-20	20-50	Over 50
	Percent of total									
Austria:										
1951. . . . .	56	-- 36 --		6	2	13	32		17	38
1960. . . . .	42	-- 38 --		15	5	6	21		23	50
1970. . . . .	1/44	-- 36 --		16	4	5	21		24	51
Belgium:										
1950. . . . .	58	23	13	5	1	23	19	28	20	10
1959. . . . .	48	27	18	6	1	16	18	32	23	11
1967. . . . .	36	27	24	11	2	10	18	32	28	12
1970. . . . .	52	18	19	10	1	10	16	31	31	13
Denmark:										
1951. . . . .	21	27	2/40	3/10	4/2	4	13	2/42	3/26	4/15
1960. . . . .	19	28	2/41	3/10	4/2	3	13	2/46	3/25	4/13
1970. . . . .	10	21	2/49	3/16	4/4	2	7	2/42	3/29	4/20
Finland:										
1950. . . . .	5/36	35	16	12	1	6/27	27	26	16	4
1959. . . . .	5/36	35	22	6	1	6/26	30	26	14	4
1969. . . . .	2/29	36	26	8	1	6/26	n.a.	n.a.	n.a.	n.a.
France:										
1955. . . . .	35	21	23	17	4	n.a.	n.a.	n.a.	n.a.	n.a.
1963. . . . .	28	19	26	21	6	n.a.	n.a.	n.a.	n.a.	n.a.
1967. . . . .	6/24	19	26	24	7	--	8	n.a.	n.a.	n.a.
1970. . . . .	6/28	16	23	25	8	n.a.	n.a.	n.a.	39	33
Germany:										
1949. . . . .	59	21	13	6	1	18	21	26	24	11
1960. . . . .	52	21	18	8	1	14	19	30	27	10
1970. . . . .	45	19	21	13	2	10	13	30	35	12
Greece:										
1961. . . . .	81	15	3	1	--	48	31	14	5	2
Ireland:										
1949. . . . .	21	24	29	19	7	4	11	23	32	30
1960. . . . .	17	23	29	23	8	3	9	22	34	32
1965. . . . .	7/16	3/32	9/21	10/25	11/5	n.a.	n.a.	n.a.	n.a.	n.a.
Italy:										
1947. . . . .	93	3	12/2	13/1	1	31	11	12/14	13/10	35
1961. . . . .	76	13	7	3	1	20	15	15	14	36
1970. . . . .	76	13	7	3	1	18	13	14	13	42
Luxembourg:										
1950. . . . .	5/29	25	29	16	1	8	15	34	36	7
1960. . . . .	22	21	30	25	2	5	10	29	47	8
1969. . . . .	16	16	27	37	4	3	6	19	59	14
Netherlands:										
1950. . . . .	59	19	14	7	1	15	23	34	19	9
1959. . . . .	51	21	19	8	1	11	20	32	30	7
1970. . . . .	33	22	29	15	1	6	14	34	37	9
Norway:										
1949. . . . .	82	12	5	1	--	6/36	32	20	10	2
1959. . . . .	84	11	4	1	--	6/40	33	17	8	2
1969. . . . .	14/57	27	12	-- 4 --	--	n.a.	n.a.	n.a.	n.a.	n.a.

See footnotes at end of table.

Continued

Table 9--Distribution of number and area of holdings by farm size classes, selected years 1950-70--Continued

Country and year:	Number of farms					Area in farms (hectares)				
	0-5	5-10	10-20	20-50	Over 50	0-5	5-10	10-20	20-50	Over 50
	Percent of total									
Portugal:										
1954. . . . .	88	7	<u>15/4</u>		1	23	10	<u>15/17</u>		50
Spain:										
1962. . . . .	66	14	10	7	3	7	7	9	13	64
Sweden:										
1951. . . . .	<u>5/34</u>	32	21	10	3	<u>5/10</u>	19	<u>24</u>	25	22
1961. . . . .	<u>5/29</u>	32	23	13	3	<u>5/8</u>	17	<u>24</u>	28	23
1970. . . . .	<u>5/21</u>	27	<u>24</u>	21	7	<u>5/4</u>	10	19	33	34
Switzerland:										
1955. . . . .	53	25	<u>16/12</u>	<u>17/9</u>	--	16	31	<u>16/23</u>	<u>17/27</u>	3
1965. . . . .	46	25	<u>16/16</u>	<u>17/13</u>	--	11	25	<u>16/26</u>	<u>17/35</u>	3
1969. . . . .	44	22	<u>16/17</u>	<u>17/16</u>	1	10	25	<u>16/27</u>	<u>17/35</u>	3
United Kingdom:										
1950. . . . .	<u>6/28</u>	16	16	21	19	2	3	6	18	71
1960. . . . .	<u>6/28</u>	13	16	22	21	2	2	6	17	73
1970. . . . .	<u>18/25</u>	<u>19/12</u>	<u>9/12</u>	<u>10/30</u>	<u>11/21</u>	n.a.	n.a.	n.a.	n.a.	n.a.

-- = less than 0.5 percent.

- 1/ Estimated from sample data.
- 2/ 10-30 hectares.
- 3/ 30-60 hectares.
- 4/ Over 60 hectares.
- 5/ 2-5 hectares.
- 6/ 1-5 hectares.
- 7/ 0-4 hectares.
- 8/ 4-12 hectares.
- 9/ 12-20 hectares.
- 10/ 20-60 hectares.
- 11/ Over 60 hectares.
- 12/ 10-25 hectares.
- 13/ 25-50 hectares.
- 14/ 0.5-5 hectares.
- 15/ 10-50 hectares.
- 16/ 10-15 hectares.
- 17/ 15-50 hectares.
- 18/ 0-6 hectares.
- 19/ 6-12 hectares.

Sources: (30), (4), (5), (9), (11), (22), (26), (12), (25), (43).

Denmark's emergence from the feudal era, although different than that of Britain, was also beneficial as Denmark has traditionally been a land of medium-size holdings. The Government encouraged Danish peasants to buy the land they farmed and made sure that the farm was actually viable. A law passed in 1899 authorized the Government to assist farmers in buying land and building on it.

In contrast, in other parts of Europe the break-up of the feudal system was erratic and sometimes violent. Peasants were given land with no regard to the viability of the holdings.

### Fragmentation

Fragmentation or parcelling of a holding into plots, stems primarily from inheritance practices which differ throughout Western Europe, creating more severe problems in some countries than in others. Under the Napoleonic code, which covered a large part of Western Europe, when a household head died the land and buildings of a holding would be divided equally among the heirs, creating smaller and smaller holdings. Since the land on a farm might vary in quality, each heir would demand a portion of each parcel of land. Thus, fragmentation or parcelling developed.

Fragmentation results in inefficiency, because time is wasted traveling between the plots. In addition, it is difficult to apply fertilizers and other chemicals and use machinery on such small areas. Many times the farm buildings are divided, as well as the land. Consequently, a farm which could otherwise be viable cannot provide adequate returns, and the situation on a farm of insufficient size is further aggravated.

Fragmentation of holdings is found throughout Western Europe, with the exception of the United Kingdom, Ireland, and Scandinavia, where the Napoleonic Code did not apply. Unfortunately, complete statistics on fragmentation are not readily available. A discussion of those few countries where good data are available suggests the scope of the fragmentation problem.

Table 10 shows that the average number of plots per Belgian farm in 1959 was 4.9 and the average plot size was 1.26 hectares. As farms grow larger the number of plots and the average size increase. In the same year, 27 percent of the farms were not divided, 34 percent consisted of 2-4 plots, 25 percent consisted of 5-9 plots, and 14 percent consisted of 10 plots or more. By 1970 the average number of plots had increased to 5.1 and the plot size to 1.7 hectares. The Flemish portion of Belgium has a more severe problem than elsewhere in the country.

Table 10--Land fragmentation, Belgium, 1959

	Farm size in hectares									
	1	1-3	3-5	5-10	10-20	20-30	30-50	50-100	100 & over	Avg.
Average number of plots per farm	1.5	3.2	5.3	7.1	9.0	9.9	9.9	9.1	9.6	4.9
Average area per plot (ha.)	.29	.57	.74	1.01	1.53	2.43	3.77	7.36	13.36	1.26

Source: (43).

Although in the Netherlands the average number of plots increased only slightly from 3.3 to 3.6 between 1959 and 1970, the average size of the plot increased from 2 to 3 hectares (table 11). This trend to more and larger plots was also present in Belgium.

Table 11--Land fragmentation, the Netherlands, 1970

Farm size (ha.)	Average plots per holding	Average size of plot
	Number	Hectares
0.01-1	1.2	--
1-5	2.2	1
5-10	3.8	1
10-15	4.7	2
15-20	4.8	3
20-30	4.7	5
30-50	4.5	8
50-100	5.7	11
100 and over	9.3	25
Total	3.6	3
Total 1959	3.3	2

Source: (20).

As seen in table 12, nearly half of the West German farms had only 1-5 plots, 24 percent had 6-10 plots, 17 percent had 11-20 plots, 10 percent had 21-50 plots, and 1 percent had over 50 plots.

Table 12--Distribution of farms by number of plots and size of farm, West Germany, 1960

Farm size (ha.)	Percentage of farms with:				
	1-5 plots	6-10 plots	11-20 plots	21-50 plots	50 & more plots
	Percent				
0.01-2	73.6	18.9	6.6	0.9	0.0
2-5	42.0	24.9	22.2	10.5	.4
5-10	29.7	25.6	23.2	18.9	2.6
10-20	31.1	26.3	22.8	16.5	3.3
20-50	40.4	28.4	20.7	5.1	1.4
50-100	46.1	26.9	20.1	6.0	.9
100 & over	58.1	16.8	15.0	8.7	1.4
Total	47.8	23.6	17.3	10.0	1.3

Source: (35).

The number of plots per West German holding in 1960 averaged 9.6 with an average plot size of 0.81 hectare (table 13). The average number of plots increases until farm size reaches about 10 hectares and then declines somewhat. The problem is especially severe in southwestern Germany.

Table 13--Land fragmentation, West Germany, 1960

Farm size (ha.)	Average plots per holding	Average size of plot
	Number	Hectares
0.01-2	4.4	0.22
2-5	9.7	.34
2-7.5	13.3	.47
7.5-10	14.8	.59
10-15	14.4	.84
15-20	12.8	1.34
20-30	10.7	2.24
30-50	9.0	4.14
50-100	8.6	7.51
100 & over	9.1	19.00
Total	9.6	.81

Source: (43).

In Switzerland the average number of plots per farm is somewhat lower than in West Germany (table 14). However, the problem is compounded by the altitude and land contours in Switzerland.

Table 14--Land fragmentation, Switzerland, 1955 and 1965

Plots per farm	1955	1965
	Number of farms	
1	40,968	29,354
2	30,322	22,434
3-5	52,047	38,691
6-10	34,850	23,387
11-15	16,599	9,851
16-20	9,699	5,182
21-25	5,650	2,924
26-50	9,399	5,037
51-100	2,376	1,292
Over 100	660	203
Average no. of parcels	8	7

Source: (3).

Spain averaged 14 plots per holding in 1960, compared with 7 in Greece. In Spain the average plot size was 1.1 hectares while in Greece it was only 0.4 hectare. Southern Greece and the Islands have more extensive fragmentation than in northern Greece. In Spain, the situation is most serious in the central and northwestern areas. OECD has estimated that 5 percent of total Spanish agricultural income is lost through fragmentation (43).

### Land Tenure

The present land tenure situation in Western Europe evolved basically from the medieval feudal system, in which the land was held by only a few persons and farmed by tenants or serfs. As the feudal system was abolished, the large holdings were divided into owner-farmer holdings.

Owner-operated family farms have traditionally been preferred in Europe since the fall of the feudal system. A farmer who owns his holding is much more willing to increase the value of land through capital investment than one who rents. Also, family labor is more conducive to the workload on farms, as hired labor is difficult to obtain on holidays, weekends and peak harvest periods. These labor needs can be filled more easily with the help of women and children. However, there are disadvantages to owner-operated farms, such as the large amount of capital needed to buy land, equipment, and buildings. With a tenant system this burden can be divided. The landowner is responsible for the land and buildings, while the tenant needs only to have the working capital (66).

Today, land tenure in Western Europe consists basically of various combinations of three types of tenure: owner-operated, rented, and sharecropped. The percentage of land devoted to these farm types varies widely from country to country. Mixtures of rented and owned land are becoming increasingly important because already existing farms can be enlarged through rental, which requires less initial capital investment than purchasing.

Sale and rental of land are not major methods of land transfer in Greece due to the importance of land as a status symbol. Land is transferred mainly through inheritance or as dowry gifts, severely hindering land reform. In 1961, 98 percent of the farms were owner-operated. However, most pasture and grazing land is not individually owned but communally owned by villages or held by the State.

Agricultural land in West Germany is mainly owner-occupied. In 1960, 45 percent of all farms were fully owned, 50 percent were of mixed tenure, and 5 percent were fully rented. Land prices tend to be high and rentals low. However, there is a strong attachment to personally owned land and people tend to hold on to the land even when it is not in use.

In Austria, where there is also a strong attachment to land, most of the agricultural land is owner-occupied--tenant holdings account for only about 3 percent of all farms. In 1960, about 4.5 percent of the agricultural land was rented. Tenant farming was most common in the eastern part of Austria (Burgenland) where 12 percent of the agricultural area was rented. Tenanted land tends to be associated with large farms, since land rent is high and the land rented is most commonly large areas of pastureland.

In Belgium-Luxembourg, France, Switzerland, the United Kingdom and Denmark, and the Netherlands complete or partial farm tenancy is common. In most of the countries, rented land is associated with medium-size to large farms, as land values tend to be high and renting is comparatively less expensive initially. Today the tenant is protected through legislation and enjoys a fair amount of security.

Farm tenancy is widespread in Belgium, where it has traditionally been important. According to the 1959 census, 20 percent of farmers rented their entire holding, 53 percent owned part of their farm, and 27 percent fully owned their farm. The latter category accounted for only 7 percent of total agricultural land and was composed mainly of small farms, usually of less than 5 hectares. Agricultural land prices are the highest in Europe, which contributes to limited ownership.

There was little change in land tenure in France during the period discussed. In 1963, 50 percent of the agricultural land was farmed by owner-occupiers, 44.7 percent was rented, 1.4 percent was operated by hired managers, and 3.8 percent was sharecropped. The proportion of farms with mixed tenure rose. Farm size varies with the system of land tenure. The larger farms tend to be rented while small ones are owner-operated, except in the vineyard regions. Rent levels have increased more slowly than land values.

Tenant farming in Switzerland accounts for approximately one-third of the total agricultural area. Between 1955 and 1965, the area of owner-occupied land declined by 10 percent, while the area farmed by tenants rose 17 percent. More than half of the farms are partly owned and partly rented. Because land values are high and land rents comparatively low, land rental is the major means of farm enlargement. As expected, the larger the farm, the greater the proportion of rented land.

Owner-occupied land accounts for approximately half of the agricultural land in England and Wales. However, only about one-third of the farms over 50 acres in size are entirely owner-occupied and about 20 percent are of mixed tenure.

The number of totally rented farms in Denmark has been decreasing as the number of partly owned partly rented farms has increased. The number of rented farms fell from 10,000 in 1960 to 3,200 in 1968 while the number of mixed-tenure farms increased from 14,500 in 1966 to 16,700 in 1968 (data are unavailable for 1960). In 1968 more than 90 percent of the farms were fully owned and 2 percent were wholly rented. Tenancy and farm managers are found more on the Islands than on the mainland.

In 1959, 47.5 percent of total Netherlands farmland was owner-operated. The demand for farmland exceeds the supply and legislation enacted to protect the tenant includes rent ceilings, long-term leases, and pre-emption rights in case the land is sold.

The feudal system was never widespread in Norway, and tenant farming, until recently, was an important aspect of farming. About 12 percent of the agricultural land in Norway has been rented in recent years and 7 percent of all farms above 0.5 hectare have been fully rented. About 6 percent of farms have been of mixed tenure. In 1959, 91.5 percent of the farms were owner-operated.

In 1961, 69 percent of the farms in Sweden were owner-operated and covered 57 percent of the farm area. Tenant-operated farms and mixed enterprises composed the remainder and accounted for 13 and 18 percent, respectively, of the total number of farms and 22 and 21 percent of the total farm area.

Government policy and regulations have changed the predominant form of farm tenure from tenant-operated to owner-operated in some countries--for example, Finland and Ireland.

According to the 1969 Finnish census, only 3.9 percent of all farms above 1 hectare were fully rented and only 6.6 percent of all arable land was rented. The law regulating farm tenancy does not encourage expansion of land through renting. Since 1918, the government has enacted legislation encouraging owner-operated land.

Over the past 100 years, Ireland's tenure system has changed from almost absentee, to almost complete owner occupancy. This has been the direct result of Government policy. There is a form of short-term renting of land for 11 months or less called *conacre*.

Sharecropping, the third form of land tenure, is found where there is little opportunity for other employment. This system has two major drawbacks. First, it is difficult to provide legal protection for the sharecropper. Second, the system is bad for the land since it is advantageous for the sharecropper to maximize his output without regard to the future of the soil (66). Sharecropping occurs in Italy, southern France, Portugal, and Spain.

Italian land tenure is more complex than in most other countries, with numerous types of tenure (table 15). Land ownership is further complicated by relating tenure to the system of operation. Half of the agricultural area was farmed by the farmer and his family, who owned two-thirds of this land and rented the other third. Further data reveal that 1 farm out of 7 was made up of rented and owner-operated land, while 1 out of 10 farms consisted of rented land only.

Table 15--Italian land tenure system, 1961

System of operation	Number of holdings	Area			
		Total	Owned	Leased	Other
	1,000	1,000 hectares			
By the farmer and his family	3,486	13,218	9,191	3,266	761
With paid employees and/or workers remunerated wholly or in part by share of output	330	9,159	8,387	613	159
Tenant settlers and share farmers	317	3,126	2,981	52	93
Other	161	1,069	1,000	33	36
Total	4,294	26,572	21,559	3,964	1,049

Source: (47).

The 1962 Spanish census revealed that 76 percent of the agricultural area was farmed by owner-occupiers, 12 percent by tenants, and 7 percent by sharecroppers. During the 1960's a new system of farm operation developed, consisting of joint farming of land belonging to a group of holdings.

The latest available figures for Portuguese tenure are for 1954, which show that 71 percent of the farms were owner-operated, 23.8 were tenant-operated, and the remainder were sharecropped or operated in other ways. About three-fourths of the farmland was owned and one-fourth was rented.

#### AGRICULTURAL INPUTS

##### Mechanization

Mechanization of farming in Western Europe has progressed rapidly during the past two decades, although the speed varies from country to country and by type of machinery. The degree of mechanization depends on wage levels, machinery costs, and availability of labor. The movement of labor out of agriculture has been extensive, providing a prime motivation for the expansion of mechanization. Lack of capital is a major problem in mechanization; this has been partially solved with government financial aid



(which may consist of monetary grants or subsidies to reduce interest rates on loans) and membership in cooperatives. Machinery cooperatives exist in Belgium, Denmark, France, West Germany, Ireland, Italy, the Netherlands, Norway, Sweden, Switzerland, and the United Kingdom.

As machines replace manual workers, a higher output per worker is obtained and a more skilled labor force is required to operate and maintain the machinery. The farmer himself is now performing more of the actual farmwork. To a certain extent, the role of the self-employed farmer is changing.

Table 16 through 21 contain data for selected years on the number of tractors, combines, and milking machines used and the agricultural area, arable area, or number of cows per machine. As mechanization increases, area per machine or cows per machine decline. Comparisons among countries shown in the tables on an area per hectare basis are somewhat misleading since land use patterns for agricultural area differ among countries.

The number of tractors in Western Europe increased phenomenally during 1950-70 (table 16). The United Kingdom and Sweden in 1950 had less area per tractor than elsewhere in Western Europe (table 17). <sup>5/</sup> However, by 1955 West Germany was in the number one position and Norway was a close second. By 1970, Germany was still leading with 10 hectares per tractor and Norway was second with 12 hectares per tractor. Greece had a high of 221 hectares per tractor in 1970.

Combined harvester threshers also rapidly increased in number during 1950-70 (table 18). Germany again had the least area per machine, 50 hectares of arable land per combine, and Portugal had the most, 1,960 hectares (table 19).

Data for milking machines are rather sketchy (table 20). For the countries available, Norway had the highest ratio, 8.5 cows per milking machine in 1970, while Ireland had 46 cows per machine, the lowest ratio (table 21).

In the future, there will probably be increased demand for heavier tractors and more mechanization of livestock operations.

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<sup>5/</sup> Statistics for the United Kingdom must be carefully interpreted. Although the United Kingdom had more area per tractor in 1970 than on most of the continent, and thus appears less mechanized, it has fewer and much larger farms and more rough grazing area.

Table 16--Tractors <sup>1/</sup> used in agriculture, selected years, 1950-70

Country	1950	1955	1960	1965	1970
	Numbers				
Austria. . . . .	13,948	50,144	n.a.	191,731	248,980
Belgium. . . . .	9,695	24,300	44,188	65,485	88,000
Denmark. . . . .	17,881	57,847	111,321	161,734	174,564
Finland. . . . .	12,300	38,326	78,280	126,900	155,500
France. . . . .	138,700	305,680	680,400	996,422	1,240,000
Germany. . . . .	139,028	460,661	856,721	1,164,113	1,370,667
Greece. . . . .	n.a.	9,000	21,320	40,128	60,000
Ireland. . . . .	12,944	28,729	43,697	60,167	84,000
Italy. . . . .	56,941	147,397	248,985	419,943	630,677
Luxembourg. . . . .	997	4,289	6,387	7,320	8,155
Netherlands. . . . .	18,839	39,155	82,066	2/130,418	2/156,414
Norway. . . . .	11,000	32,000	49,500	72,000	90,000
Portugal. . . . .	5,000	4,495	9,550	15,535	28,153
Spain. . . . .	16,000	26,019	51,503	147,884	259,819
Sweden. . . . .	68,450	3/116,400	153,800	231,820	250,000
Switzerland. . . . .	17,530	27,240	38,890	61,649	74,000
United Kingdom. . . . .	325,000	422,000	457,000	472,000	4/470,000

n.a. = not available.

<sup>1/</sup> Excludes garden tractors except where specified.<sup>2/</sup> Includes garden tractors.<sup>3/</sup> 1956.<sup>4/</sup> 1969.

Source: (4).

Table 17--Agricultural area per tractor, selected years 1950-70

Country	1950	1955	1960	1965	1970
	Hectares				
Austria. . . . .	299	82	n.a.	20	16
Belgium. . . . .	185	72	39	26	19
Denmark. . . . .	177	54	28	19	17
Finland. . . . .	240	76	37	23	19
France. . . . .	241	111	51	35	1/27
Germany. . . . .	102	31	17	12	10
Greece. . . . .	n.a.	974	416	221	221
Ireland. . . . .	362	164	108	79	62
Italy. . . . .	382	150	84	51	35
Luxembourg. . . . .	144	34	22	19	17
Netherlands. . . . .	127	62	28	18	16
Norway. . . . .	95	33	21	14	12
Portugal. . . . .	n.a.	835	432	291	194
Spain. . . . .	n.a.	1,614	801	282	192
Sweden. . . . .	69	39	25	17	14
Switzerland. . . . .	124	80	44	35	n.a.
United Kingdom. . . . .	60	47	44	42	41

n.a. = not available.

<sup>1/</sup> 1968.

Source: Tables 7 and 16.

Table 18--Combined harvester-threshers used in agriculture, selected years, 1950-70

Country	1955	1960	1965	1970
Number				
Austria. . . . .	3,000	8,906	22,695	26,253
Belgium. . . . .	1,015	2,775	5,603	1/7,754
Denmark <u>2/</u> . . . . .	2,214	8,895	30,638	42,253
Finland. . . . .	2,000	7,000	16,500	29,600
France . . . . .	17,738	50,100	102,068	1/131,309
Germany. . . . .	3/8,598	58,000	124,000	160,000
Greece . . . . .	750	1,870	3,763	1/4,344
Ireland. . . . .	1,848	4,301	5,842	1/6,700
Italy. . . . .	4/616	4,361	13,160	18,427
Luxembourg . . . . .	34	611	1,191	1,974
Netherlands. . . . .	1,906	3,033	n.a.	7,500
Norway . . . . .	2,700	5,500	9,000	11,208
Portugal . . . . .	96	368	935	2,532
Spain. . . . .	818	4,606	15,348	21,798
Sweden . . . . .	18,423	25,100	35,900	42,700
Switzerland. . . . .	5/151	610	2,744	1/4,117
United Kingdom <u>6/</u> . . . . .	32,930	51,983	57,950	7/60,220

n.a. = not available.

1/ 1969. 2/ Excludes combined harvester-threshers on machine stations. 3/ Excludes the Saar.

4/ Self-propelled only. 5/ Excludes combined harvester-threshers owned by contractors.

6/ From 1961 onward, excludes Scotland and Northern Ireland; 1960 figure excludes Northern Ireland. 7/ 1968.

Source: (4).

Table 19--Arable land area 1/ per combine, selected years 1955-70

Country	1955	1960	1965	1970
Hectares				
Austria. . . . .	601	197	76	71
Belgium. . . . .	984	347	163	110
Denmark. . . . .	1,238	312	89	63
Finland. . . . .	1,279	376	161	92
France . . . . .	1,204	429	200	147
Germany. . . . .	1,000	150	68	50
Greece . . . . .	4,775	1,971	972	908
Ireland. . . . .	726	320	216	172
Italy. . . . .	26,351	3,635	1,172	811
Luxembourg . . . . .	2,353	124	61	55
Netherlands. . . . .	549	341	n.a.	115
Norway . . . . .	306	153	93	74
Portugal <u>2/</u> . . . . .	n.a.	11,223	4,829	1,960
Spain. . . . .	24,498	4,538	1,338	924
Sweden . . . . .	201	146	94	72
Switzerland. . . . .	3,093	730	155	98
United Kingdom . . . . .	222	138	125	121

n.a.=not available.

1/ Arable land and orchard area. 2/ Total agricultural area per combine.

Source: Tables 7 and 18.

Table 20--Milking machines in use, selected years 1950-70

Country	1950	1955	1960	1965	1970
	<u>Number</u>				
Austria. . . . .	n.a.	n.a.	31,149	50,000	70,000
Belgium. . . . .	10,880	19,380	32,428	43,653	<u>1/</u> 50,685
Denmark. . . . .	<u>8/</u> 60,220	<u>2/</u> 123,850	<u>2/</u> 142,360	<u>2/</u> 123,148	n.a.
Finland. . . . .	4,145	22,000	34,000	51,000	84,000
France . . . . .	n.a.	79,881	124,000	185,863	266,797
Germany. . . . .	n.a.	95,616	260,000	<u>3/</u> 518,947	519,000
Ireland. . . . .	2,386	n.a.	10,454	23,629	<u>4/</u> 32,400
Luxembourg . . . .	1,635	n.a.	4,888	4,937	4,677
Netherlands. . . .	3,835	9,211	38,659	78,061	85,472
Norway . . . . .	7,500	19,000	40,000	n.a.	49,689
Switzerland. . . .	<u>2/</u> 700	<u>2/</u> 1,535	<u>2/</u> 12,578	28,260	<u>1/</u> 34,392
United Kingdom . .	<u>5/</u> 88,045	<u>6/</u> 280,060	300,390	<u>7/</u> 282,740	<u>4/</u> 275,020

n.a. = not available.

1/ 1969.2/ Number of farms with milking machines.3/ Average of 1964-65.4/ 1968.5/ Average of 1948-52, includes Scotland and Northern Ireland. Other years exclude them.6/ 1956.7/ 1966.Source: (4).

Table 21--Cows per milking machine, selected years, 1950-70

Country	1950	1955	1960	1965	1970
	<u>1/</u>				
	<u>Number</u>				
Austria. . . . .	n.a.	n.a.	36.3	22.6	15.4
Belgium. . . . .	76.6	50.8	31.6	23.3	20.5
Denmark. . . . .	n.a.	n.a.	n.a.	n.a.	n.a.
Finland. . . . .	263.7	57.9	33.7	21.9	<u>2/</u> 12.2
France . . . . .	n.a.	112.5	79.3	52.3	36.0
Germany. . . . .	n.a.	60.9	21.8	11.2	11.1
Ireland. . . . .	491.6	n.a.	114.2	57.6	<u>2/</u> 46.1
Luxembourg . . . .	31.2	n.a.	11.7	11.1	<u>3/</u> 12.8
Netherlands. . . .	387.5	161.4	41.4	21.8	22.5
Norway . . . . .	100.5	34.6	15.1	n.a.	8.5
Switzerland. . . .	1,230.0	577.2	74.7	32.6	26.1
United Kingdom . .	51.5	13.2	13.4	14.9	15.9

n.a. = not available.

1/ Based on average 1947/48-1951/52 cow numbers taken from FAO.2/ Based on 1969 cow numbers.3/ Based on 1968 cow numbers.Sources: Table 20 and (5).

### Chemicals

Use of chemicals in agriculture has increased many times over during the past two decades and has contributed to the higher yields in recent years. Per area use of fertilizers tends to be higher in Western Europe than in the United States. More intensive agriculture is practiced in Europe than in the United States due to its limited land area and high population density. However, use of insecticides and herbicides is not as extensive in Western Europe as in the United States.

Utilization of the three major fertilizers--nitrogen, phosphate, and potash--on a gross tonnage basis increased in all West European countries during the time period covered in table 22, except for potash and phosphate in the Netherlands. The proportion of these three fertilizers used varies considerably by individual country as the soils and major crops differ. Belgium and the Netherlands consume more fertilizer per hectare than other West European countries, and Spain less (table 23). Fertilizer consumption figures per hectare of agricultural area should be used with caution, since the proportion of crops to livestock and the types of crops produced are different in each country.

Use of insecticides, herbicides, and copper sulphate (tables 24, 25, and 26) is much more varied than fertilizer use and the data are quite sketchy. There is a downward trend in the use of DDT and copper sulphate in most countries and an upward trend for aldrin and herbicides for all countries shown.

### Irrigation

Although irrigation facilities are found throughout Western Europe, in the south development has been most advanced, because irrigation is most needed here. Hot, dry summers and rainfall limited primarily to the winter make irrigation necessary for adequate agricultural output in southern regions. Of the countries in Western Europe, Italy has the greatest proportion of irrigated land to total area. In 1970 the ratios of the five major irrigated countries in Western Europe were as follows: (52), (53), (54), (55), (56).

Italy--18 percent of land equipped for irrigation;

France--3 percent of land equipped for irrigation;

Spain--6 percent of land irrigated;

Greece--8 percent of land irrigated;

Portugal--14 percent of land irrigated.

#### Italy (54).

From 1948 to 1970, the area equipped for irrigation in Italy increased by 55 percent to 3.4 million hectares (table 27). Area equipped for irrigation was only 10 percent of total agricultural area in 1948, 13 percent in 1958, and 18 percent in 1970. Data from surveys made in 1961 and in 1967 show the relationship between farm size and irrigation. Between 1961 and 1967, the number of farms using irrigation declined from 925,400 to 882,800. However, the relative percentage of farms using irrigation increased from 21.6 to 23.3 percent. This same trend also occurred on an area basis. As the size class of farms increased, the number of irrigated farms within any category increased. Between the two survey periods, the larger size classes showed steeper increases in number of farms irrigated. In 1961, the percentage of farms irrigated by size of farm was as follows: 5 hectares and under, 20.6 percent; 5-20 hectares, 24.7

Table 22--Total fertilizer use, selected years, 1/ 1950/51-1970/71(N = nitrogen; P =  $P_2O_5$  = phosphate; K =  $K_2O$  = potash)

Country and fertilizer	1950/51	1955/56	1960/61	1965/66	1970/71
	<u>1,000 tons</u>				
Austria:					
N. . . . .	22.5	31.8	46.7	91.3	125.8
P. . . . .	39.2	47.5	88.1	118.7	125.7
K. . . . .	25.0	43.5	86.5	140.9	159.7
Belgium:					
N. . . . .	78.0	85.3	100.3	146.6	167.2
P. . . . .	79.6	96.7	<u>2/</u> 88.7	<u>2/</u> 130.2	148.2
K. . . . .	98.0	148.5	152.2	168.6	185.4
Denmark: <u>3/</u>					
N. . . . .	70.0	88.7	124.0	191.6	289.0
P. . . . .	84.5	98.7	116.0	127.2	126.6
K. . . . .	103.0	157.1	180.6	174.8	181.7
Finland:					
N. . . . .	17.4	36.2	64.4	104.8	169.4
P. . . . .	61.2	73.1	105.5	132.0	176.0
K. . . . .	31.2	55.5	77.2	107.8	136.5
France: <u>4/</u>					
N. . . . .	262.1	381.1	565.1	870.6	1,423.1
P. . . . .	411.6	629.3	877.4	1,258.8	1,819.5
K. . . . .	390.2	581.3	749.9	969.8	1,389.0
Germany:					
N. . . . .	361.6	471.6	618.4	873.8	1,133.8
P. . . . .	411.4	473.6	651.9	819.1	<u>5/</u> 913.1
K. . . . .	659.0	847.0	1,005.9	1,190.3	1,184.6
Greece:					
N. . . . .	22.0	41.6	73.1	133.9	200.6
P. . . . .	19.0	30.6	58.6	101.8	118.5
K. . . . .	n.a.	n.a.	9.0	15.0	17.5
Ireland:					
N. . . . .	8.2	13.6	24.6	31.9	87.0
P. . . . .	50.3	54.7	78.9	104.5	182.5
K. . . . .	21.4	37.6	66.4	80.9	154.2
Italy:					
N. . . . .	156.5	253.9	322.6	461.8	594.5
P. . . . .	n.a.	n.a.	378.9	452.6	518.4
K. . . . .	19.0	57.0	103.8	167.6	225.3
Luxembourg:					
N. . . . .	3.1	3.7	4.8	6.8	10.5
P. . . . .	4.7	5.3	6.3	6.1	7.0
K. . . . .	3.9	5.4	6.1	7.0	8.0

See footnote at end of table

Continued

Table 22--Total fertilizer use, selected years, <sup>1/</sup> 1950/51-1970/71--Continued

(N = nitrogen; P = P<sub>2</sub>O<sub>5</sub> = phosphate; K = K<sub>2</sub>O = potash)

Country and fertilizer	1950/51	1955/56	1960/61	1956/66	1970/71
	<u>1,000 tons</u>				
Netherlands:					
N. . . . .	166.0	184.3	223.6	310.8	406.6
P. . . . .	120.0	110.6	112.1	114.8	109.4
K. . . . .	155.0	165.4	138.2	136.6	135.0
Norway:					
N. . . . .	30.7	37.7	50.1	62.9	77.8
P. . . . .	34.2	35.2	46.7	49.9	52.3
K. . . . .	41.3	48.7	53.7	56.8	67.5
Portugal:					
N. . . . .	31.9	43.8	63.8	88.3	110.2
P. . . . .	57.0	76.1	73.4	61.3	61.9
K. . . . .	5.0	6.1	6.9	16.3	20.0
Spain:					
N. . . . .	56.6	171.7	275.2	384.7	540.0
P. . . . .	136.0	268.2	279.4	305.5	428.6
K. . . . .	35.0	82.4	95.0	92.1	206.0
Sweden: <sup>6/</sup>					
N. . . . .	68.0	83.8	106.2	161.1	225.6
P. . . . .	105.4	103.9	103.6	120.0	146.2
K. . . . .	54.4	86.9	83.5	105.7	130.9
Switzerland:					
N. . . . .	9.0	11.0	16.2	25.3	35.7
P. . . . .	34.0	41.0	43.0	47.5	50.3
K. . . . .	14.0	22.0	42.0	60.0	61.5
United Kingdom: <sup>6/</sup>					
N. . . . .	218.8	380.3	230.0	689.7	800.1
P. . . . .	297.6	372.8	313.8	421.8	542.6
K. . . . .	464.0	429.5	453.3	436.3	533.8

n.a. = not available.

<sup>1/</sup> July-June year unless otherwise indicated.

<sup>2/</sup> Excludes other citrate solubles.

<sup>3/</sup> August-July year.

<sup>4/</sup> May-April year.

<sup>5/</sup> Includes ground rock phosphate.

<sup>6/</sup> June-May year.

Source: (4).

Table 23--Fertilizer use per hectare of agricultural area, selected years,  
1950/51-1970/71

(N = nitrogen; P =  $P_2O_5$  = phosphate; K =  $K_2O$  = potash)

Country and fertilizer	1950/51	1960/61	1970/71	Country and fertilizer	1950/51	1960/61	1970/71
	Kg/hectare				Kg/hectare		
Austria:				Luxembourg:			
N. . . . .	5	12	32	N. . . . .	21	35	78
P. . . . .	9	22	32	P. . . . .	33	46	52
K. . . . .	6	21	41	K. . . . .	27	44	59
Belgium:				Netherlands:			
N. . . . .	44	58	105	N. . . . .	69	97	185
P. . . . .	44	51	93	P. . . . .	50	49	50
K. . . . .	55	88	116	K. . . . .	65	60	62
Denmark:				Norway:			
N. . . . .	22	39	97	N. . . . .	29	49	72
P. . . . .	27	37	43	P. . . . .	33	45	55
K. . . . .	33	57	61	K. . . . .	40	52	71
Finland:				Portugal:			
N. . . . .	6	22	60	N. . . . .	9	15	22
P. . . . .	21	36	63	P. . . . .	17	18	13
K. . . . .	11	27	49	K. . . . .	2	2	4
France:				Spain:			
N. . . . .	8	16	43	N. . . . .	1	7	13
P. . . . .	12	25	55	P. . . . .	3	7	10
K. . . . .	12	22	42	K. . . . .	1	2	5
Germany:				Sweden:			
N. . . . .	26	43	84	N. . . . .	15	24	66
P. . . . .	29	46	67	P. . . . .	22	24	42
K. . . . .	47	70	87	K. . . . .	12	19	3
Greece:				Switzerland:			
N. . . . .	2	8	23	N. . . . .	4	8	16
P. . . . .	2	7	13	P. . . . .	16	20	23
K. . . . .	0	1	2	K. . . . .	6	19	28
Ireland:				United Kingdom:			
N. . . . .	2	5	18	N. . . . .	11	12	41
P. . . . .	11	17	38	P. . . . .	15	16	28
K. . . . .	5	14	32	K. . . . .	24	23	128
Italy:							
N. . . . .	7	15	30				
P. . . . .	0	18	26				
K. . . . .	1	5	11				

Sources: Tables 7 and 22.



Table 24--Agricultural use of insecticides 1/, selected years 1950-70

Country	DDT and related compounds			Benzene hexachloride and lindane		
	1950 <u>2/</u>	1961	1970	1950 <u>2/</u>	1961	1970
	<u>Tons</u>					
Austria. . .	300.2	70.5	20.5	n.a.	<u>3/</u> 459.0	<u>3/</u> 1,199.6
Belgium. . .	200.0	n.a.	n.a.	38.3	n.a.	n.a.
Finland. . .	15.6	33.0	6.1	n.a.	4.0	4.1
Germany. . .	<u>4/</u> 485.0	295.1	151.9	<u>4/</u> 180.0	143.0	88.4
Greece. . .	80.2	278.5	235.0	13.5	32.5	<u>5/</u> 57.2
Italy. . .	<u>3/</u> 1,001.0	<u>3/</u> 828.6	<u>3/</u> 1,491.6	<u>3/</u> 1,265.0	<u>3/</u> 3,517.0	<u>3/</u> 5,788.9
Luxembourg :	8.2	4.1	<u>5/</u> 2.7	n.a.	.8	<u>5/</u> 0.2
Netherlands:	120.0	n.a.	n.a.	80.0	n.a.	n.a.
Spain. . .	378.4	1,329.3	<u>3/</u> 1,200.0	440.6	2,067.4	<u>3/</u> 40.0
Sweden . . .	<u>3/</u> 865.7	<u>3/</u> 248.0	<u>3/</u> 6/184.0	<u>3/</u> 958.7	<u>3/</u> 237.0	<u>3/</u> 6/75.0
	Aldrin			Parathion		
		1961	1970		1961	1970
	<u>Tons</u>					
Austria. . .	<u>3/</u> 58.0	<u>3/</u> 110.7		<u>7/</u> 59.4	<u>3/</u> 44.3	
Belgium. . .	n.a.	n.a.		n.a.	n.a.	
Finland. . .	0.2	1.0		17.6	7.3	
Germany. . .	n.a.	n.a.		<u>8/</u> 253.0	<u>9/</u> 501.5	
Greece. . .	10.0	<u>5/</u> 131.2		93.3	<u>5/</u> 108.8	
Italy. . .	<u>3/</u> 2,074.0	<u>3/</u> 2,764.0		<u>3/</u> 1,153.9	<u>3/</u> 1,036.3	
Luxembourg :	0.3	<u>5/</u> 0.3		1.2	<u>5/</u> 1.4	
Spain. . .	9.1	<u>6/</u> 64.0		n.a.	<u>5/</u> 361.0	
Sweden . . .	n.a.	n.a.		<u>2/</u> 10/284.4	<u>3/</u> 10/155.0	

n.a. - not available.

1/ Quantities used or sold to agriculture. Active ingredients unless otherwise specified.2/ Average 1948-52. In some cases, the average is based on only 2, 3, or 4 years within this period.3/ Product weight basis.4/ 1952.5/ 1968.6/ 1969.7/ 1962.8/ Average 1961-65.9/ Consumption of malathion.10/ Consumption of organic phosphorous compounds--parathion, malathion, and others.Source: (h):

Table 25--Agricultural use of copper sulphate (fungicide)  
1/, selected years 1950-70

Country	1950 2/	1961	1970
	Tons		
Austria. . . .	842.5	263.5	325.9
Finland. . . .	3.1	0.1	n.a.
France . . . .	n.a.	n.a.	3/7,000.0
W. Germany . .	4/3,487.5	4/2,068.5	4/581.1
Greece . . . .	1,406.7	5/1,692.8	662.3
Italy. . . . .	3/77,018.1	5/47,928.0	3/17,038.5
Luxembourg . .	45.8	31.0	6/3.5
Portugal . . .	3/16,653.4	3/23,872.5	3/5,461.8
Spain. . . . .	2,906.4	2,439.4	500.0
Sweden . . . .	n.a.	6/144.0	6/146.0
Switzerland. .	n.a.	1,040.0	380.0

n.a. = not available.

1/ Quantities used in or sold to agriculture. Active ingredient basis.

2/ Average 1948-52. In some cases, the average is based on only 2, 3, or 4 years within this period.

3/ Product weight.

4/ Other copper compounds.

5/ Average 1961-65.

6/ Total copper and compounds.

Source: (4).

Table 26--Agricultural use of herbicides, 1/ selected years 1950-70

Country	1950 2/	1961	1970
	Tons		
Austria. . . .	3/37.8	3/447.0	3/2,160.0
Finland. . . .	n.a.	423.6	1,197.4
West Germany :	322.5	1,676.9	11,485.0
Greece . . . .	3/121.0	3/297.4	3/4/454.3
Italy. . . . .	3/244.0	3/1,616.2	3/5,777.6
Luxembourg . .	19.5	96.7	4/169.9
Spain. . . . .	3/23.0	3/416.0	4/509.2
Sweden . . . .	n.a.	3/3,095.0	3/5,777.0
Switzerland. .	n.a.	3/470.0	3/4/1,260.0

n.a. = not available.

1/ Quantities used in or sold to agriculture, unless otherwise specified. Active ingredient basis.

2/ Average 1948-52. In some cases, the average is based on 2, 3, or 4 years within the period.

3/ Product weight.

4/ 1968.

Source: (4).

percent; 20-100 hectares, 27.3 percent; 100-500 hectares, 28.4 percent; and over 500 hectares, 11.2 percent. In addition, the smaller the farm, the greater the percentage of farm area actually irrigated.

In 1968, the value of irrigated crops accounted for approximately one-fourth of the country's marketable output. The area in fodder accounted for the largest share of irrigated area, 1.2 million hectares, while market garden crop area was second at 630,000 hectares. Irrigated corn area was 340,000 hectares and fruit, 220,000 hectares.

The more prosperous region of northern Italy has the largest share of land equipped for irrigation, 72 percent of the total in 1970. Over 80 percent of the irrigation in Italy is by gravity--run-off, infiltration, and flooding. However, sprinkler irrigation, new in Italy, is rapidly gaining popularity, especially among larger farms. Nearly 70 percent of the water used for irrigation is river water, while ground water and water from reservoirs account for the remainder.

#### Greece (53).

Irrigation has been a primary factor in promoting agricultural growth in Greece. where the quality of arable land is often poor and land tends to erode.

Use of irrigation in Greece is relatively recent. Only 178,000 and 270,000 hectares were irrigated in 1929 and 1939, respectively. However, the Government's main concern during this period was drainage and flood protection. Due to the aftermath of the Second World War, little progress was made until 1950. During the 1950's irrigation development proceeded at an average annual rate of approximately 17,000 hectares. Total irrigated land more than doubled between 1950 and 1969, reaching 710,000 hectares and accounting for 5 percent of total land area, 8 percent of farmland, and 18 percent of cultivated land.

By 1962, about 80 percent of the land planted to rice and the major commercial vegetables was irrigated. By 1967, irrigated area reached 80 percent for sugarbeets and cotton, 61 percent for alfalfa, and 51 percent for corn.

#### Portugal (55).

Historically, water has been an important factor of production in Portugal and a frequent source of disputes between farmers. Portugal is unusual in that most of the irrigation has been by private interests, especially in the more prosperous northern and central portions of the country.

Irrigation developed slowly until recent years. In 1955, irrigated area totaled 620,172 hectares, 12.7 percent of the cultivated land. By 1970 it had increased by only 10 percent to 684,500 hectares, 14 percent of the cultivated area. The northern and central regions of Portugal account for nearly 80 percent of the area irrigated. However, the region around Lisbon and the southern part of the country have shown the greatest increase in irrigated area during the last two decades.

The latest figures available for the distribution of crops on irrigated land are for 1951-56. At that time arable crops accounted for the most area under irrigation, 481,000 hectares. Vegetables were the most irrigated crop with nearly 92 percent of the crop grown on irrigated land.

#### Spain (56).

In 1968, about 2.1 million hectares in Spain were irrigated, an increase of 48 percent from 1950. The proportion of arable land irrigated rose from

Table 27--Irrigated area in selected countries, specified years, 1955-69

Country and irrigated area	1955	1960	1965	1969
	1,000 hectares			
Greece:				
Irrigated cultivated area. . .	315	590	601	711
Agricultural area <u>1/</u> . . . .	8,661	8,871	8,871	8,870
Percent. . . . .	4	7	7	8
Italy:				
Area equipped for irrigation . .	2/2,526	3/2,778	4/3,010	5/3,400
Agricultural area <u>1/</u> . . . .	2/21,371	3/20,965	4/20,597	5/20,227
Percent. . . . .	12	13	15	17
Portugal:				
Irrigated area . . . . .	620	n.a.	660	684
Agricultural area <u>1/</u> . . . .	3,755	n.a.	4,515	4,990
Percent. . . . .	17	n.a.	15	14
Spain:				
Irrigated area . . . . .	n.a.	1,828	2,006	2,173
Agricultural area <u>1/</u> . . . .	n.a.	41,277	41,734	42,191
Percent. . . . .	n.a.	4	5	5
France:				
Equipped for irrigation. . .	2/350	n.a.	600	5/825
Agricultural area <u>1/</u> . . . .	2/34,049	n.a.	33,905	5/33,178
Percent. . . . .	1	n.a.	2	2

n.a. = not available.

1/ Taken from table 5.2/ 1956.3/ 1958.4/ 1962.5/ 1970.

Sources: (52), (53), (54), (55), (56).

8.2 to 10.4 percent during the same period. The annual rate of increase in irrigated area varied greatly. Between 1900 and 1940 there was a slow average growth rate of 6,500 hectares annually. The pace gradually quickened from an average of 14,000 hectares between 1950 and 1960 and 30,000 hectares between 1960 and 1964 to about 50,000 hectares a year during the latter 1960's. These figures refer to the activities of official agencies and do not include land irrigated under private schemes. Irrigation development accounted for 70 percent of total public investment in agriculture under the First Plan (1960-64) and 60 percent under the Second Plan (1964-67).

The greatest percentage of irrigated area is on the east coast along the Mediterranean and in the central regions of the country. For 1965/66-1966/67, almost three-fourths of the land planted to horticultural crops was irrigated--a larger share than for any other crop. However, grain accounted for most irrigated land--34 percent of total irrigated area. Value of output from irrigated land accounted for nearly half of crop production.

#### France (44).

Since rainfall is adequate in all but the southern portion of France, development of irrigation has been less crucial than in the other Mediterranean countries. Until recently, irrigation was confined to the southern provinces, but it is now spreading to the Beauce and Paris Basin where it is useful for regulating crop yields and raising the income level. With new techniques and increased capital, irrigation is becoming less labor intensive and more attractive for larger farms.

In 1970, 825,000 hectares in France were equipped for irrigation, accounting for nearly 4.6 percent of arable land and 2.5 percent of all agricultural land. The average annual increase in land equipped for irrigation was about 25,000 hectares between 1956 and 1965, and 45,000 hectares between 1966 and 1970. Most of the increase in irrigated area has come from sprinkler irrigation. Since sprinkler irrigation tends to be more expensive initially, it is not unusual that a wealthy country such as France would use it more extensively than the other Mediterranean countries.

## OUTLOOK

During the 1970's, agriculture as a percentage of GDP will probably continue to decline in Western Europe, although GAP continues to rise. Agricultural employment should continue to decline, but at a decreasing rate. A continuation of this trend will depend on the general economy and opportunity for employment in other sectors of the economy. Since most farm labor is now provided by the farmer and his family, a reduction in farm labor will probably come mainly from reduction in the number of farm operators (38).

The average size of full-time farms will continue to grow during the 1970's as land in small and part-time farms is sold or rented to the more viable full-time farms. Reform programs in the EC and most other countries are geared toward reducing the number of small farms and consolidating the land. This is achieved in part by introducing retirement programs and retraining opportunities for the younger farmer and his family. Retraining programs are generally geared toward rural industrialization since farmers frequently do not want to move too far from their home and a mass exodus to cities is not desirable.

In northern and central Western Europe the trend of increasing fertilizer and machinery use will probably slow considerably as fairly high levels of use have already been achieved. Also, as farm enlargement continues more efficient use will be made of farm machinery. However, in southern Western Europe there is much room for improvement. Use of pesticides and fungicides will probably continue to increase in most areas of Western Europe. Irrigation in the southern regions should continue to increase and will always be an important input in certain countries.

Agricultural income will continue to have an impact on agricultural policymaking. If farm employment continues to decrease and farms enlarge and become more viable, the income disparity between agriculture and other economic sectors should improve and governments may have more flexibility in introducing economic rationality into their agricultural trade policies.

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