WEST EUROPEAN DEMAND FOR

UNITED STATES FEED GRAINS

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ABSTRACT

WEST EUROPEAN DEMAND FOR UNITED STATES FEED GRAINS

by James Wilton Graves

Body of Abstract

Feed grains were produced in increasing quantities in United States

during most of the period from 1950 to 1961. Utilization failed to main-

tain pace with production resulting in growing carryover levels. Feed

grain surpluses in storage rose from 1.5 million tons in 1950 to more than

46 million tons in 1961. A revision of the domestic feed grain program

in 1961 allowed some reduction in carryovers, however considerable concern

over the size of the surplus is still evident.

One proposed solution to the United States surplus problem is to sell

all surplus products overseas. The purpose of this thesis was to evaluate

the potential foreign market for United States feed grains. Since Western

Europe has consistently been the major dollar market for agricultural

exports, it was decided to limit the study to this one area. The data used

in projecting the West European demand for United States feed grains were

obtained from secondary sources entirely; the most reliable being from the

Food and Agriculture Organization of the United Nations. Discrepancies

were often found between these and other published data. Only limited

information was available concerning the utilization of feed grains in

Western Europe. More data have been published in the past year, however,

and information on foreign markets is becoming more reliable with time.

In analyzing the factors influencing foreign demand for United States exports, an analytical model was developed. This model was presented in graphic form to bring out more clearly the effects of trade policies, foreign competition, and surplus levels. Such a model aided considerably in analyzing the empirical data and weighting the variables used in projecting the trends.

West European feed grain production and disappearance levels were projected to the periods of 1964-66 and 1969-71 in this thesis. It was estimated that the three-year average production level of 48 million metric tons during 1959-61 would increase to approximately 55 million metric tons by 1964-66 and 63 million metric tons by 1969-71. Following similar medium level projections of disappearance, it was estimated that the three-year average disappearance level of 63.6 million metric tons in 1959-61 would increase to 74 million metric tons by 1964-66 and 84 million metric tons by 1969-71. A range of high and low level estimates for these periods was based upon different sets of growth and policy assumptions. These projections indicated that West European feed grain import levels might reach from 13 to 26 million metric tons by 1964-66 with the greatest likelihood being in range of from 18 to 21 million metric tons. This range of imports was projected to be from 10 to 35 million metric tons with the most likely levels ranging from 19 to 26 million metric tons by 1969-71. Such projections were of little help in determining the portion of West European imports which might be supplied by United States. It was concluded, however, that United States exports to Western Europe would not increase sufficiently to solve the domestic surplus problem, although they would likely show a steady expansion given favorable trade policies.

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FOR

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By

James Wilton Graves

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CHAPTER I

THE FEED GRAIN SURPLUS PROBLEM

Surplus stocks of feed grains have presented a perplexing problem
to economists and policy makers in the United States for more than a
decade. Throughout the 1950's, the feed grains of corn, grain sorghum,
oats, and barley were produced in increasing quantities. Since the
total utilization of these feed grains failed to keep pace with produc-
tion, carryover levels continued to increase from 1952 to 1961. The
quantity of feed grains in storage under price support programs rose
from 9 million tons in 1952 to nearly 75 million tons by 1961. Through-
out the same period stocks on hand in commercial storage remained at
approximately 10 million tons, giving a total carryover going into the
1961 crop year of nearly 85 million tons (Table I-1).

The Problem

A new feed grain program went into effect in 1961, and as a result
of voluntary acreage reduction, total production fell by 15 million tons
from the previous year s high. This decline continued during the 1962
crop year, and stocks on hand at the beginning of the 1963 marketing
year were predicted to be 61 million tons, 11 million tons less than the
carryover into 1962. In spite of this abrupt change in the direction of
feed grain carryover levels, the federal programs do not pretend to have
solved the basic problem of supply and demand balance in the feed grain-
livestock economy. Federally controlled price and production programs

TABLE 1-1

UNITED STATES FEED GRAIN SUPPLY AND UTILIZATION
BY YEAR 1950/51 THROUGH 1963/64

Marketing Year	SUPPLY				UTILIZATION			DESIRABLE CARRYOVER	SURPLUS
	Beginning Stocks	Production	Import	Total	Domestic Use	Export	Total		
	(a)	(b)						(c)	(d)
				----Million Short Tons----					
1950/51	30.5	113.1	.8	144.4	109.4	6.4	115.8	29.0	1.5
1951/52	28.6	104.8	1.3	134.7	109.8	4.8	114.6	28.6	0.0
1952/53	20.1	111.0	1.7	132.8	100.5	5.3	105.8	26.4	-.3
1953/54	27.0	108.3	2.2	137.5	102.0	3.8	105.8	26.4	.6
1954/55	31.7	114.1	.9	146.7	102.1	5.5	107.6	26.9	4.8
1955/56	39.1	120.8	.8	160.7	109.3	8.1	117.4	29.4	9.7
1956/57	43.2	119.3	.9	163.4	106.9	7.4	114.3	28.6	14.6
1957/58	48.8	132.4	1.0	182.2	113.9	10.5	124.4	31.1	17.7
1958/59	59.0	144.1	.4	203.5	123.7	12.8	136.4	34.1	24.9
1959/60	67.5	149.6	.5	217.6	128.8	12.2	141.0	35.2	32.3
1960/61	74.6	155.6	.4	230.6	133.6	12.3	145.8	36.4	38.2
1961/62	84.7	140.6	.4	225.7	135.6	17.6	153.3	38.3	46.4
1962/63 (e)	71.8	143.1	.2	215.1	136.5	16.3	152.8	38.2	33.6
1963/64 (e)	63.1	155.9	.5	219.5	136.7	18.0	154.7	38.7	24.4

Notes:
(a) Stocks of corn and grain sorghum in all positions on October 1, and oats and barley on July 1.
(b) Grain only, excluding corn in silage, forage, and hogged off.
(c) Computed as one fourth of total utilization.
(d) Beginning stocks less desirable carryover.
(e) Preliminary figures.

Source: Economic Research Service, U.S.D.A., Feed Situation, September, 1962, p. 28, and February, 1964, p. 5.

can offer temporary relief but at a high cost to taxpayers. The basic
imbalances still remain unless major adjustments are made. The difference
between imports plus production, and total utilization is the amount
that is added to stocks each year. This difference was between four
and ten million tons each year during the entire period from 1952/53
until 1961/62 (See Table I-1). In September of 1961, carryover stocks
were ten million tons larger than those of a year earlier. However,
reduced production during 1961 (15 million tons less than the previous
year) helped bring the 1962 level of surplus stocks down by 13 million
tons.

Feed Grain Surpluses

Considerable difficulty is encountered in defining the exact quan-
tity of feed grains that can be termed surplus. It would not be con-
sidered desirable to enter any crop marketing year without some stocks
from the preceding year on hand. Only the quantity in excess of this
desirable carryover level can be realistically called surplus. The
problem then becomes one of determining the desirable level of carry-
over to maintain. In order to provide some protection against crop
failure and wartime shortages, it has been estimated that at least one
quarter of a year's domestic and export requirements needs to be carried
over into the next marketing year.[1] This carryover level is presented
in Table I-1 under the heading "Desirable Carryover". The difference

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[1] James T. Bonnen, "How Large is the Surplus of Farm Products",
Quarterly Bulletin, Michigan Agricultural Experiment Station, Vol. 40,
No. 4, (East Lansing: May, 1958), pp. 921-923; M.R. Benedict, "Current
Imbalance of Supply and Demand for Farm Products", Policy for Commer-
cial Agriculture, Joint Economic Committee Print, (85th Congress, 1st.
Sess: 1957), p. 99; and, Karl Fox and O.V. Wells, Reserve Levels for
Storable Farm Products, Senate Document No. 130, (82nd Congress, 2nd
Sess: 1952), pp. 4-7.

between the beginning stocks on hand and the desirable carryover from
1950/51 through 1963/64 is shown as surplus in the right column. Figure
I-1 shows the increases in the size of the surpluses of feed grains that
occurred from 1954 through 1961. Should the downward trend in beginning
carryover since 1961 continue at the same rate as it has in 1962 and 1963,
by 1965 or 1966 the entire quantity of surplus feed grains would be elim-
inated. Such a projection requires an assumption that production will
remain 10 to 15 million tons less than utilization, and that the general
increase in utilization will continue.

Undoubtedly the one factor that has had the greatest influence in
the size of the surplus has been the price support and acreage control
programs. Higher support prices tend to increase production and reduce
utilization. A stricter acreage control program or a widely accepted
acreage reduction program such as initiated in 1961 would tend to reduce
total feed grain production. In order to understand the reasons for the
buildup of surpluses, it is necessary to examine the relationships be-
tween price supports and production control programs. At the price sup-
port levels existing from 1954/55 through 1961/62, feed grain surpluses
built up rapidly. Price support and production control conditions ex-
isting in the late 1950's encouraged overproduction and brought about
the large quantities of surplus grain in government loan. An eventual
elimination of price supports or tightening of production controls could
cause feed grain surpluses to disappear, but the adjustment period would
be difficult for both farmers and the federal administration.

Even though price supports declined from 1954 through 1960, the
quantities of feed grains placed under the support program continued
to expand. The increase in carryover levels were caused by the use
of new technology combined with ineffective production controls, and
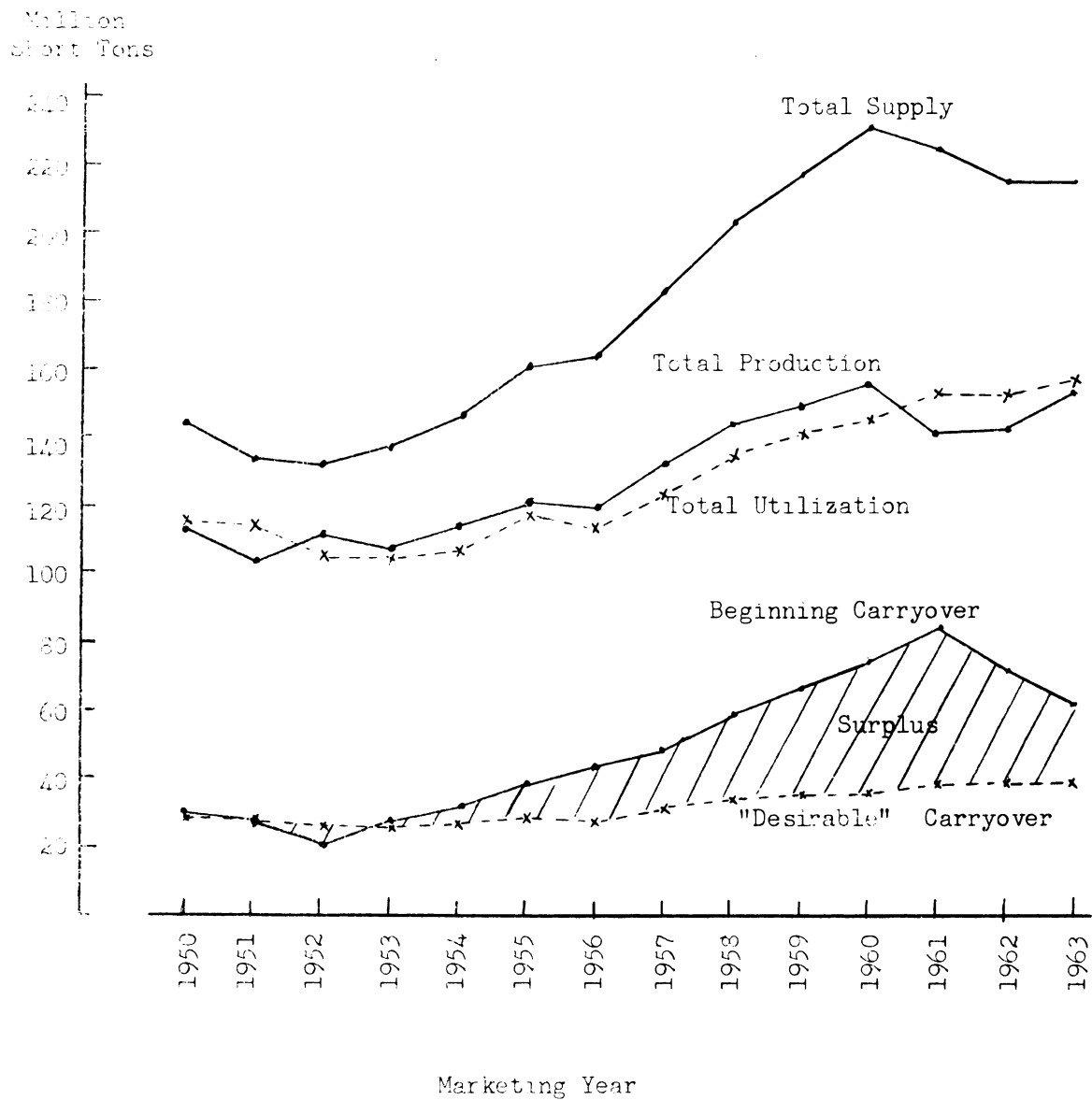
FIGURE I-1

TOTAL SUPPLY AND UTILIZATION OF FEED GRAINS IN UNITED STATES
1950 TO 1963 SHOWING SURPLUS STOCK ACCUMULATIONS

drastic action would have been required to counteract this trend.[2]
The present patterns of feed grain production and utilization can be
more easily understood by examining the changes that have occurred during
the past 30 years. An understanding of these changes presents an in-
sight into future adjustments that may occur.

Objectives

Three major objectives instigated the development of this thesis.
The first objective was to examine the forces which effect demand and
supply relations in feed grains and cause surpluses or shortages. These
forces differ throughout various countries and must be considered in
the context of economic development and foreign policy.

The second objective was to present a framework of analysis for
use in projecting subsequent demand and supply relationships. It was
felt that if a geometrical model could be successfully developed to
graphically portray the effects of demand and supply forces, projections
could be attempted from extensions of current trends.

The third objective was to present projections of the West European
demand for United States feed grain exports for a period in the immedi-
ate future and for a more distant future period. Although institutional
relationships exert a major influence on the foreign market for feed
grains, it was felt that economic undercurrents and physical demand
and supply limitations present a foundation upon which foreign policy
could best be based. By projecting high and low levels of demand and

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[2] Geoffrey Shepherd, Appraisal of the Federal Feed-Grains Programs,
North Central Regional Publication No. 128, (Ames: January, 1962), pp.
355-360.

supply relationships and pointing out the policy implications, alterna-
tive future projected levels could be compared.

Method of Analysis and Previous Research

This study of West European demand for United States feed grains
first examines the components of feed grain utilization and production.
The main factors influencing demand and supply are briefly reviewed and,
where possible, compared quantitatively. Due to the weaknesses of avail-
able data, a graphical analysis is developed for use in projecting post-
war trends. Projections for two periods, 1964-66 and 1969-71 are presented
at high, medium, and low levels of West European utilization and produc-
tion. The wide range encompassed by these projections is then analyzed
with regards to policy implications.

At the time this study was originated, very little previous research
had been published concerning West European demand for specific agri-
cultural products. Consistent and reliable data of that area's imports,
production, and utilization of feed grains were unavailable. Information
obtained from publications of the Food and Agriculture Organization of
the United Nations appears to be the most acceptable of any published
during the 1950's. In attempting to use USDA reports and data published
by the Bureau of the Census, considerable difficulty was encountered.
Consistency of year-to-year feed grain exports from United States to
Western Europe was not satisfactorily obtained from these data due in
part to the methods of sampling shipments used by the Bureau of the
Census and the lag in reporting some shipments. These same problems
were encountered by Benedict, Bauer, and Hollerman in their development
of tables showing destinations of United States farm exports and are
discussed in the supplement to Farm Surpluses: U.S. Burden or World

Asset?[3]/

During the first three years of the 1960's, the United States De-
partment of Agriculture (USDA) has published many studies of the foreign
market for United States agricultural exports. A selected sample of
the results of their studies pertaining to the West European area is
presented in the bibliography of this thesis. A review of these studies,
as well as others pertinent to the problem, would serve little purpose
here. References are made throughout this thesis to previous studies
where a review of such work would aid in a more comprehensive analysis
of particular points.

Today's problems of feed grain surpluses did not come about in
just a few years. Imbalances have been present for years and the cum-
ulation of this excess supply have left United States with a burdensome
problem which will not be solved immediately. A better understanding
of the nature of the present surplus problem can be obtained by exam-
ining the changes in supply and utilization which have occurred during
the middle years of the twentieth century.

Historical Changes in Feed Grain Supply and Utilization

Between 1925 and 1960 a large expansion in the supply and utili-
zation of feed grains occurred. Table I-2 shows five-year averages of
feed grain supply and utilization levels over those four decades. Carry-
over levels, while fairly large during the second World War (between
11 and 23 million tons), did not really become a problem until after
the Korean War. In the period 1946-50, the Commodity Credit Corporation

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[3]/ M.R. Benedict, E.K. Bauer, and M.S. Hollerman, Destinations of
U.S. Farm Exports and Sources of U.S. Agricultural Imports, (Division
of Agricultural Sciences, University of California, 1962), p. 89.

TABLE I-2

HISTORICAL CHANGES IN FEED GRAIN SUPPLY AND UTILIZATION IN UNITED STATES,
FIVE-YEAR AVERAGES 1926-30, 1936-40, 1946-50, AND 1956-60

Period	1926-30	1936-40	1946-50	1956-60
Supply (a)		------Million Short Tons------		
Carryover (Total)	8.1	14.5	18.7	58.6
(Government) (b)	(d)	(4.3)	(7.3)	(49.8)
Production	86.0	83.0	110.8	140.2
Imports (c)	.1	.9	.5	.7
Total	94.2	98.4	129.9	199.5
Utilization				
Livestock Feed	76.7	70.1	90.2	108.7
Food, Industry, Seed	8.5	9.6	12.8	12.8
Exports (c)	1.7	1.8	4.8	11.1
Total	86.9	81.4	107.7	132.6
Animal units fed annually (Mil.)	153.4	147.2	160.6	164.6
Feed grains fed per animal unit (Ton)	0.50	0.48	0.56	0.66

Notes: (a) Year beginning October 1 for corn and grain sorghum, and
            July 1 for oats and barley.
        (b) Under loan or owned by CCC.
        (c) Includes grain equivalent of products.
        (d) Less than 50,000 tons.

Source: Computed from Table 15, Feed Situation, Economic Research Service,
         (U.S.D.A.: September, 1962), p. 28, and Grain and Feed Statistics
         Through 1961, Economic Research Service (U.S.D.A.: Revised June,
         1962), Statistical Bulletin No. 159, Table 1, pp. 3-5.

(CCC) did not obtain significant quantities of feed grains until 1949 (15 million tons). Imports of feed grains (mostly oats) have remained negligible relative to production throughout the periods studied. Production on the other hand, has increased from an average of 86 million tons in 1926-30 to a 140 million ton average in the period 1956-60. Even more significant is the fact that production increased from 119.3 million tons in 1956/57 to 155 million tons in 1960/61 (Table I-1). During the three earlier five-year periods shown in Table I-2, there had been no definite trend of annually increasing production as was seen between 1956 and 1960. The total supply of feed grains for the period 1956-60 averaged more than twice the supply of the period 30 years earlier.

Expansion in utilization has not been as rapid as in production, however. From 1936-40 to 1956-60, total utilization increased by only 51 million tons while total supply increased by more than 100 million tons (Table I-2). The greatest absolute increase in utilization has been for livestock feed. Quantities fed to livestock increased from an average of 70 million tons in 1936-40 to 109 million tons in 1956-60. Increases in feeding rates and livestock numbers during that period more than offset the declines in feed consumed by horses. Uses of feed grains for seed, industrial purposes, and food have shown a steady, but relatively small, rise. Any increases in the use of feed grains for seed would be expected to be followed by increased production and greater carryovers. Unless economically profitable uses of feed grains for industry are discovered, there is not much optimism for increasing utilization through this outlet. There is also very little likelihood that increases will occur in the consumption of feed grains as food.

The dietary trend toward more meat and less cereal products will very likely continue rather than be reversed. Therefore, the only reasonable conclusion is that domestic increases in feed grain utilization will come about through increased uses of livestock feed.[4]

Livestock Feed

A comparison of the changes in quantities of feed grains fed per animal unit as shown in Table I-2 indicates a trend toward increasing consumption per animal since 1936-40. From 1936-40 to 1946-50, animal units fed annually increased by nine percent while feed grains consumed by livestock increased 29 percent. Between 1946-50 and 1956-60, animal units increased by only two percent while feed grains fed to livestock increased by 20 percent. If this relationship continues to hold in the future, a 5 percent increase in animal units on feed would be expected to consume more than a 5 percent increase in feed grains. In order to increase feed grain consumption sufficiently to absorb the amount of surplus in 1962/63, an extremely large increase in animal units on feed would be necessary. The average surplus between 1956-60 was 25.5 million tons, (computed from Table I-1), meaning consumption by livestock would have had to increase by 23 percent to absorb the total surplus as livestock feed. Such an increase in feed grain consumption by live-stock could be accomplished by a less than 23 percent increase in live-stock numbers only if the feeding rates continued to increase also. The rate of feed grain consumed per animal unit rose to .72 ton in 1961/62

[4] Wheeler McMillen, "New Uses and New Crops", Policy for Commercial Agriculture, (Joint Economic Committee Print, 85th Congress, 1st. Sess. November 27, 1957), pp. 612-627.

and 1962/63. Although feeding rates may increase slightly, further
increases in grain consumed by livestock will undoubtedly be influenced
more by changes in livestock numbers than by increases in the amount
of feed consumed per animal unit.

Feed Grain Exports

The final item listed under "Utilization" in Table I-2 is exports.
Even though the total quantity of feed grains exported is less than ten
percent of total utilization, the expansion in exports has been quite
remarkable during the 1950's. Exports of feed grains increased by more
than five hundred percent between 1926-30 and 1956-60. This is almost
as great a relative increase as the increase that occurred in carryover
stocks over the same time span. In 1962/63, 16.3 million tons of feed
grains were exported, a slightly larger quantity than the total amount
used domestically for seed, industry, and food. Should such increases
in feed grain exports continue during the next few decades, the problem
of excess production would no longer exist. It is the goal of this
thesis to examine one occasionally suggested solution to the surplus
problem—that of expanding the exports of feed grains sufficiently in
the major dollar market area to reduce carryovers to a desirable level.
In recent history, Western Europe has been the most important cash market
for United States feed grains. The role which this market may play in
the future is examined carefully in the following chapters.

There have been differing views of future opportunities for United
States feed grain exports. Total feed grain exports had more than tripled
from 1953 to 1961, but this increase does not truly indicate a shift
of such magnitude in foreign demand. For example, during the fiscal

year 1961/62, 9.7 million dollars of export payments were made on feed grains.[5] Government programs were most influential in the exporting of feed grains during the decade of the fifties. When export subsidies are in effect, the conditions of sale must be carefully evaluated to accurately interpret the foreign demand for feed grains. The programs under which these grains were exported must be examined as well as the prices paid and terms of payment.

In order to analyze trends and projections of the exports of feed grains it is necessary to carefully examine the major factors which influence foreign demand. Foreign demand is used here to mean the relationship between the quantity that will be purchased from this country by all foreign nations and the corresponding price at any given time and place. Due to the complex nature of foreign trade data, this demand relationship for feed grains cannot be obtained directly from available statistics. Even though quantities traded may be reported regularly, variations in grades, prices, terms of trade, and exchange ratios make demand relationships difficult to determine. An estimated 71.2 percent of the corn exported in the fiscal year 1958/59 was sold at a price reduction, and over 90 percent was sold with some assistance from government programs. The export price quoted by the United States government is obtained from dividing the estimated value by the total amount exported. Such a price is not representative of the cost involved to foreign countries and is of little use in determining effective foreign demand. If any nation can import feed grains at reduced prices, as a donation, or in trade for some of their own exports, it seems unlikely

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[5] Eleanor N. DeBlois and Robert L. Tontz, "Export Payment Assistance to U.S. Agricultural Exports", Foreign Agricultural Trade of the United States, (Economic Research Service, U.S.D.A.: June, 1963), p. 21.

it would purchase as much for actual hard currency as if it had to buy
all their feed grain imports at world market prices.

Government assistance to export trade is administered under several
programs. Public Law 480 (P.L. 480) is mainly concerned with increasing
exports of surplus commodities held in storage by CCC. The Agricultural
Act of 1949 authorized donations of surplus agricultural commodities
to foreign people in need. Recent amendments have authorized further
donations to prevent or reduce domestic storage wastes. The Mutual
Security Act of 1954(Public Law 665) authorized mutual security programs
for agricultural commodities under its Section 402. In most cases, the
feed grains exported under these programs have been sold for foreign
currencies. In addition to these programs, the United States govern-
ment assists the exports of feed grains by extending credit to some
purchasing nations and by selling at less than domestic market prices
or paying exporters in cash or in kind to export surplus commodities.
It is difficult to determine the effect of these government programs
on the long term adjustments of the foreign demand for United States
feed grains. Foreign countries look upon these programs as of temporary
duration and not to be counted on in future growth plans. Importing
nations hesitate to plan on obtaining feed grains under these programs
in the future, and instead turn to building up their own production.

The major areas importing feed grains are Western Europe (noncom-
munist nations), Japan, Canada, Mexico, Israel, South Korea, Poland,
and India. Exports from United States to Western Europe and Japan have
been increasing in recent years while those to Canada have fallen.
The majority of the feed grains exported to Israel, Korea, Poland, and
India have been under P.L. 480 programs and not sold for hard currency.
United States, Argentina, Canada, and Australia together export more than

three-fourths of all feed grains exported in the non-communist world.
Competition for world markets has become more intense in recent years
and problems of product promotion and market expansion have developed.

Following this brief background concerning the large feed grain
surplus and difficulties of analyzing foreign market potential, Chapter
II presents a review of the variables influencing levels of feed grain
utilization and production throughout the world. These variables differ
between countries of the world, and the relationship between alternative
uses is shown for both the developed and underdeveloped areas.

CHAPTER II

UTILIZATION, PRODUCTION, AND TRADE

Total quantities of feed grains utilized in different countries
throughout the world are influenced by many factors. Feed grains are
used for food and seed, in beverages, industrial products, and livestock
feed in varying degrees of importance in nearly every country. Grains
principally fed to livestock in this country are a main item in the
human diets of underdeveloped areas. In world trade, corn, oats,
barley, and sorghum grains together with millets and mixed grains are
classified as coarse grains in contrast to the bread grains; wheat and
rye. This chapter will examine the world demand and supply of coarse
(or feed) grains and recent patterns of trade for these products.

Feed Grain Demand

Variables which influence the demand for coarse grains for use as
food differ from those which influence their demand for feed. Quanti-
ties of coarse grains used for these two purposes far exceed quantities
demanded for all other uses. As a country's economic development pro-
gresses, adjustments in human diets occur influencing the flow of grains
away from human food and into livestock feed. These changes are examined
briefly in the following review of feed grain uses throughout the world.
It is the purpose of this section to show how the major proportion
of grain usage shifts from human to livestock consumption with advances
in economic development.

Demand for Food

Feed grains are consumed as meal, flour, flakes, and baking ingredients in human food. Relatively large quantities are prepared for human consumption in farm households of many economically undeveloped countries. More than half of the feed grains utilized in India, Pakistan, and the Republic of South Africa are consumed as food directly on the farms where it is produced and very little is prepared commercially.[1]/ The majority of the agrarian population of these countries has little knowledge of bread grains or more desirable diets and therefore little incentive to change their present consumption practices. Shifts to higher protein diets cannot be anticipated in these countries without major changes in income and education levels.

In contrast, those countries with relatively well-developed economies use only small amounts of feed grains for human consumption. In countries such as Israel, Canada, United States, and those of Western Europe, less than 10 percent of the total disappearance is consumed as food. Human diets in these countries are composed of bread grains rather than feed grains, and only small amounts go into human consumption to satisfy certain tastes and customs. Demand for breakfast cereals, flours, and margarines using feed grains is relatively stable, changing more with population than with income or price changes. Increases in population will increase the demand for feed grains for food only in low income areas, however, and as incomes rise, demand will tend to decline. In countries with developed economies there appears to be very little

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1/ "Domestic Utilization of Coarse Grains", Monthly Bulletin of Agricultural Economics and Statistics, No. 10, Vol. VIII, (FAO, Rome: October, 1959).

opportunity for increasing the consumption of feed grains as human food since this would require a reversal of trends in tastes and preferences.

Demand for Beverages, Industrial Uses, and Seed

Feed grains are utilized in the manufacture of beverages and in certain industrial uses only to a minor extent throughout the world. In the United States, corn is used for alcohol, distilled spirits, beer, and industrial products. Barley is an important input in the brewing industry in most countries, however. Sorghum grain usage is similar to corn for beverages and industrial products. Oats are very seldom utilized for either beverages or industry. In less developed economies, only a small amount of feed grains is used in beverages or industry and this will very likely remain true in the immediate future. The volume of feed grains used for seed depends primarily on the specific kind of grain grown. Barley and oats require higher seeding rates than do corn and sorghum grains. Production practices, yields, and total acres planted also influence the demand of these grains for seed. As domestic feed grain production expands, the demand for seed also expands, but this is generally satisfied from home production, not imports. In many countries the total utilization of feed grains in the form of beverages, industrial uses, and seed comprises less than twenty percent of total disappearance.

Demand for Livestock Feed

By far the greatest use of feed grains in the world is for feed for livestock (including poultry). Throughout most of North America and Western Europe, three-fourths or more of total consumption goes into livestock feed. Feeding rates for livestock are generally higher in

countries with well-developed economies than in less developed areas.
Individual grains are fairly interchangeable in feeding livestock.
The only major exception to this generalization is the feeding of draft
animals. Oats, more often than other grains, are fed to horses and
the continuing decline in numbers of draft animals has reduced the demand
for oats in United States, Western Europe, and other developed countries.
Hogs are the greatest consumers of feed grains throughout the world
and can utilize all types of grains relatively efficiently. In addi-
tion to utilizing feed grains, hogs and cattle consume some rye; while
wheat is fed to poultry in many countries. Potatoes form an important
source of feed for livestock in many European countries, especially
during years of low grain yields. Bread grains and potatoes act as
substitutes for feed grains to some extent in livestock feeds in the
more highly developed economies. Since 1955, world feed grain consump-
tion has increased, mainly due to increases influenced by rising stand-
ards of living. As a standard of living rises, diets tend to shift
from feed grains to bread grains and to livestock products such as meat,
dairy products, and eggs. The small quantities not used for human con-
sumption disappear into feed consumed by livestock.

Factors Influencing Feed Grain Demands

In order to project demands for feed grains into the future it
is necessary to consider the various factors which affect a particular
consuming area. Consumption of feed grains as food will likely be re-
stricted to undeveloped areas with low income and high population rates.
The small quantities of feed grains used for food, beverages, and in-
dustrial purposes in highly developed economies are not greatly influenced

by incomes or prices and these volumes are relatively unimportant in total consumption. Of course, discoveries of new industrial uses for feed grains may create new demands, but it does not appear likely that these new demands will become important in the near future. It is also evident that the demand for feed grains as food depends directly upon the population size and inversely upon the per capita income and availability of bread grains. Hence, it is generally accepted that advancements in education or income levels, standards of living, and food technology will not have any significant positive affect on the demands for feed grains for food.

Increases in the consumption of livestock products in the future will exert the greatest influence on the demands for feed grains. A shift from cereal to meat type diets greatly increases the need for feed grains since the calories required for livestock maintenance must be obtained from the grains before being converted to food nutrients. The major factors influencing the demand for livestock products are per capita incomes, prices of these products, and eating habits. In countries where the standard of living is increasing along with the population, the demand for livestock products and, consequently, feed grains is likely to increase. Many areas of the world will likely experience such increased demand in the future. In Western Europe, demand expansion for livestock products has occurred consistently since World War II. The per capita consumption of livestock products in Western Europe has increased along with the population and there seems to be no reason to expect an abrupt change in this trend.

In order to attempt a prediction of future consumption of feed grains, the economy of the area in question must be analyzed. Variables

such as income levels, dietary customs, religions, prejudices, relative prices of livestock products and feed grains, population potentials, and other forces affecting the standard of living must be identified and studied. If the demand for livestock products can be projected and if the major use of feed grains is for livestock feed, a projection of the demand for feed grains can be obtained. The demand for feed grains is thus obtained or "derived" from an analysis of the demand for livestock products.

Unfortunately, not all fluctuations in the demand for livestock products are reflected by changes in demand for feed grains. Short-time shifts in the demand for livestock products may be absorbed within the marketing channels and have little affect on feed grains. Permanent shifts in demand due to changes in standards of living, disposable consumer incomes, and populations do have important effects on the demand for livestock products and are influential in the changes in demand for feed grains. In addition to a consumer demand for livestock products, there are other factors which influence the demand for feed grains for use as livestock feed. Some of these are the availability of substitutes for feed grains, the state of feeding technology, and the information available to producers. Substitutes for feed grains vary in different areas of the world but might be thought of as food grains, pasture, forage and silage, and potatoes. The state of knowledge of producers influences their reaction to changes in supplies of livestock feeds and demand for livestock products. As producers become better informed of efficient feeding methods and new technology, their demand for feed grains may change. The present state of economic development, the type of information services available, transportation facilities,

and the existing level of technology all affect feeding practices, and
as a result, the demand for feed grains.

An area with a highly developed economy will have a much different
demand for livestock products, a different choice of substitutes for
feed grains, and a different level of feeding knowledge than an economic-
ally undeveloped area Any changes in these factors will lead to dif-
ferent repercussions on the demand for feed grains in different economies.
Obviously, there is a great difference between indicating a tendency
and direction of a change in demand and predicting the amount of the
change. While it is possible to theorize that, given certain assumptions,
an increased demand for livestock products will eventually cause an
increased demand for feed grains, it is quite a different problem to
predict the prices and quantity that would satisfy equilibrium conditions
in future feed grain markets. This problem will be further examined
in the following chapters.

Utilization, Production, and Trade Statistics

Table II-1 compares the major uses of feed grains for twenty different
countries. Column one shows the average annual quantities of all feed
grains consumed in each of the different countries during the period
from July 1, 1955 to June 30, 1958. During that period, United States
consumed nearly ten times the amount consumed in any other country listed
in this table. Columns two through six list the percentages of the
quantities in column one that are used for the various purposes. In
three countries, the waste and loss estimates were not reported while
in United States it was included under "feed for animals". The figures
for Pakistan combine percentages of feed grains used for food, beverages,

TABLE II-1

DOMESTIC UTILIZATION OF FEED GRAINS BY TYPE OF USE IN SELECTED COUNTRIES
AVERAGES FOR YEARS 1955/56 THROUGH 1957/58

Country	Total Domestic Consumption 1,000 Metric Tons	Feed for Animals	Human Food	Beverages and Industrial Uses	Seed	Waste and Loss
		— Percentage of Total Domestic Consumption —				
Israel	295	93.2	1.7	1.0	2.7	1.4
United States	109,196	89.6	3.7	4.4	2.3	a/
Netherlands*	2,801	89.0	7.0	2.7	1.3	...
France*	9,024	87.8	0.0	5.3	6.3	0.6
Switzerland*	580	87.4	8.1	1.2	1.6	1.7
Canada	11,754	87.4	2.2	3.5	6.9	...
Norway*	593	84.7	4.7	3.0	6.4	1.2
Austria*	1,359	77.0	5.1	9.6	6.2	2.1
United Kingdom*	8,957	76.8	5.5	12.6	3.9	1.1
Poland	3,962	74.5	5.8	4.0	13.0	2.7
West Germany*	8,073	74.1	4.3	15.1	4.0	2.5
Italy*	4,836	73.6	18.6	2.0	4.5	1.3
Ireland*	1,018	70.3	3.5	11.9	6.9	7.4
Turkey	4,849	69.7	10.?	0.4	14.7	4.7
Finland*	1,093	61.1	...	1.7	12.4	17.6
Australia	1,121	60.5	...	15.8	18.5	...
Portugal*	674	42.4	...	1.9	7.9	0.3
Republic of S. Africa	2,708	33.7	...	6.4	2.8	1.8
Pakistan	1,898	22.4	...	b/	0.7	2.7
India	12,081	1.1	...	0.0	4.?	4.?

Notes: a/ Included in "Feed for Animals"
b/ Human Food, Beverages and Industrial Use not separated for Pakistan
... Data Unavailable
* Western European Countries

Source: Monthly Bulletin of Agricultural Economics and Statistics, Table 2, pp. 19-17, Volume VIII, 26,35 October 1959, (FAO, Rome).

and industrial uses. However, it is logical to assume that the break-
down for Pakistan would be similar to that in India, and a large portion
of the 68 percent was used for human food. Countries marked by an as-
terisk are located in Western Europe and all except Portugal utilize the
majority of the feed grains consumed for livestock feed.

A few of the more accurate estimates of the non-communist world
production of feed grains are presented in Table II-2. The totals in
this table include corn, barley, oats, sorghum grains, millets, and mixed
small grains usually produced for livestock feed. The world total prod-
uction has been influenced to a considerable extent by annual fluctuations
of United States corn production. The first four nations; Argentina,
Australia, Canada, and United States are the major exporters of feed
grains but not, in all cases, the major producers. It should be noted
that in Table II-2 production is measured in metric tons (2204.62 pounds)
while the unit of measurement in Table I-1 was the short ton (2000 pounds).
The production of millets and mixed grains in United States is relatively
small and does not influence the totals significantly. In Europe and
other areas, some domestically produced and consumed small grains are
not accurately reported and estimates of the production of mixed grains
may not be very reliable.

World Trade

Before examining the West European market for United States feed
grains in detail, it is beneficial to examine the trade relationships
of consuming and producing areas of the world with respect to feed grains.
In Table II-3, it can be seen that United States dominates exports of
feed grains and Western Europe dominates imports. United States exported

TABLE II-2

WORLD PRODUCTION OF FEED GRAINS BY TYPE AND SOURCE
AVERAGE FOR 1952-57 AND BY YEAR
FROM 1958/59 THROUGH 1962/63

	Average 1952/53- 1957/58	Crop Year[a/]				
		1958/59	1959/60	1960/61	1961/62	1962/63[b/]
			Million Metric Tons			
Grain Type						
Corn	129.7	139.9	155.8	161.9	154.2	154.4
Barley	46.4	51.4	51.5	53.9	49.4	56.4
Oats	42.8	43.3	37.6	39.8	35.0	33.0
Sorghum & Millets	36.2	47.5	46.2	47.9	44.5	45.0
Mixed Grains	5.1	13.8	14.4	14.4	11.7	9.2
Source of Production						
Major Exporters						
United States	115.7	131.6	136.3	142.0	128.3	130.8
Canada	13.5	13.6	13.5	12.5	8.8	12.3
Argentina	6.0	8.8	8.3	8.7	9.2	6.7
Australia	1.8	3.4	2.1	3.3	2.4	2.5
(Total)	(137.0)	(157.4)	(160.2)	(166.5)	(147.8)	(152.3)
Other Producers						
Western Europe	43.0	41.5	47.2	50.3	48.3	51.6
Far East[c/]	22.1	23.5	31.2	32.2	31.0	31.2
Africa & Near East	37.4	39.2	38.3	40.8	39.1	41.7
Others	20.5	33.4	29.1	26.2	27.9	21.6
World Total[d/]	260	295	306	318	295	298
Major Exporters				Percent		
As % of Total	53	53	52	52	50	51

Notes: a/ Crop Years: United States, July/June; Canada, August/July;
Argentina and Australia, December/November.
b/ Provisional Estimates.
c/ Excluding Mainland China, North Korea, North Viet-Nam.
d/ Excluding Eastern Trading Area.

Source: Monthly Bulletin of Agricultural Economics and Statistics: Volume
VIII, No. 2 and 12; Vol. IX, No. 7/8, Vol. 10, No. 2, 7/8, Vol. 11,
No. 2, and Vol. 12, No. 2, 6 and 9. (FAO, Rome).

14.8 million metric tons of feed grains in the year from July 1, 1962 to June 30, 1963. This was one-half of the 27.3 million metric tons exported by all countries. Western Europe dominated the import market even more than United States dominated exports. In that same marketing year, Western Europe imported slightly more than 73 percent of world imports. Almost 65 percent of all United States feed grain exports went to Western Europe and 9.5 of the 17.9 million tons of West European net imports came from United States. Although a total of 20.4 million tons were imported by Western Europe, countries in this area exported 2.5 million tons giving a total of 17.9 million tons of net imports.

As can be seen from Table II-3, Argentina, Canada, Australia, France, and the Republic of South Africa were the major feed grain exporting countries other than United States. An analysis of specific grains shows Argentina has traditionally been an important exporter of corn, and Canada and Australia have exported oats and barley. In 1962/63, France exported most of its surplus barley and corn to other West European countries.

Major importing countries outside Western Europe were Canada, Japan, and United States. Table II-4 contains five-year averages of feed grain exports, by specified exporting country and by type of grain, to major importing areas. The three five-year periods include a period just prior to World War II, from 1934/35 through 1938/39, a period just after the war, from 1947/48 through 1951/52, and a more recent period from 1957/58 through 1961/62. This table shows that Western Europe has obtained most of her barley from United States and Canada throughout this period. However, there has been a shift from Canada to United States as the main source of Western Europe's oats since World War II.

TABLE II-3

WORLD TRADE IN FEED GRAINS BY SIX MAJOR SOURCES AND BY DESTINATIONS
JULY 1, 1962 THROUGH JUNE 30, 1963

Source / Destination	United States 1	Argen- tina 2	Canada 3	Aus- tralia 4	France 5	Rep. of S. Africa 6	Sub- Total of Six	Total Imports	Total World Exports	Six as % of Total Imports
	------	------	---	---	--- Million Metric Tons ---	---	---	---	---	Percent
Europe										
Western	9.5	3.0	0.4	0.4	1.0	1.1	15.5	20.4	.	76
Eastern	0.5	--	--	--	--	--	0.6	0.6	.	94
America										
North & Central	2.3	--	0.1	--	--	--	2.4	2.4	.	99
South	--	--	--	--	--	--	0.1	0.1	.	47
Asia										
Near East	0.4	--	--	--	--	--	0.4	0.6	.	63
Japan	1.4	0.1	--	--	--	0.9	2.4	3.1	.	78
Other Far East	0.5	0.2	--	--	--	0.2	0.9	0.9	.	99
Other Areas	0.3	--	--	0.1	--	--	0.5	0.8	.	62
TOTAL EXPORTS	14.8	3.3	0.5	0.5	1.1	2.3	22.2	27.8	27.8	81
TOTAL WORLD IMPORTS	.					.		27.8	.	

Notes: a. -- Less than fifty thousand metric tons.
   b Totals may not check due to rounding errors and incomplete statistics.

Source: World Grain Trade Statistics 1960/61 and 1962/63, (FAO, Rome).

TABLE II-4

SOURCE AND DESTINATION OF WORLD FEED GRAIN TRADE
SELECTED FIVE-YEAR AVERAGES AND 1962/63

Destination and Period	UNITED STATES				ARGENTINA			CANADA		AUSTRALIA		REP. OF S. AFRICA
	Corn	Bar-ley	Oats	Sorg & Millets	Corn	Bar-ley	Oats	Bar-ley	Oats	Bar-ley	Oats	Corn
					Thousand Metric Tons							
Western Europe												
1934/5-1938/9	439	169	2	906	5554	377	371	164	113	61	3	--
1947/8-1951/2	1645	169	149	...	1235	280	144	264	92	111	140	--
1957/8-1961/2	4384	1361	383	1620	1792	204	305	618	54	402	198	2366
1962/63	6629	864	239	1693	2440	43	103	154	269	146	221	1117
Japan												
1934/5-1938/9	82	283	--	35	73	--	--	64	--	3	--	--
1947/8-1951/2	478	141	--	85	6	6	--	72	--	--	--	245
1957/8-1961/2	826	--	--	560	233	--	--	--	1	128	2	931
1962/63					95	--	--			--	4	--
Canada												
1934/5-1938/9	351	36	43	--	265	--	4			--	--	--
1947/8-1951/2	272	30	4	1	--	--	5			--	--	--
1957/8-1961/2	651	23	16	2	--	--	--			--	--	--
1962/63	1674	99	--	3	--	--	--			--	--	--
United States												
1934/5-1938/9					589	--	38	120	14	--	--	--
1947/8-1951/2					--	--	8	234	390	--	--	--
1957/8-1961/2					4	--	--	148	514	2	--	--
1962/63					--	--	--	51	42	--	--	--
Mexico												
1934/5-1938/9	5	4	1	...	--	--	--	2	--	--	--	--
1947/8-1951/2	30	24	7	...	--	--	--	2	--	--	--	--
1947/8-1961/2	296	34	2	27	--	--	--	--	...	--	--	18
1962/63	232	24	--	172	--	--	--	--	--	--	--	--

Notes: a) ... Data unavailable. b) -- Less than 500 metric tons.

Source: FAO Bulletin No. 18, Grain, May, 1950; Grain Exports by Source and Destination, 1949/50 to 1954/55 and World Grain Trade Statistics, 1955/56 to 1962/63, (FAO, Rome).

In the more recent five-year period, the Republic of South Africa has

emerged as an important source of corn for Western Europe. Sorghum and

millets import and export data are not complete for the prewar period,

but the average of the five-year period from 1957/58 through 1961/62

shows the importance of United States exports to West European markets.

Importing countries utilize feed grain imports mainly for livestock

feed. Imports are influenced by the number and type of livestock pro-

duced, the amount of home grown feeds and substitutes available, and

the relative returns to livestock production. Some of the factors in-

fluencing the demand for imports appear to be the relative prices and

costs from different sources, the availability and acceptability of cur-

rencies or barter goods, trade agreements, and import quotas. The im-

portance of each of these factors varies between countries and through

time. Similar influences effect exporting countries' decisions concerning

the countries to which they export feed grains. These influences and

their effects on trade will be considered in turn in the following chapters.

This chapter has presented a broad picture of the utilization and

production of feed grains along with trade relationships. The following

chapter will further analyze these patterns with reference to United States

trade with Western Europe since World War II. Information concerning

trade between these two areas has been more accurate and complete than

between other areas. In Chapter IV the cause and effect relationships

brought out in this chapter are developed with respect to Western Europe

and the feed grain balance in that area since World War II.

CHAPTER III

WEST EUROPEAN FEED GRAIN PRODUCTION AND UTILIZATION

Some idea of the complex nature of problems concerning an analysis
of feed grain demand, supply, and trade relationships throughout the world
has been brought out in the previous chapters. The purpose of this chap-
ter is to examine the relationships present in the West European feed
grain demand and supply patterns. This examination will serve as a back-
ground for the development of an empirical model and the projections to
follow. Immediately after World War II, Western Europe went through a
period of recovery and major adjustments were made, especially in agri-
culture. As a result, little help is gained from an examination of the
feed grain relationships prior to 1947 except as a comparison between
the prewar and postwar period.

West European Area

Western Europe has been the major destination of feed grain exports
from United States since World War II. In the five year period from
July 1, 1954 to July 1, 1959, an average of 73 percent of United States
feed grain exports were shipped to that area. Any fluctuation in import
demand from this one area would have an important influence on total
United States exports. Changes in either demand or supply that are
not counterbalanced by corresponding changes in domestic conditions
influence an area's demand for imports or their "feed grain gap". "Feed
grain gap" is used here to mean the divergence between the quantity

utilized and the quantity produced domestically. A positive gap indicates
net imports or a reduction in carryover stocks while a negative gap in-
dicates net exports or increased carryovers of feed grains.

At the outset it is necessary to define the area considered as
Western Europe in this study. The concept of the West European area
has changed from strictly geographical to a non-communistic collection
of countries to the east and southeast of Russia and her satellites.
Western Europe's boundaries encompass the following countries according
to the United Nations definition: Austria, Belgium-Luxembourg, Denmark,
Finland, France, Western Germany, Greece, Iceland, Ireland, Italy, Nether-
lands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom,
and Yugoslavia. Turkey plus all but two of these nations (Finland and
Yugoslavia) comprise the European countries of the Organization for
Economic Cooperation and Development--(the OECD countries, originally
organized as the Organization for European Economic Cooperation). Geo-
graphically, Western Europe would include all countries in the U.N.
definition except Greece and Yugoslavia. These differences in identi-
fication raise problems in the use of historical data because the West
European area of one time may not be consistent with the West European
area of another time. In this study, an attempt is made to consistently
use data from the West European area of United Nations definition (Figure
III-1). Trade has been freer within this area and data more complete
than from the rest of the European nations since World War II.

Feed Grain Utilization in Western Europe

Feed grains are used mainly for livestock feed in Western Europe,
as in other areas with well developed economies. Portugal is the major
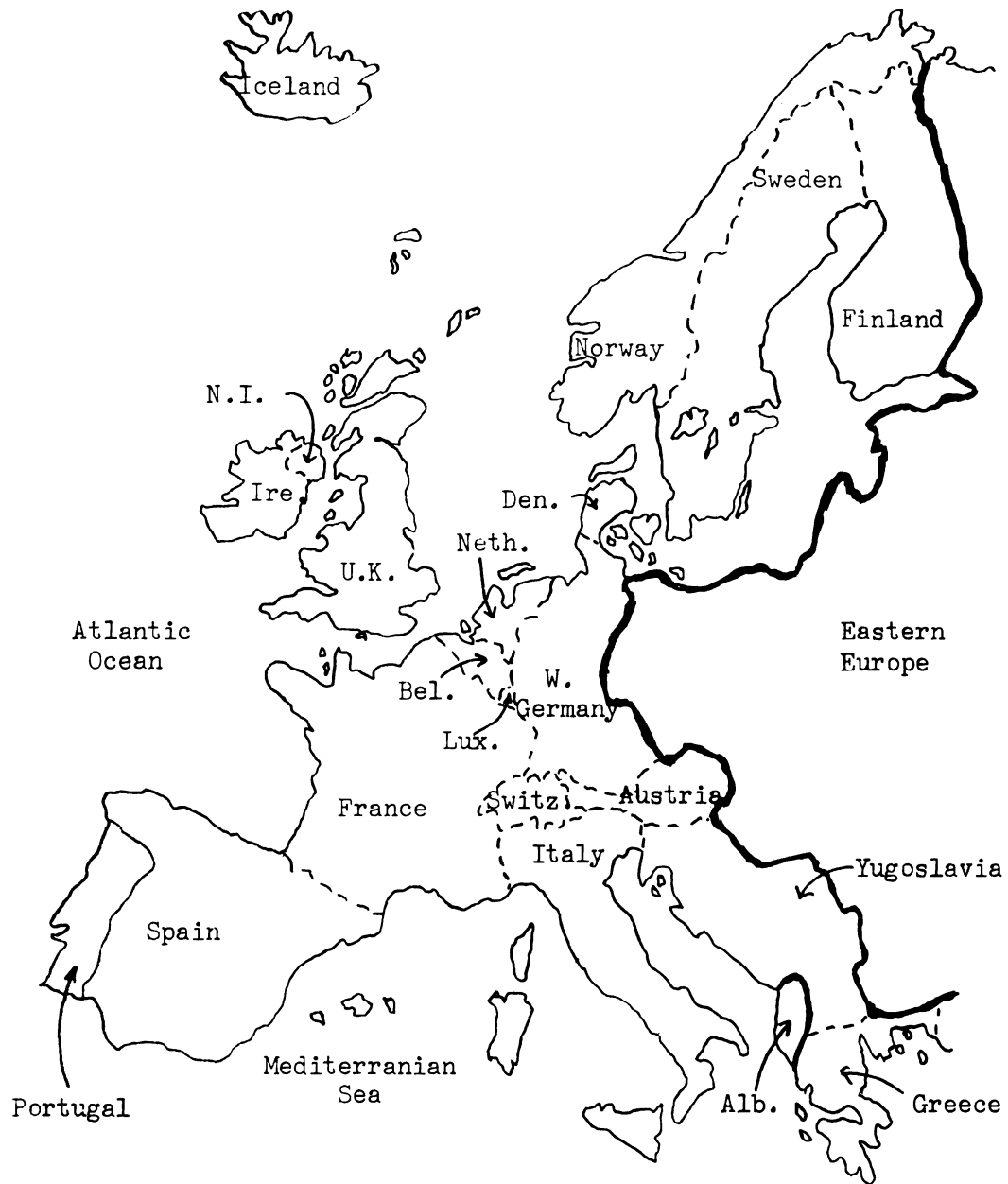
FIGURE III-1

WEST EUROPEAN AREA AND EASTERN EUROPE

exception, using less than 60 percent of its coarse grain in the form
of livestock feed. During the period from 1956 to 1958, the relatively
small quantity of coarse grain that Portugal consumed was almost equally
divided between human and livestock consumption (See Table III-1). Major
coarse grain consuming nations during that period were France, the United
Kingdom, West Germany, and Italy. In these countries nearly 80 percent
of the total utilization is for livestock feed. As is shown in Table
III-1, the four largest consumers of feed grains together accounted for
nearly 80 percent of the total domestic disappearances in eleven West
European countries. Pigs and poultry were the main consumers of feed
grains in France and West Germany, but in the United Kingdom more grain
was consumed by cattle than by hogs. Detailed information is unavailable
concerning Italian feed grain utilization.

The per capita consumption of animal products fell drastically in
Western Europe during World War II and remained low for several years
after the war was over. Since 1948/49, however, consumption levels of
meat, fats and oils, eggs, cheese, and milk have all risen until they
are now well above prewar levels. Increased per capita income and a
desire for higher protein diets have created even greater demands for
livestock products than existed prior to World War II. On the other
hand, the consumption of feed grains as human food has fallen since
1948/49, indicating a dietary shift throughout the area. The ravages
of war brought heavy losses to livestock breeding herds, and human diets
were restricted to grain and root crops. Following World War II, con-
siderable effort was made to rebuild livestock herds. Nearly all animals
and poultry available were used for breeding purposes. It was not until
1955/56 that meat consumption reached the level existing before the war.

TABLE III-1

FEED GRAIN UTILIZATION IN ELEVEN WEST EUROPEAN COUNTRIES
AVERAGE FOR THREE-YEAR PERIOD 1955/56 THROUGH 1957/58

	Feed for Animals	Total Domestic Utilization	Feed for Animals	Human Consumption
	Thousand Metric Tons--		-----Percent----	
Austria	1046	1359	77	5
Finland	668	1093	61	7
France*	7919	9024	88	0
Germany, Western*	5985	8073	74	4
Ireland	716	1018	70	4
Italy*	3558	4836	74	19
Netherlands	2494	2801	89	7
Norway	502	593	85	5
Portugal	286	674	42	48
Switzerland	507	580	87	8
United Kingdom*	6877	8957	77	5
Total of 11	30,558	39,008	78	
Total of 4 major consumers	24,339	30,890	79	
Four major consumers as % of 11	----Percent------			
	80	79		

Note: * - Major feed grain consuming countries in Western Europe.

Source: Monthly Bulletin of Agricultural Economics and Statistics,
         Vol. VIII, No. 10, (FAO, Rome: October, 1959), Table I,
         pp. 15-17.

Since then the per capita consumption of meat has continued to increase. Other livestock products have shown the same trend although the exact year when they reached and passed prewar levels is not the same in each case. The adjustments in feed grain utilization for human food mentioned above have not been accompanied by as great a change in livestock feeding rates. Feeding practices have changed rather slowly throughout most of Western Europe and some countries such as Portugal and Spain have a long way to go before the productivity of their livestock economy compares with that of Western Germany and the United Kingdom.[1] To many farmers, formal education is unavailable and modern scientific feeding principles are unknown. Despite this lack of education, there has been an increased use of feed grains and a better balance in the feeding diets in many West European countries. Commercially prepared feed consumption has increased in countries such as Ireland, Sweden, Switzerland, France, and Western Germany replacing on-the-farm preparations. These few changes in feeding methods have been of minor importance relative to total livestock feeding operations in Western Europe, however. The major influence on demands for feed grains has been brought about by increases in livestock numbers since the World War II.

Changes in the use of feed grain substitutes also have influenced the amounts used for livestock feed. Root crops, especially potatoes, have been generally used as substitutes for grain in the diets of cattle and swine. An estimate of the quantities of potatoes used for feed in the OECD countries shows that the prewar average increased from 22 to nearly 27 million metric tons during the period from 1953 to 1957. Feed grains used in livestock feed also increased from 31 to 38 million

_____

[1] Problems of Animal Feeding in Europe, (FAO, Rome, June, 1955).

metric tons over this period. Other livestock feeds used in this area
include sugar beets and fish and oil by-products, but are of little
importance relative to potatoes. Grass and hay still remain the basic
components of cattle rations in Western European countries, and while
not perfect substitutes for grain, their production has influenced the
demand for feed grains.

Feed grain utilization is influenced to a considerable extent by
the demand for livestock products such as meat, dairy products, and eggs.
Both production and consumption of these products have increased consis-
tently since World War II. An increase in the demand for meat could be
satisfied either by reducing livestock numbers for immediate consumption
or by building the size of herds and increasing meat production over a
longer time period. It is evident from Tables III-2 and III-3 that OECD
countries built up their herd size before increasing the output of live-
stock products. The numbers of cattle reached prewar levels by 1949,
but as can be seen in Table III-3, total production of beef and veal
did not reach the prewar level until 1951/52. Even though there were
as many milk cows on farms in 1948 as there were prior to World War II,
milk production did not reach prewar levels until 1950. Undoubtedly,
this lag was due to the difficulty of developing productive dairy herds
after the devastations of the war. A different situation occurred in
poultry and egg production. It can be noted from Table III-3 that egg
production surpassed prewar levels by 1949/50, but poultry numbers did
not reach prewar levels until 1951 as shown in Table III-2. The rapid
rise in egg production was possible because of the nature of poultry
production. Poultry flocks can be increased rapidly and in Western
Europe greater specialization in egg production after the war encouraged

TABLE III-2

LIVESTOCK NUMBERS IN EUROPEAN OECD COUNTRIES BY CLASS
PREWAR AVERAGE AND BY YEAR 1947 THROUGH 1961

	Draft Animals	Cattle		Sheep & Goats	Pigs		Poultry
		Total	Milk Cows		Total	Sows for Breeding	
				—Thousand Head—			
Prewar (1934-38)	14,906	75,249	28,928	115,569	42,267	4,499	473,090
1947	13,754	73,270	28,673	103,997	26,397	3,280	372,900
1948	14,054	74,701	29,000	109,853	28,578	3,651	415,740
1949	13,845	76,656	29,832	107,414	36,152	4,170	459,340
1950	13,638	78,837	31,193	109,069	40,377	4,469	472,330
1951	13,408	80,079	31,261	112,929	42,699	4,511	475,880
1952	13,098	80,790	31,593	114,832	45,063	4,715	487,760
1953	12,824	82,262	32,264	118,913	45,737	4,919	503,160
1954	12,411	83,132	32,806	118,760	49,104	5,433	513,250
1955	11,970	83,483	32,998	118,441	49,347	5,229	502,980
1956	11,620	84,234	33,150	121,055	48,934	5,337	538,074
1957	11,258	85,330	33,936	125,023	52,315	5,629	546,616
1958	11,085	87,188	34,366	130,045	52,498	5,591	564,993
1959	10,799	89,853	35,700	135,112	53,046	5,796	584,935
1960	10,329	91,638	36,182	135,331	55,009	6,092	572,120
1961	9,627	93,236	37,007	136,773	59,131	6,431	603,000

Note: Total for OECD countries of Europe excluding Spain.

Source: *Agricultural and Food Statistics*, 1959, Table 6; and 1962, Table 4, (OECD, Paris).

TABLE III-3

PRODUCTION OF LIVESTOCK PRODUCTS IN EUROPEAN OECD COUNTRIES
INDICES BY FISCAL YEAR 1947/48 THROUGH 1961/62

Indices: 1934-38 = 100

| | Total Meat | Meat | | | | Milk | Cheese | Butter | Eggs | Total Livestock Products |
		Beef & Veal	Mutton & Lamb	Pig Meat	Other Meat					
Prewar (1934-38)	100	100	100	100	100	100	100	100	100	100
July-June										
1947/48	71	82	73	53	85	78	66	68	73	75
1948/49	76	79	77	64	91	90	95	81	85	83
1949/50	92	92	91	90	98	99	107	89	102	97
1950/51	97	98	86	97	102	106	117	98	109	104
1951/52	102	100	87	105	104	107	122	97	108	106
1952/53	110	107	109	122	107	110	131	100	114	112
1953/54	118	119	108	126	114	116	141	109	122	118
1954/55	126	128	109	132	119	115	138	106	127	123
1955/56	127	126	113	139	120	118	142	109	128	125
1956/57	130	128	118	143	124	122	152	112	138	128
1957/58	137	136	120	150	128	124	159	119	143	134
1958/59	138	132	118	153	125	124	164	118	151	138
1959/60	145	136	131	159	138	129	172	123	157	142
1960/61	155	148	143	161	161	135	175	126	157	148
1961/62	162	156	145	169	162	137	177	132	162	n.a.

Notes: n.a. -- not available

Source: Agricultural and Food Statistics, 1959, Tables 11 and 12; 1962, Tables 8 and 9 (OECD, Paris).

the development of productive laying flocks.

From 1948 to 1961 the population of draft animals declined in Western Europe. This reduction occurred mainly because of the adjustment from animal to tractor power and the trend toward more mechanized farming. The decline in demand for draft animal feed was far outweighed by the increased demand for feed for other livestock. Other changes such as reduced labor requirements, less intensive farming methods, increased use of fertilizers, larger producing units, and improved yields also occurred during this period and have been associated to some degree with the increased use of tractors. These changes and their effects are examined more closely in Chapter IV.

An indication of the demand for feed grains in Western Europe can be obtained from a measure of the output of livestock products. Such a measure, theoretically, could be approximated by developing an index of livestock production. The right column of Table III-3 presents an index of the production of total livestock products from 1947/48 through 1961/62. A serious difficulty arising from the use of this index as an indicator of feed grain demand is due to the lag between the time when feed grains are consumed and when the final products are sold. Using an index of total production of livestock products as an indicator of changes in demand for feed grains implies the assumption that the composition of livestock feed remains relatively the same, and increased output is due to increased input alone. Another assumption which is implied in the use of such an index is that the relationship between different components of the index remains the same throughout the period studied. This last assumption raises a serious question as to the validity of such an index through a time where growth in all livestock production

does not remain in a proportional balance.

A much more sensitive indicator of feed grain demand might be developed from an index of livestock numbers on feed, providing that the index is constructed so as to give representative weights to different classes of livestock. However, this type of an index would require an assumption that technology and feeding practices were unchanged throughout the time period considered and only the changes in numbers influenced demand. If all countries in Western Europe maintained their relative position in total livestock numbers, an assumption of constant technology and practices might be reasonable. Yet, the production of certain classes of livestock in some countries increased as much as 300 percent (as was the case for pigs in Denmark, the United Kingdom, Netherlands, and West Germany); while during the same period (1947-57) production in other countries (Italy, for example) declined. It is very likely that the feeding practices during the period of increasing swine production (from 1947 to 1957) did not remain the same in all countries although accurate information on feeding practices is unavailable at the present time. Perhaps an accurate indicator of feed grain demand could be constructed only by weighting each class of livestock differently and also weighting the livestock produced in each country by some indicator of feeding rates. Obviously, developing an index of demand for feed grains based on live-stock numbers throughout a diversified area is not a simple task. At present there is not sufficient information available to permit a compu-tation of realistic weights to apply to different classes of livestock in order to compute a feeding unit for each of the various countries of Western Europe.

The preceding analysis indicates some of the difficulties involved in creating an index of livestock numbers which would be an accurate

indicator of the demand for feed grains for livestock feed in Western
Europe. Some of these difficulties can be avoided by examining a trend
of per capita consumption of livestock products to obtain an indication
of the changes that are taking place. An analysis of such a trend and
its projection is presented in the following chapter.

West European Feed Grain Production

Import levels of feed grains are influenced by changes in domestic
supply as well as changes in demand. The West European area had recovered
from the wartime disruption of grain production by 1951 and has produced
grains in generally increasing quantities since then. Considerable varia-
tion has occurred in the production of different types of grains, however.
Production of barley reached prewar levels by 1948 while total corn pro-
duction remained below prewar levels until 1951. The total production
of oats has been less than prewar levels for all except two years since
the war. Total feed grain production for European OECD countries is
shown in Table III-4 by type of grain. The indices at the bottom of
the table show relative changes for each grain and for the total production
relative to the prewar period 1934-38. The "Total" column includes mixed
grain production in addition to barley, oats, and corn. Barley production
has increased continually since World War II and by 1960/61 nearly two
and one half times the prewar level was produced in European OECD countries.
Corn production has not risen as rapidly but has increased fairly consis-
tently since 1947/48. A projection of these trends and their implications
for import demand are discussed in Chapter IV.

Throughout different countries in the West European area there has
been a wide variation from country to country in the rates of increases
in feed grain production levels. As is shown in Table III-4, total pro-

TABLE III-4

PRODUCTION OF FEED GRAIN IN EUROPEAN OECD COUNTRIES
BY TYPE OF GRAIN AND INDICES
PREWAR AND BY YEARS 1947/48 THROUGH 1961/62

	Barley	Oats	Corn	Total
		Million Metric Tons		
Prewar				
(1934-38)	12.3	15.4	5.6	33.2
July-June				
1947/48	9.8	11.8	3.9	27.2
1948/49	11.8	13.6	4.6	32.1
1949/50	13.5	14.2	4.1	32.0
1950/51	11.5	15.8	4.3	32.7
1951/52	13.9	14.6	5.7	37.4
1952/53	15.6	14.9	5.3	38.6
1953/54	16.7	15.5	6.4	41.5
1954/55	15.6	14.5	6.5	39.5
1955/56	17.1	15.0	6.7	41.2
1956/57	21.3	16.3	7.6	47.8
1957/58	20.2	13.4	7.3	43.1
1958/59	21.2	13.2	8.0	43.8
1959/60	22.7	12.9	8.7	46.1
1960/61	24.9	12.4	9.7	50.1
1961/62	24.7	12.0	9.5	49.4
		Indices		
		(1934-38 Avg = 100)		
Prewar				
(1934-38)	100	100	100	100
July-June				
1947/48	92	77		82
1948/49	111	89	83	97
1949/50	108	92	73	96
1950.51	113	80	78	99
1951/52	127	95	102	113
1952/53	153	97	95	116
1953/54	165	100	115	125
1954/55	154	97	117	119
1955/56	169	98	120	124
1956/57	210	106	137	144
1957/58	204	87	131	130
1958/59	202	86	144	132
1959/60	225	84	155	139
1960/61	226	87	175	151
1961/62	244	84	171	149

Source: Agricultural and Food Statistics, 1959. Table 12; and 1962
Table 9, (OECD, Paris).

TABLE III-5

PRODUCTION OF FEED GRAINS IN EUROPEAN OECD COUNTRIES
PREWAR AVERAGE AND BY YEAR 1947/48 THROUGH 1961/62

Major OECD Producers Crop Year (July-June)	Sweden	Denmark	United Kingdom	France	Western Germany	Italy	Spain	Turkey(a)	European OECD Total	Yugoslavia(b)
	Million Metric Tons(c)									
Prewar Avg. (1934-38)	2.0	2.9	2.8	6.0	4.8	3.8	3.3	2.8	33.2	5.3
1947/48	1.3	2.9	4.5	4.4	2.3	2.5	2.7	2.3	27.2	4.7
1948/49	1.6	3.2	5.6	5.4	3.1	3.0	3.1	3.3	32.1	4.8
1949/50	1.7	3.3	5.9	5.1	4.3	2.9	2.4	2.3	32.0	4.5
1950/51	1.7	3.1	5.2	5.5	4.4	2.8	2.5	3.1	32.7	2.6
1951/52	1.7	3.3	5.4	6.3	5.0	3.5	3.3	4.0	37.4	4.7
1952/53	1.8	3.9	6.0	5.8	4.9	3.2	3.4	4.5	38.6	2.0
1953/54	2.1	3.8	6.3	7.0	5.3	4.2	2.6	4.9	41.5	4.7
1954/55	1.9	3.6	5.3	7.3	5.4	3.8	3.5	3.7	39.5	3.5
1955/56	1.5	3.9	6.3	7.6	5.4	4.0	2.9	4.3	41.2	4.6
1956/57	2.4	4.1	5.8	13.1	5.7	4.2	2.7	4.2	47.8	4.1
1957/58	2.0	4.2	5.5	7.8	5.6	4.4	3.2	5.0	43.2	6.8
1958/59	2.1	3.9	5.7	8.4	5.5	4.6	3.2	5.1	43.8	4.7
1959/60	1.9	3.5	6.6	9.8	5.8	4.7	3.6	4.8	46.1	7.7
1960/61	2.6	4.2	6.6	11.5	6.5	4.5	3.0	5.4	50.9	7.1
1961/62	3.0	4.3	7.1	10.7	5.7	4.9	3.3	4.5	49.4	5.6

Notes: (a) - Not in Western Europe of FAO definition
       (b) - Not a member of OECD
       (c) - Includes barley, oats, corn and others

Source: Agricultural and Food Statistics, 1959, Table 14; and 1962, Table 13, (OECD, Paris).

duction increased from a 33 million ton prewar average to 50 million tons
by 1960/61. A slight reduction in 1961/62 reduced the total to 49.4
million tons, but total production remained fifty percent greater than
the prewar average. In the United Kingdom, total production increased
by two hundred and fifty percent from the prewar period to 1961/62; while
in Spain it remained relatively unchanged (Table III-5). Other West
European OECD countries have increased production over prewar levels
but not as rapidly as the United Kingdom. The eight OECD countries
listed in Table III-5 produced 88 percent of the feed grains grown in
all 17 European OECD countries in 1961/62. Yugoslavia, the only West
European country not a member of OECD, increased its feed grain produc-
tion slightly since prewar levels but with considerable year-to-year
variation.

The expansion of feed grain production was brought about by increases
in both planting areas and yields. In the European OECD countries, the
acreage planted to feed grains increased from an estimated prewar average
of 17.9 to 19.5 million hectares by 1953-57.[2] Between 1952 and 1957
the area producing all cereals (including wheat and rye) increased approx-
imately 4 percent in France and 3 percent in other Western European
countries.[3] The greatest increase in planting acreage occurred in
Yugoslavia and Turkey with an 11 percent increase (mostly in feed grains)
for Yugoslavia and 23 percent increase for Turkey.

Grain yields also increased rapidly after the war in OEEC countries.
Yields of barley rose 30 percent from 16 to nearly 21 quintals per hectare.
Oats and corn yields increased approximately 16 to 18 percent respectively

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[2] *Agricultural and Food Statistics*, OEEC Statistical Bulletin, (Paris, 1959), p. 3.

[3] F.C. Schlemer, "Developments in World Grain Production by Type of Grain and Region, 1951-57 and Outlook", Monthly Bulletin of Agricultural Economics and Statistics, Vol. VIII, No. 3, (FAO, Rome: March, 1959), Table 3, p.7.

from the prewar period to 1953-57. During the period 1952 to 1957, the yield of all cereals in Western Europe rose approximately $18\frac{1}{2}$ percent (from 16.8 to 19.9 quintals per hectare).[4] Corn yields increased by 47 percent in France and 21 percent in both Italy and the United Kingdom from the prewar average to 1952-57 average. The major cause for the rise in production was due to increased yields rather than increased acreages planted to feed grains. Future yields are expected to rise as a result of new technology in feed grain production and wider application of known production increasing methods. It has been estimated that the yearly increase in West European feed grain yields will average about 0.8 to 0.9 percent above the early 1960 period. This increase will range from less than 0.7 percent in some countries to 1.4 percent in France.[5]

Acreages planted to feed grains are not expected to increase greatly in Western Europe unless government programs are developed which encourage major acreage shifts from other crops. It is technically possible to readjust present bread grain producing areas and shift new areas into feed grain production, but it does not appear likely that such shifts will be economical in the near future under current price relationships. The soil type and climate throughout much of Western Europe tend to impose a limit upon the land area which can be economically productive in feed grains. Whether or not such adjustments will be economical in the future depends to a large extent upon the farm programs which become effective in the West European area. The types of programs presently in effect are discussed in the following section.

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[4] Ibid.

[5] Ibid., p. 10.

National Grain Policies in Western Europe

Economic motivations are not the only factors that influence the utilization and production of feed grains. A lack of technological knowledge and a low level of education in combination with a value system suspicious of change tend to reduce the effects of price fluctuations on consumption and production practices. Utilization and production are also influenced by specific government grain policies in different countries. Each government in the West European area has a specific set of regulations and policies aimed at increasing livestock production and the standards of living in general. Methods used include import tariffs or quotas, price supports, subsidies on particular farm inputs, farm improvement aid, and marketing mechanisms to improve returns to producers.[6] The approach used to analyze this complex problem will be to first examine those policies which are aimed at increasing the utilization of feed grains. Then the major governmental programs designed to increase feed grain production will be reviewed. Obviously, it is impossible to present a complete analysis of all national policies influencing feed grain utilization and production in Western Europe in this thesis; but the major ramifications will be discussed. If the Common Market does implement a common agricultural policy, the problem of analyzing the influence of this policy will be made much easier.

Policies Influencing Utilization

Governmental policies influencing the disappearance or utilization

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[6] John O. Coppock, North Atlantic Policy: The Agricultural Gap. (New York: Twentieth Century Fund, 1963), pp. 33-35.

of feed grains can be divided into three categories: (1) subsidies to
livestock producers, (2) regulations influencing grain handling and feed
mixing, and (3) import controls. Methods of subsidizing livestock produc-
tion are accomplished in some countries by paying refunds directly to
producers. In Belgium, for example, refunds are determined from the
quantities produced on the farm and quantities of grains bought by in-
dividual producers. Another method of subsidizing producers occurs in
Norway where a bonus is paid to farmers who feed grains to livestock.
Such policies also increase the future demand for feed grains by in-
creasing livestock production and causing farmers to increase the use of
grains in their feeding programs. Livestock production is indirectly
subsidized in some countries such as Austria where corn is sold at prices
below import costs. By equalizing feed grain prices through government
controls, corn is supplied at prices below the competitive level. Costs
of producing livestock are reduced and corn utilization is increased
through programs of this type. Returns to livestock producers are in-
creased in many countries by protective policies insulating domestic
producers from foreign competition. According to estimates of the Ec-
onomic Commission for Europe, Denmark was the only country with competi-
tive prices for livestock products, and many nations including the United
Kingdom, West Germany, and Italy had protection ranging upward from 20
percent on most domestically produced livestock products.[1] The long-
run impact of subsidies is difficult to determine, but continued expansion
in livestock production will mean an increase in the long-run demand
for imported feed grains if they remain unavailable from domestic production.

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[1] Economic Commission for Europe, Economic Survey of Europe in
1960. (Geneva, 1961), Chapter 3.

Many governments in Western Europe have controls and regulations
on practices of mixing livestock feeds. In addition to standardizing
mixing practices, such policies may have secondary effects of stabiliz-
ing the mixed feed trade and increasing consumer confidence in the pro-
ducts. Requirements concerning labeling and accurate weighing are also
being imposed. Over time this may aid the livestock producers in be-
coming better informed concerning the advantages of using commercially
prepared mixed feeds.

Import controls in general have prevented effective expansion of
the demand for feed grains in many countries. Quantity restrictions on
imports of feed grains reduces available supplies and causes higher
prices. Controls on bread grain imports have indirect effects on feed
grain prices. Limitations on the quantities of bread grains imported
reduce available supplies and contribute toward increased prices of all
domestic grains. As a result, the feeding of bread grains in livestock
rations is restricted and livestock producers resort to feeding the
cheaper feed grains. Therefore, restrictions on imports of bread grains
may increase the imports of feed grains if these are not restricted also.

West European governments have endeavored to increase the produc-
tion of livestock by reducing production costs and increasing prices
through the elimination or severe curtailment of foreign competition.
In some cases considerable success has been attained. Future demands
for imported feed grains will depend to a large extent upon two major
factors. First, the level of livestock production will determine, to
an important extent, the domestic demand for feed grains. Second, the
imposed restrictions on import levels of feed grains will determine the
balance reached between quantities imported and those produced domestically.

On the other hand, the future level that domestic grain production is able to attain will influence import policies to some extent and import demand even more.

Policies Influencing Domestic Production

Policies influencing the production of grains in Western Europe are closely related to those concerned with their utilization. Agricultural policies effecting feed production differ as widely from country to country as do policies effecting consumption. A complete analysis of all existing policies would be too complex to be of value in this thesis. However, governmental policies directly influencing production can be divided into three general categories based upon the approach used. These categories are: (1) price support policies, (2) research and education policies, and (3) other related policies.

Governmental actions of many types might have indirect effects upon feed grain production, but only those policies which are directly aimed at influencing the production of feed grains will be discussed here. National farm programs influencing the profitability of producing bread grains are generally followed by shifts in feed grain production. Any policies which reduce the risks or change the returns to farmers also may influence production methods and effect feed grain production levels over a long period.

Although many Western European nations have price supports on certain feed grains, the effects of such policies in the 1950's were not as great as those in United States. For example, France, West Germany, Spain, and the United Kingdom have had price supports, but the support level was generally below free market prices. During the 1950's, the

prices for feed grains were favorable to production, and support prices did not provide strong incentives to increase feed grain production.

With the development and approval of a common agricultural policy for the European Economic Community in January 1962, support levels for feed grains took on a new importance. The wide variations of feed grain prices between Common Market countries have led to considerable anxiety on the part of exporting nations concerning the ultimate price levels to be set. It has already been noted that feed grain production could be expanded considerably by the shifting of acreages from other crops (as was the case in 1956/57) and increasing yields. High prices would tend to encourage more rapid expansion in feed grain production in Western Europe and reduce the demand for imports. A secondary effect of high grain prices would be the raising of prices of livestock products and the corresponding pressures to slow down expansion in their comsumption. If the final policy in the Common Market does lead to these results, it would tend to mitigate improvements in future standards of living and perhaps even reverse the trend toward increased consumption of livestock products.

Policies designed to increase the education of producers and improve technology in the 1950's had an important impact upon present yields and may also be quite influential in the future. Many countries have nationally supported research programs and provide extension services to farmers In Denmark, France, and the United Kingdom such programs have directly benefited feed grain producers. Such policies likely increased the integration and specialization of production as well as expedited the adoption of new technology. In the 1960's, research programs will continue to bring about further increases in yields. Of course,

it is impossible to accurately predict any government's future actions,
but programs designed to support and strengthen research and education
will undoubtedly be included in future policies of the West European area.

Domestic policies directly influencing feed grain production in
addition to those mentioned above include programs facilitating farm
improvements, obtaining credit, and subsidizing agricultural inputs.
Denmark, Italy, and Spain all have programs designed to ease the credit
problems of grain producers and permit long term loans for farm improve-
ments. Several countries have made fertilizer available below cost and
many subsidize tractor fuels. French farmers even receive a 15 percent
subsidy of the cost of agricultural equipment.[8/] Such programs appear
to have had only a slight influence on feed grain production although
their combined effect is difficult to determine. If incomes in the
agricultural sector of these countries fall relative to incomes in other
sectors, such programs may become more important in the future. On the
other hand, if agricultural incomes and especially dietary levels maintain
a steady growth, there will be less incentive to force increased livestock
production, and governmental policies in that direction may be relaxed.
The present lack of information concerning livestock production and feed
grain conditions in many West European countries tends to make predictions
of future policies extremely hazardous.

Of more immediate concern to nations trading with countries in
Western Europe are the combined and individual foreign trade policies
in effect. Individually, West European countries had relatively liberal
policies concerning grain imports following World War II. These policies
have become somewhat more restrictive and particular concern is evident

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8/ John C. Coppock, Op. Cit., P. 57.

over the combined policies of the Common Market. Restrictions on imports
of livestock products had greater influence than restrictions on grain
imports in the 1950's. In general, foreign trade policies protect domes-
tic grain production by limiting competition. In the 1950's, these re-
strictions were applied to imports of wheat to a greater extent than to
feed grains. However, quotas limit the quantities of feed grains imported
in several West European countries and in Turkey feed grain exports have
been subsidized. These policies assure favorable prices to producers
and perhaps have been influential in maintaining domestic prices above
the support levels discussed previously.

As individual nations, the West European countries have had restricted
bargaining power in international trade. However, joined together in
a common market, their combined actions have had considerably more effect
on trade negotiations with outside countries. The European Common Market
was formed in 1957 by Belgium, France, West Germany, Italy, Luxembourg,
and the Netherlands under the title of the European Economic Community
(EEC). The stated objective of the EEC was to reduce trade barriers
between members and strengthen their economic stability. The ultimate
effect of Common Market influences on feed grain utilization and con-
sumption is difficult to predict, but some general implications can be
stated.

As internal trade restrictions are reduced or eliminated between
EEC countries, feed grain production will very likely shift to greater
specialization in areas of higher economic advantage. However, if stand-
ards of living continue to increase and people demand more meat and higher
protein diets, a shift in the demand curve for livestock products is to
be expected. Answers to the question of where livestock products and

feed grains for European consumption will be produced become of extreme concern to surplus producing areas such as United States. In EEC countries, the variable levy and gate price system protects domestic producers from foreign competition.2/ Under such a policy, imports are admitted only at a price above supported domestic prices. Together with import discrimination and preferential treatment policies, the variable levies and gate price systems comprise the major nontariff barriers applied to feed grain imports in Western Europe. This variable levy or equalization fee effectively insulates the EEC from all external competition, since neither subsidies nor normally low world prices can influence prices within the Common Market. Import discrimination and preferential trade agreements with certain countries tend to give preferred exporting countries a larger share of the Common Market feed grain market than less favored exporters.

Adjustments in the location of livestock and grain production will come about slowly due to the many immobilities involved. West European countries will probably continue to produce a large share of their own livestock products since these products in general are relatively perishable and expensive to transport. Feed grain production in this area is almost certain to increase as a result of the increasing yields. Yields will likely increase both in the presently lower yielding areas where current technology and education are relatively backward and also in areas where yields are already above average. Government policies will attempt to bring about economic growth and development with or without a completely unified Western Europe. It may be some time before Common

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2/ Economic Research Service in Cooperation with Foreign Agricultural Service, Agricultural Protection by Nontariff Trade Barriers, USDA, ERS-Foreign-60, (Washington, September, 1963).

Market trade policies will be designed to encourage the importation of a larger share of feed grains and then only when pressures of demand make such policies acceptable. However, other West European countries outside of the Common Market may maintain their individual trade agreements and remain strong markets for United States feed grain exports.

This chapter has been devoted to a brief examination of West European utilization, production, and trade of feed grains in recent years. Governmental policies and programs which directly influence this area's demand and supply conditions have also been reviewed. It was noted that both the production and utilization of feed grains have shown continued expansion since 1947. While limitations in grain producing areas may be reached in this area, no such limitations can be expected concerning its utilization as long as livestock production continues to expand. The effects of governmental policies concerning grain production and utilization are extremely difficult to measure but undoubtedly will play an important part in the future. Unless answers to questions concerning West European domestic and foreign policies are obtained, predictions of future production and utilization levels become rather hazardous. Without a framework of analysis, such information can contribute little toward developing sound projections of the potential value of the West European area as a market for United States feed grains. Chapter IV presents a conceptual framework and an empirical analysis for a projection of future feed grain imports into this area.

CHAPTER IV

THE FEED GRAIN TRADE STRUCTURE OF WESTERN EUROPE

An important portion of the feed grains utilized in Western Europe
is not obtained from domestic production but from imports. From 16 to
22 percent of the yearly disappearance in OECD countries has been im-
ported annually since 1947. It is the purpose of this chapter to in-
vestigate this trend after first developing a theoretical trade model
and to project estimates of future changes in the demand and supply of
feed grains in Western Europe. Traditional concepts of demand and supply
are supplemented in this analysis by trade theory and dominant firm
analysis. These concepts contribute to the development of a model which
helps explain the basis for fitting trend lines to post World War II
data and developing projections forward to the years 1965 and 1970.

Construction of a Theoretical Framework

Several different approaches could be followed in examining the
trade structure of feed grains in an importing country. International
trade theory with the concepts of terms of trade, balance of payments,
and comparative advantage could be applied to feed grain trade between
surplus and deficit areas. It is questionable whether a functional
model involving all of these relationships could be developed and used.
The present state of international trade theory has not been advanced
to the point where satisfactory answers are available to questions of
dynamics. This type of approach would leave nearly as many questions

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unanswered as it would answer and would not allow adjustments to be made should conditions change.

Studies of the history of production, consumption, and trade in feed grains have approached the problem at the opposite extreme. Analysts examined and used empirical data in these studies to project indicated trends for short periods into the future.[1] While this type of work is quite valuable in compiling data which are badly needed, such analyses do not measure or explain the effects of different variables on each other. Projections are often based on indications of future supply and demand situations and assumptions (frequently implied but not stated) that certain present conditions will remain unchanged. Projections and predictions normally are given only over short ranges of time because the assumptions employed cannot realistically be applied to long run periods.

One of the main objectives of this study is to examine and evaluate the most important variables influencing West European demand for United States feed grains. In doing this, it is useful to appropriate some of the methods of the above two approaches. A complete investigation of trade theory and the concepts involved is not practical for a study of this type. On the other hand, a study based entirely on empirical data would present an inadequate foundation upon which to examine the effects of individual variables or predict long run future trends. A theoretical model in which many variables are assumed fixed presents a reasonably solid foundation for an analysis of empirical data and projections of

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[1] Studies previously noted by the Food and Agriculture Organization of the United Nations are examples. See especially "Grains: World Trade in 1959/60", Monthly Bulletin of Agricultural Economics and Statistics, Vol. 10, No. 1, (FAO, Rome: January, 1961), pp. 10-13.

trends into future periods. Such a model requires assumption varying

widely from actual conditions, yet as some of the assumptions are relaxed,

the resulting adjustments become more representative of real world situa-

tions. Many restrictive original assumptions are required before it

is possible to examine the large number of complications which influence

imports of feed grains

A simplified theoretical demand and supply relationship indicates

graphically some of the more important forces which motivate international

trade in feed grains. As a starting point, an assumed demand and supply

relationship such as might exist in Western Europe is shown in Figure IV-1.

Although the actual demand and supply curves for this area have not been

determined empirically, it is hypothesized that both of these curves are

relatively inelastic. The time period is assumed to be one crop year

for both the demand and supply curves, since a period of that length

would include a complete cycle for many of the short-run fluctuations

which effect consumption and production decisions. At price P_E the

domestic market is in equilibrium with a quantity q being offered for

sale and accepted by buyers. The supply curve shows the amounts offered

at various prices and is made up of the amount produced domestically

during the current crop year plus the carryover from the previous year's

supply. The demand curve indicates the quantity demanded at different

prices for use as livestock feed, human food, industrial uses, and seed.

If prices were to be artificially set at levels below P_E without

equalizing shifts in either demand or supply curves, shortages would

be anticipated. In order to reach an equilibrium at a price below P_E

in Figure IV-1 without shifting domestic demand or supply relationships,

supplies would have to be obtained from foreign sources. Feed grain
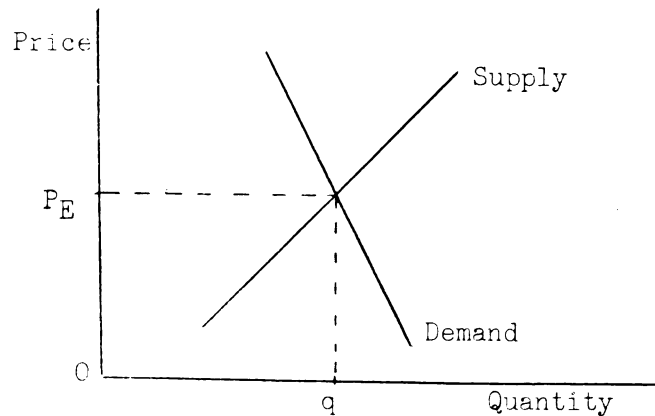
FIGURE IV-1

HYPOTHETICAL DEMAND AND SUPPLY CURVES FOR FEED GRAINS
IN WESTERN EUROPE

imports sold on the market at prices below P_E would replace part of

the supplies obtained from domestic production, and increased quantities

would be consumed. Quantities imported at prices below P_E can be vis-

ualized from a theoretical analysis of foreign offer curves and domestic

demand and supply relationships.

Western Europe has several alternative foreign sources of feed

grains, but historically has obtained nearly one-half of her net imports

from United States. In spite of this fact, the quantities obtained from

United States in recent years as compared to the amount of surplus grains

in storage have been relatively small. At the end of the 1959 crop year,

the United States feed grain carryover was 74.7 million short tons (67.8

million metric tons). Exports from United States to Western Europe

during that same period totaled 8 5 million metric tons or only 11.4

percent of the carryover. If approximately one-half of the carryover

is considered as surplus, Western Europe might have increased her im-

ports of feed grains from United States fourfold and still not eliminate

the surplus. In other words, United States could offer Western Europe

more than four times the amount sold at that price before the surplus

stocks of feed grains were eliminated. An "offer" curve of feed grain

exports from United States is therefore assumed to be horizontal to

an importing nation or area for a wide range in quantity beyond the

amount normally taken. This means that any one area could import as

large a quantity of feed grains as it desired (within limits) from

United States without materially influencing the sale price.

An offer curve facing a nation which purchases feed grains from

United States appears as F-F' in Figure IV-2. The exact price which

an importer must pay for feed grains depends upon domestic market prices

in United States as well as export subsidies, insurance and freight

costs, and tariffs imposed by the importing nation. In Figure IV-2,

assume P is the domestic market price for feed grains of a specified

quality at any one time and place. A lower price of P_1 is indicative

of the F.O.B. price at port of shipment assuming a large United States

subsidy on feed grain exports. If the price to the importer includes,

in addition to the cost of the grain, all insurance and freight costs

(c.i.f.) plus any import tariffs, his price would be the import price

P_2. Any net change due to shifts in tariffs, subsidies, or freight rates

would shift the import price. Increases in tariffs or freight rates

or decreases in subsidies would have the effect of moving the import

price upward from P_2. Decreases in tariffs or freight rates or increases

in subsidies would have the opposite effect and cause the import price

to shift downward.

If United States were the only feed grain exporter, import demand

can be indicated by combining domestic demand and supply curves with

Price P_2 F_2 ——————————— F_2'

P F ——————————— F'

P_1 F_1 ——————————— F_1'

0 | Quantity Offered
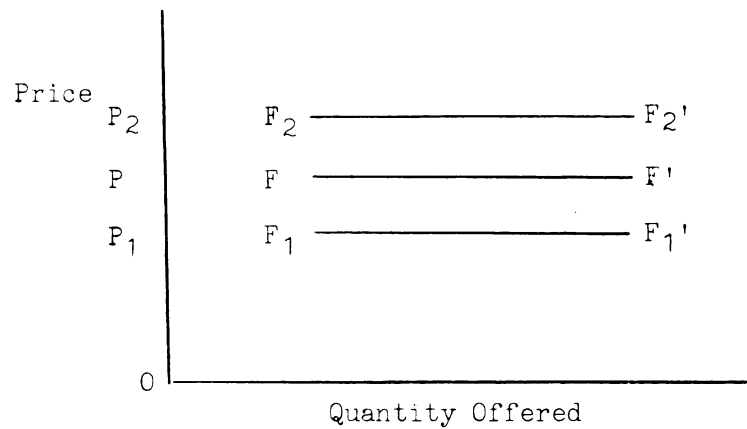
FIGURE IV-2

HYPOTHETICAL OFFER CURVES FOR UNITED STATES FEED GRAIN
EXPORTS AT VARIOUS PRICES

the United States export offer curve adjusted to import price levels.

Figure IV-3 shows the conventional demand-supply relationship on the

right side of the graph, while on the left the previous export offer

curve is shown measured in the opposite direction. Prices and quantities

of feed grains are meaningful only if the term "feed grains" refers to

a particular composition of corn, oats, barley, and sorghum grains.

Therefore, for the purpose of analysis, it will be assumed that the

relationship of the four grains remains constant throughout price and

quantity changes and that a unit of "feed grains" contains the same

composition of the individual grains. In Figure IV-3, a price P_E and

quantity Q would be in equilibrium only if no feed grains were imported.

By importing grains priced at P_1 from United States, equilibrium is

reached at a price of P_1 when the quantity OQ_1 is produced domestically

and the quantity Q_1Q_2 is imported. Through trade, the quantity utilized

in the importing country would be increased from OQ to OQ_2 and the price

reduced from P_E to P_1.

Price
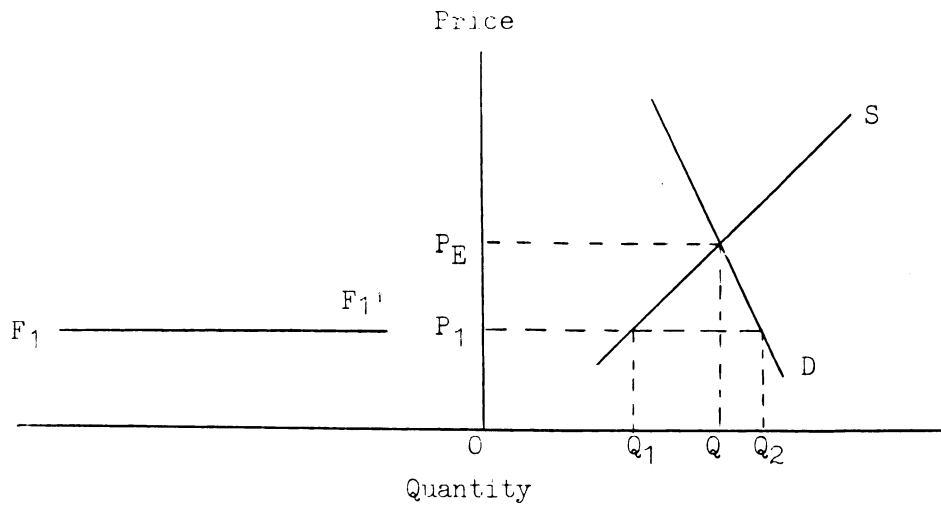
FIGURE IV-3

HYPOTHETICAL DOMESTIC DEMAND AND SUPPLY CURVES AND AN
IMPORT OFFER CURVE FOR FEED GRAINS

A curve can be drawn indicating the quantity that will be desired

from other sources given the domestic demand and supply relationships

of Figures IV-1 and IV-3. This import demand curve, I_D P_E is shown on

the left half of Figure IV-4 below. I_D P_E indicates the total amount

that would be desired from all other sources at various prices from O

to P_E. The import demand curve is derived from domestic demand and

Price
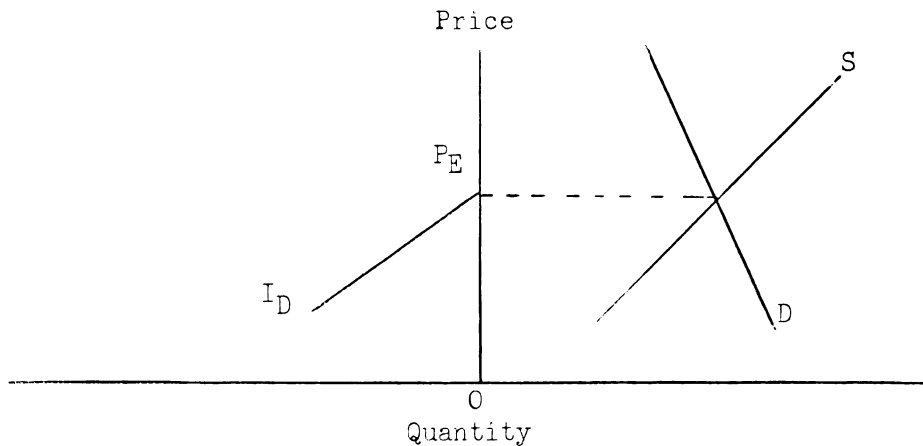
FIGURE IV-4

AN IMPORT DEMAND CURVE DERIVED FROM HYPOTHETICAL
DOMESTIC DEMAND AND SUPPLY CURVES
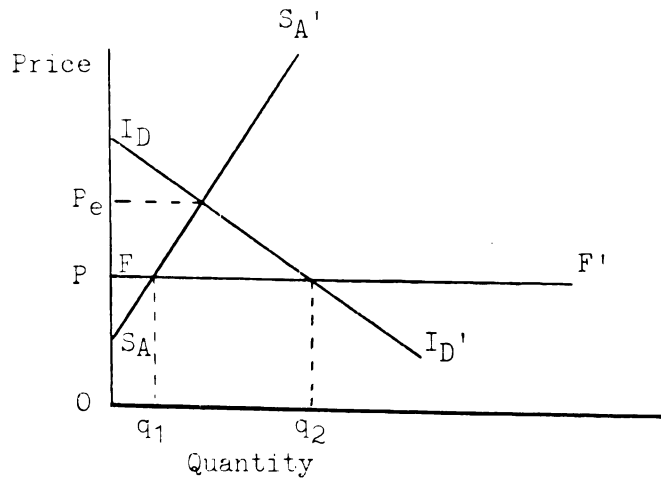
FIGURE IV-5

AN IMPORT DEMAND CURVE TOGETHER WITH A SUPPLY CURVE
FROM COMPETING SUPPLIERS

supply curves by computing the horizontal distance between the two curves

at prices below the equilibrium price. The horizontal axis measures

quantity, increasing in both directions from the center, as in Figure

IV-3. The area beneath the intersection of the demand and supply curve

is equal to the area under the curve I_D P_E on the left of Figure IV-4.

If feed grains are available from countries other than United

States, adjustments in the diagram can be made to show this relation-

ship. In Figure IV-5, the offer curve from United States is represented

as a horizontal line FF'. An importing area has a demand for feed grain

imports as indicated by the import demand curve I_D I_D' (transposed from

Figure IV-4). The price and quantity of grains that another exporting

country will sell to the importing area is indicated by the offer curve

S_A S_A'. This exporting country A, is assumed to not have surplus supplies

and, therefore, will offer larger quantities only at higher prices.

An importing country would theoretically obtain feed grains at as low

a price as possible, so buy from country A until the quantity O_{q_1} was

purchased, causing the import price to rise to P. Since the import

price from country A is above P for any quantity in excess of O_{q_1}, the importing country would obtain quantity $q_1\ q_2$ from United States at price P. Any increase in United States export price of feed grains would reduce the quantities demanded from United States by importing countries, and other exporting countries with prices above P may enter the market. Due to the large volume of surplus grain in United States, this country has the effect of a "dominant firm" upon the world market for feed grains.

To summarize, the amount of feed grains that will be demanded from United States depends upon the United States offer price and the offer prices from other exporting countries. Assuming any other nation exporting feed grains does not change its offer curve as the offer price from United States is changed, the amount that an importing country will purchase from United States can be determined under various price conditions. The quantity demanded from United States can be determined from the horizontal distance between the offer curve from another exporting nation $S_A\ S_A'$, and the import demand curve $I_D\ I_D'$ at various United States price levels, as indicated in Figure IV-5.

Instead of showing this demand as the difference between two curves, it can be shown as a kinked demand curve $P_e\ K\ I_D'$ as in Figure IV-6. The kink at K occurs at the price level above which any exporting countries other than United States would offer feed grains for export. Curve $P_e\ K\ I_D'$ is derived from Figure IV-5, by plotting the horizontal distance under curves $S_A\ S_A'$ and $I_D\ I_D'$ against the price axis. Therefore, the area under curves $S_A\ S_A'$ and $I_D\ I_D'$ at prices below P_e is equal to the area under curve $P_e\ K\ I_D'$. The demand curve $P_e\ K\ I_D'$ in Figure IV-6 indicates the quantity of feed grains that an importing
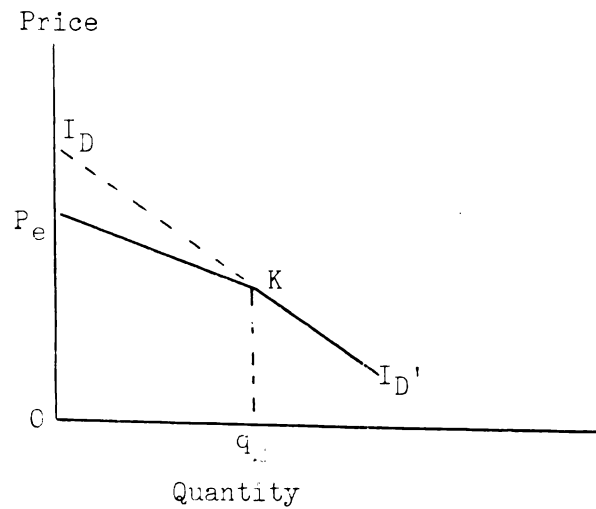
Price

FIGURE IV-6

A HYPOTHETICAL IMPORT DEMAND CURVE FOR UNITED STATES FEED GRAINS

country would be willing to purchase from United States at various United

States offer prices below price P_e. At United States prices above P_e

the importing country would obtain all imports from exporting country

A at price P_e. If other feed grain exporting countries should enter

the market with offer curves below the offer curve S_A S_A' of country

A in Figure IV-5, the demand curve P_e K I_D' would need to be adjusted

downward to compensate for the additional competition facing United States.

In this analysis, it must be assumed that other grain exporting countries

do not adjust their offer curves to compensate for changes in the United

States offer price.

Many complications arise when the theoretical framework presented

above is applied to any one importing area. In the first place, demand

and supply curves for feed grains are not available from areas importing

United States feed grains at the present time. The increasing avail-

ability and accuracy of information concerning the production and con-

sumption of feed grains throughout the world indicates possibilities

of developing demand and supply relationships in the future. A second complication arises over the difficulty of determining the prices at which United States feed grains are sold in foreign markets. Import restrictions greatly influence the market price for United States grains in almost all foreign markets, although the acceptance of payments in foreign currencies may counteract these restrictions to some extent.

Even though it may be impossible to develop an empirical verification of the relations shown in the previous theoretical analysis, there is sufficient evidence to locate a point on the demand and supply curves for each year. Quantities imported from other countries at various prices along with the quantities imported from United States also indicate the location of the United States offer curve and the import demand curve.

It is possible to compare the historical evidence of production, consumption, and trade in feed grains for the area of Western Europe and, in light of trends and governmental policies, estimate future conditions and implications. A review of data concerning trade and a comparison of these data with the theoretical model presented above will present a basis for predicting future changes.

West European Trade in Feed Grains

During the past one hundred years Western Europe has been considerably involved in world feed grain trade. Prior to World War II OECD countries imported an average of 27 percent of the feed grains they consumed, more than a quarter of their domestic disappearances. Since 1947 the percentage of feed grains obtained through imports has been lower than before the war; but ranged from 16 to 22 percent of the

amount consumed. West European countries imported a net of 10.7 million
metric tons per year, on the average, during the prewar period from 1934
to 1938. Such a high level was not again reached until the fiscal year
1958/59, when net imports of feed grains for Western Europe rose to 14.3
million metric tons. Although imports of feed grains into Western Europe
have been above prewar averages since 1955/56, exports from country to
country within that area have also been above prewar averages. West
European influence on world feed grain trade was discussed in Chapter
II and five-year averages shown in Table II-4.

Table IV-1 shows West European feed grain imports by commodity for
each year beginning July 1, from 1947/48 through 1962/63 and for a five-
year prewar average. Since the fiscal year is used in FAO trade reports
and also coincides fairly closely with the crop years of most feed grains,
it will be used in this thesis and designated by a slanted line separ-
ating the two years, unless otherwise specified. Five countries: United
States, Argentina, Australia, Canada, and the Republic of South Africa
have been the major sources of West European feed grain imports. In
recent years Syria, Tunisia, Morocco, British East Africa, the Federation
of Rhodesia and Nyassaland, and the Sudan have also exported feed grains
to Western Europe. Internal grain trade between the individual countries
in Western Europe is included in the total import and export figures.
Exports originate from France, Denmark, Netherlands, the United Kingdom,
and Yugoslavia and go to other West European countries. Data on destin-
ations of feed grains exported from Western Europe indicate that between
74 and 95 percent do not leave the West European area. In 1960/61 France
exported 1,750 thousand metric tons of barley and maize (five times the
average for the three previous years). Ninety-four percent of these

TABLE IV-1

FEED GRAIN IMPORTS INTO WESTERN EUROPE, TOTAL AND FROM UNITED STATES, BY PREWAR AVERAGE AND BY YEAR 1947/48 THROUGH 1962/63

IMPORTS	BARLEY	OATS	CORN	SORGHUM & MILLETS	TOTAL	TOTAL EXPORTS	NET IMPORTS
			----Thousand Metric Tons----				
Prewar Avg.							
(1934-38)	2330	700	8330	201	11561	833	10728
July-June							
1947/48	1640	590	3700	176	6106	786	5320
1948/49	1720	950	4440	410	7520	549	6971
1949/50	2670	760	4530	551	8511	515	7996
1950/51	2100	570	3800	821	7291	296	6995
1951/52	3110	840	4250	1396	9596	855	8741
1952/53	3750	525	3400	902	8577	615	7962
1953/54	3715	820	4020	349	8904	701	8203
1954/55	4090	765	4570	765	10190	557	9633
1955/56	4210	900	4595	1915	11620	1130	10490
1956/57	5275	1115	5035	1050	12475	2150	10325
1957/58	4610	1165	5400	1170	12375	2000	10375
1958/59	4750	1310	7000	2360	15420	1165	14255
1959/60	4700	1340	8790	2785	17615	1830	15785
1960/61	3985	1065	8950	2015	16015	2645	13375
1961/62	4700	1110	11160	2510	19480	3480	16010
1962/63	3840	1160	13050	2250	20400	2460	17940

		IMPORTS FROM UNITED STATES				PERCENT OF NET IMPORTS	
Prewar Avg.							
(1934-38)	169	2	439	a/	610	6	
July-June							
1947/48	207	239	554	...	1000	19	
1948/49	168	275	1734	...	2178	31	
1949/50	178	162	2084	581	3006	38	
1950/51	171	48	2174	1067	3460	49	
1951/52	120	22	1677	1070	2889	33	
1952/53	82	10	2529	31	2652	33	
1953/54	4	--	1877	150	2031	25	
1954/55	440	127	1532	766	2865	30	
1955/56	1561	366	2700	1647	6274	60	
1956/57	464	345	2559	683	4052	39	
1957/58	1203	360	2711	795	5068	49	
1958/59	1741	424	3731	1960	7856	54	
1959/60	1608	559	4201	2155	8523	54	
1960/61	1017	385	4697	1627	7726	58	
1961/62	1238	186	6580	1561	9565	60	
1962/63	864	329	6692	1693	9515	53	

a/ Sorghum and Millets data based on calendar year prior to 1954/55.

Notes: 1) ... Data unavailable.   2) -- Less than 500 metric tons.

Source: Grain Exports by Source and Destination, 1949/50-1954/55 and
         World Grain Trade Statistics, 1955/56-1962/63, (FAO, Rome).

exports went to other West European countries. The following year (1961/62)

French barley and maize exports rose to over 2 million metric tons; with

75 percent going to other West European countries. Yugoslavia, the only

other net feed grain exporter in Western Europe, exported 294 out of

337 thousand metric tons (76 percent) in 1960/61 to West European countries.

For the West European area, total imports minus total exports (net im-

ports) nearly equal the total imports of feed grains from outside sources.

Historically, these net imports present a realistic estimate of the "feed

grain gap", a term used here to mean the volume of feed grains demanded

within Western Europe and not supplied domestically. Total feed grain

trade from United States to Western Europe has increased since 1947/48,

though not in equal amounts for each grain. Exports of barley increased

nearly fivefold while exports of oats less than doubled between 1947/48

and 1962/63. Corn trade from United States to Western Europe expanded

more than any other feed grain since 1947/48 with an increase of 6.1

million metric tons. In recent years corn imports have come more from

United States and the Republic of South Africa than from Argentina.

Argentina had supplied nearly 70 percent of Western Europe's imports

of corn prior to World War II, but feed grain trade between Western

Europe and Argentina has declined since the war. Despite the fact that

it was not until 1958/59 that net feed grain imports surpassed prewar

averages in Western Europe, United States supplied more every year since

1947/48 than prior to the war. The column entitled Percent of Net Im-

ports in Table IV-1 indicates the United States share of all of the

feed grains that Western Europe imported. Since 1948/49, United States

has supplied at least 30 percent, and in 1955/56 and 1961/62 60 percent,

of the net feed grain imports going into Western Europe. In Table IV-2,

TABLE IV.2

FEED GRAIN IMPORTS INTO WESTERN EUROPE FROM FOUR COUNTRIES

Source	Argentina			Australia			Canada		Republic of South Africa	Total From Four Countries	Four Countries As % Of W Europe's Net Imports
Year Grain	Barley	Oats	Corn	Barley	Oats	Sorghum & Millets	Barley	Oats	Corn		
	← Thousand Metric Tons →										Percent
Prewar Avg (1934-38) July-June	377	361	5554	61	3	...	164	113	...	6643	61
1947/48	742	96	2922	192	152	...	8	115	--	3826	72
1948/49	264	62	1646	141	266	...	218	83	--	2730	39
1949/50	121	32	1282	a	...	...	46	54	--	1661	21
1950/51	28	32	155	...	...	...	219	40	--	675	10
1951/52	246	40	594	b --	...	...	829	160	--	1938	22
1952/53	174	6	596	265	174	...	1505	103	--	2868	36
1953/54	825	550	1306	336	51	-	972	76	--	4116	50
1954/55	385	308	482	303	38	55	1085	89	--	3744	39
1955/56	571	177	428	246	162	25	590	48	652	2900	28
1956/57	556	65	1033	203	121	24	1012	9	673	3889	38
1957/58	434	270	951	219	28	12	725	58	869	3915	38
1958/59	245	175	1854	378	275	79	1145	95	554	4780	34
1959/60	274	277	2744	518	184	71	835	70	200	5143	33
1960/61	122	214	1560	417	231	...	238	26	332	3131	23
1961/62	183	356	852	478	269	--	148	26	986	4296	27
1962/63	43	103	2440	146	221	46	153	269	1117	4538	25

Notes: a) .. Data unavailable   b) -- Less than 500 metric tons

Source: Grain Exports by Source and Destination, 1949/50 through 1954/55 and World Grain Trade Statistics, 1955/56 through 1962/63 (FAO, Rome).

other major sources of feed grains for Western Europe are shown along
with their total as a percentage of all West European net imports.

United States Share of the West European Feed Grain Market

The existence of the "share of the market" concept influences
world trade as it does domestic market relationships. Exporting coun-
tries that have historically supplied a large percentage of the world
exports of a certain commodity, consider that a portion or share of the
world market is rightfully theirs in the future. It has been the stated
policy of the United States government to attempt to continue to supply
world agricultural markets in proportion to its rightful share. The
Foreign Agricultural Service in a report on Agricultural Exports under
Government Programs stated, "In general, the CCC export pricing policy
reflects the desire to maintain the United States' fair share of estab-
lished export markets and to expand U.S. exports in undeveloped and
new market areas."[2] The surplus feed grain problem existing in United
States at the beginning of the 1960's gives this country the opportunity
to supply feed grains to world markets at nearly any set level of prices.
Price adjustments are made under the argument that United States is
attempting to maintain its fair share of the world market. Other feed
grain exporting countries do not have such great quantities of surplus
grains and may not be able to maintain their share of imports into
Western Europe should their productivity decline or domestic demand
increase sizeably. A new Trade Expansion Act was signed into law in

_____

[2] U.S. Department of Agriculture, Foreign Agricultural Service,
U.S. Agricultural Exports under Government Programs, Fiscal Years 1954-
55 Through 1958-59, Foreign Agriculture Circular, FATP 16-60, (Washing-
ton. June 30, 1960), p. 8.

October 1962, enabling the United States president or his representatives to negotiate trade agreements with considerably more freedom than previously. It seems likely that United States will use this authority to maintain and if possible expand its share of the world feed grain market.

Not only has the volume of feed grains imported into Western Europe fluctuated widely in recent years, but the proportionate tonnages by commodity have also changed. Table IV-3 shows the net imports of feed grains into Western Europe for the prewar 1934-39 average and for the years from 1947/48 through 1962/63. As a proportion of the net imports of all grains, it can be seen that barley increased after World War II to a high of 41 percent in 1952/53 then decreased to 12 percent by 1962/63. Net imports of oats rose relative to the net imports of all feed grains immediately after the war then fell and have remained between 5 and 9 percent since 1948/49. Corn imports fell relative to the net imports of all feed grains after the war and continued to fall until 1951/52. During the following ten years, the net imports of corn increased to more than two-thirds of the total. Imports of sorghum and millets increased relative to other feed grains from 2 percent of prewar averages to 16 percent in 1951/52. Sorghum and millet net imports fell during the next two years but have increased since 1953/54, ranging between 12 and 17 percent of all net feed grain imports in the past 5 years.

A comparison of the relative percentages of the individual feed grains shipped to Western Europe from United States is shown in Table IV-4. On the average, more than 75 percent of all feed grains imported from United States was composed of corn and sorghum grains between 1957/58 and 1961/62. Prior to World War II, the small quantities obtained from United States consisted of 72 percent corn and 28 percent barley. Imme-

TABLE IV-3

NET IMPORTS OF FEED GRAINS INTO WESTERN EUROPE AND PERCENTAGES OF EACH GRAIN
PREWAR AVERAGE AND BY YEAR 1947/48 THROUGH 1962/63

	NET IMPORTS OF ALL FEED GRAINS	BARLEY	OATS	CORN	SORGHUM & MILLETS	BARLEY	OATS	CORN	SORGHUM & MILLETS
		--------Thousand Metric Tons--------				--Net Imports of Each Grain-- As Percent of Total			
Prewar Avg. (1934-38) July-June	10725	2170	550	7720	188	20	6	72	2
1947/48	5380	1410	555	2180	175	27	10	60	3
1948/49	6971	1555	915	4100	401	22	13	59	6
1949/50	7996	2470	645	4290	541	31	9	54	6
1950/51	6995	1900	470	3760	805	28	7	54	11
1951/52	8741	3080	810	3570	1381	34	9	41	16
1952/53	7662	3470	455	3355	982	41	6	42	11
1953/54	9203	3315	725	3525	338	40	9	47	4
1954/55	9633	3790	655	4445	743	39	7	46	8
1955/56	10490	3570	720	4415	1785	34	7	42	17
1956/57	10325	3445	915	4965	1000	33	9	48	10
1957/58	10375	3390	935	4960	1065	33	9	48	10
1958/59	14255	4180	1190	6615	2335	29	8	46	16
1959/60	15790	3700	1170	8170	2750	23	7	52	17
1960/61	13375	2575	950	7875	1975	19	7	59	15
1961/62	16010	2100	800	10660	2450	13	5	67	15
1962/63	17940	2240	1070	12480	2150	12	6	70	12

Source: Grain Exports by Source and Destination, 1949/50 through 1954/55 and World Grain Trade Statistics, 1955/56 through 1962/63. (FAO, Rome).

TABLE IV-4

TOTAL FEED GRAIN EXPORTS FROM UNITED STATES TO WESTERN EUROPE
AND PERCENTAGES OF EACH GRAIN BY YEAR, 1947/48 THROUGH 1962/63
AND AVERAGES FOR 1934-38, 1947-51, 1952-56 AND 1957-61

July-June	Total Feed Grain Exports from United States to Western Europe Thousand Metric Tons	Barley	Oats	Corn	Sorghum &Millets
		- - - - Percent - - - - - -			
Prewar Avg 1934-38	610	28	--	72	...
1947/48	1050	..	24	55	...
1948/49	2172	8	13	79	...
1949/50	5006	6	5	69	19
1950/51	3460	5	1	63	31
1951/52	2849	4	1	58	37
Avg. 1947/48-1951/52	2506	9	9	65	17
1952/53	2652	3	--	95	1
1953/54	2031	--	--	92	7
1954/55	2464	15	4	53	27
1955/56	6274	25	6	43	26
1956/57	4052	11	9	63	17
Avg. 1952/53-1956/57	3575	14	5	63	13
1957/58	6069	24	7	53	16
1958/59	7856	22	5	47	25
1959/60	8223	19	7	49	25
1960/61	7726	13	5	61	21
1961/62	9565	13	2	69	16
Avg. 1957/58-1961/62	7748	18	5	56	21
1962/63	9515	9	3	70	18

a) ...Grain sorghum exports unavailable prior to 1949.

b) --Indicates less than 0.5 percent.

Source: Grain Exports by Source and Destination, 1949/50 through 1954/55
and World Grain Trade Statistics, 1955/56 through 1962/63, (FAO, Rome).

diately after World War II, oat exports from United States to Western

Europe increased, and by 1947/48 oats made up 24 percent of all feed

grain shipments. Since 1947/48, the quantities of oats have declined

relative to other feed grains. In 1953/54 less than 500 metric tons

were shipped from United States to Western Europe, and since then oats

have made up less than 10 percent of the feed grain trade. Data on

United States sorghum grain exports to Western Europe are unavailable

for years prior to 1949/50, but undoubtedly a fairly large portion of

all sorghum imports into Western Europe came from United States.

Averages for the five-year period 1957-61 are shown in Table IV-4

to indicate the proportion of each grain relative to the average of all

feed grains exported from United States to Western Europe. Using this

average as a basis, it might be assumed that United States feed grain

exports to Western Europe should be defined as approximately 18 percent

barley, 5 percent oats, 56 percent corn, and 21 percent sorghum grains.

However, exports of corn have risen faster than other grains during the

early 1960's and future feed grains exported to Western Europe may very

likely be made up of approximately 60 percent corn. A more realistic

assumption of the overall composition of feed grains shipped from United

States to Western Europe in the near future might be 15 percent barley,

5 percent oats, 60 percent corn, and 20 percent grain sorghum. Year-to-

year fluctuations in the proportions of each grain shipped make any

projections of the composition of United States feed grain exports to

Western Europe extremely difficult.

Analyses and Projections

The demand for feed grain imports has been shown to be based upon

the annual domestic demand and supply curves in the model developed for
an importing area previously in this chapter. Imposed upon these curves
was an offer curve depicting alternative sources of feed grains and in-
dicating the size of the feed grain gap. Where detailed and accurate
historical data are available in sufficient quantities such as in United
States, it has been possible to apply refined statistical techniques to
project trends to future periods.[3/]

For areas where the data are sketchy and subject to wide errors,
it is sometimes adviseable to use another method of analysis. Under
these conditions, linear projections of historical trends may provide
useful information upon which to base policy decisions concerned with
present and future developments. Programs which increase consumption,
divert production, or influence foreign trade have far-reaching effects
on agriculture. The bases for decisions concerning these programs all
too often are founded upon inaccurate information, or perhaps even worse,
no information at all. Even where statistical data are limited and
subject to large errors, it is possible to obtain useful estimates
of future potentials. Of course, it is always desirable to have as
much complete and accurate information as possible before making policy
decisions, but when such decisions must be made, it is important to
have all available information evaluated and analyzed. An attempt is
made in the following sections to analyze the most consistent data for
Western Europe that is presently available.

[3/] Kenneth W. Meinken, The Demand and Price Structure for Oats,
Barley and Grain Sorghums, U.S. Department of Agriculture, Technical
Bulletin No. 1080, (Washington: 1953), and Richard J. Foote, John W.
Klein and Malcolm Clough, The Demand and Price Structure for Corn and
Total Feed Concentrates, U.S. Department of Agriculture, Technical
Bulletin No. 1061, (Washington: 1957).

The following projections of historical trends may lack some of the sophistication of regression lines or least squares projections, but they do present a logical interpretation of available data. These estimates give as realistic a set of projections of current trends as is possible with presently available information. If the assumptions upon which they are based become widely divergent from actuality, the projections could be expected to deviate widely from future occurrences. It is clearly evident that conditions influencing production of feed grains, demand for meat, income levels, and political relationships are changing rapidly in Western Europe. Therefore, any one set of assumptions which appears close to reality in 1963, may prove to be highly unrealistic in a few years.

In an attempt to encompass the range of changes which may occur, Chapter V expands the projections by presenting three sets of assumptions for both domestic production and disappearance levels of feed grains for the averages of the years 1964-66 and 1969-71. These future years are selected to coincide with years for which other projections have been made. Three-year averages of those two periods allow some smoothing out of changes due to weather and extreme climatic conditions which may occur. Even if extreme conditions occur outside of the range encompassed by these projections, it is relatively simple to adjust the analysis to take the unforeseen event into consideration.

Specifically, the following five assumptions are presented as being a foundation upon which to expand the basic analysis.

1. The time period over which data are analyzed is a representative period and the predominant influences will continue in the future.

2. External influences such as weather conditions and treaty commitments

occurring in the future will be balanced by other offsetting factors
and not effect the results of the projections.

3. The data being analyzed are reliable and representative of historical

   conditions. Future data will be at least as good if not better than

   data collected in the past.

4. The area under study (Western Europe) will not change in size or

   form of government beyond the specific assumptions made in the anal-

   ysis.

5. Wars, inflations, depressions, or major disasters will not occur.

These assumptions are not violated by the changes that have occurred

since 1947 in Western Europe. The data on production and consumption

follow a fairly consistent pattern and a projection of the present trends

might be expected to give reasonable results with the accuracy decreasing

as projections are extended further in the future. There has not been

a wide divergence from year to year, although weather has caused some

fluctuations in yields and areas.

Time is not used for the purpose of explaining the changes that

have occurred in the production and consumption of feed grains even

though it is the variable over which the changes are shown. These changes

can be partially explained by the influences of new technology, govern-

ment controls, postwar recovery, rising incomes and standards of livings,

and price fluctuations. Data are not available to measure all of these

variables nor will they be available in the near future. The problems

of compiling data for the various countries within Western Europe with

their varied cultural patterns and degrees of economic development are

extremely complex. Therefore, the analysis will not attempt to explain

cause and effect relationships in a statistical sense, but to project

from trends that have been observed to occur in the recent history of the area. The aim of this analysis is to present reasonable and reliable estimates of future events, even though these results may not be testable in an a priori sense.

Where the observations have maintained a constant increase, a straight-line trend can be easily developed. This appears to be the case for much of the data analyzed in this study. Perhaps over a longer time period the trend would not be a straight line but a curved line or even a broken line separating different periods. For projections into the future periods under consideration, an assumption of constant changes will be used. A non-linear trend is difficult to determine over a short period since several different forms of a curvilinear function may fit the small number of observations. Unless the data indicate a strong tendency to follow a curved line, a straight-line trend may give more reliable future results, even though a curvilinear function gives a better fit for the current period.

Production Trends and Projections

Feed grain production is reviewed for the area of Western Europe in Chapter III. Production data for the late 1940's and years since are periodically reported by F.A.O. These data also periodically are revised, but undoubtedly they are as accurate as any that are available over the period since 1947. Since F.A.O. reporting methods are relatively consistent from year to year, a trend may correctly emphasize the year-to-year fluctuations even though a bias may exist for the actual quantities produced in any one year. By aggregating the data for each country into a total for Western Europe, possibly some of the inconsistencies

for individual countries will tend to compensate for each other. However, the reverse may be true and aggregation could introduce greater inaccuracies than are present for individual countries. Since there is no way to check the data except by other United Nations' reports, it is not possible to determine the effects of aggregation.

The production trend for feed grains in Western Europe approximates a straight line during the period from 1947/48 to 1962/63 as shown in Figure IV-7. A substantial increase in output has occurred since 1947/48 when a total of 28 million metric tons of barley, oats, and corn were produced. By 1959/60 total production had risen to slightly more than 47 million metric tons. Even though production had increased by almost 20 million metric tons, there was considerable variation in rates of increase between the individual grains during that period. Oat production increased until 1953/54, but has declined every year since then except for 1956/57. In the winter of 1955/56 Western Europe experienced a hard freeze which killed large areas of wheat, especially in France. These areas were planted to barley and oats the following spring, shifting an additional two million hectares to feed grains. As a result, the barley and oat harvest in 1956/57 reached thirty-five million metric tons, five million metric tons above the level reached the previous year. Barley and corn production as shown in Figure IV-7 have generally increased throughout the entire period. While year-to-year data tend to fluctuate because of weather and other short run influences, a three-year moving average evens out these fluctuations and makes the trend more obvious. These averages are plotted in Figure IV-7 as a dotted line and indicate a close approximation to the straight-line trend.
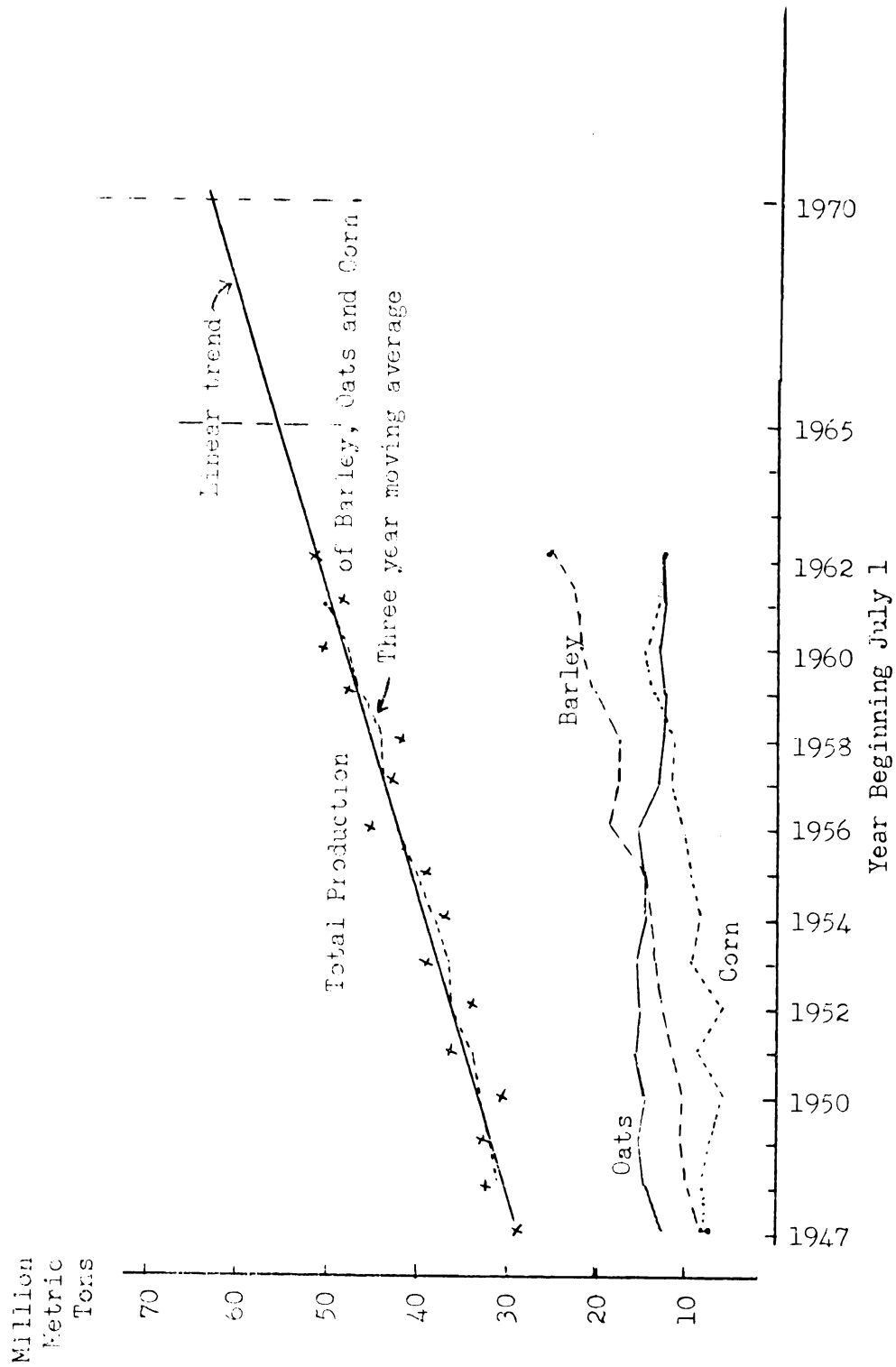
FIGURE IV-7

PRODUCTION OF BARLEY, OATS, AND CORN IN WESTERN EUROPE

Producing Areas

Further understanding of trends in production can be obtained by
examining trends in producing areas and average yields. The total area
in feed grain production has increased slightly since 1947/48, but the
change has been slow and unsteady as shown in Figure IV-8. In 1947/48,
20.2 million hectares (approximately 49.9 million acres) were harvested;
but, other than the previously mentioned increase that occurred in 1956/57,
changes since then have been slow. The shift that occurred in 1956/57
indicates to some extent the substitutability of wheat areas for barley
and oats. It is anticipated that wheat production will soon approach
the level of consumption.[4] As further increases in wheat yields occur,
there is a strong possibility that more land will be shifted from wheat
to feed grain production in Northwestern Europe. Producing areas in
Southwestern Europe are not as productive as those to the north where
climate is more favorable, and increases in southwestern feed grain
producing areas due to shifts from wheat are less likely to occur.
If new drought-resistant varieties of feed grains should be developed
or irrigation should become more widespread, there would be greater
areas of land in feed grain production even in Southwestern Europe.

With the present state of information available concerning soil
conditions, irrigation potentials, or crop varieties being developed,
it is not possible to determine with any high degree of confidence the
potential adjustments that might occur between bread grain and feed
grain producing areas. These adjustments will depend in part upon the
growth in yields, both of bread grains and feed grains. Further increases

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[4] FAO Agricultural Commodities-Projections for 1970, (FAO, Rome:
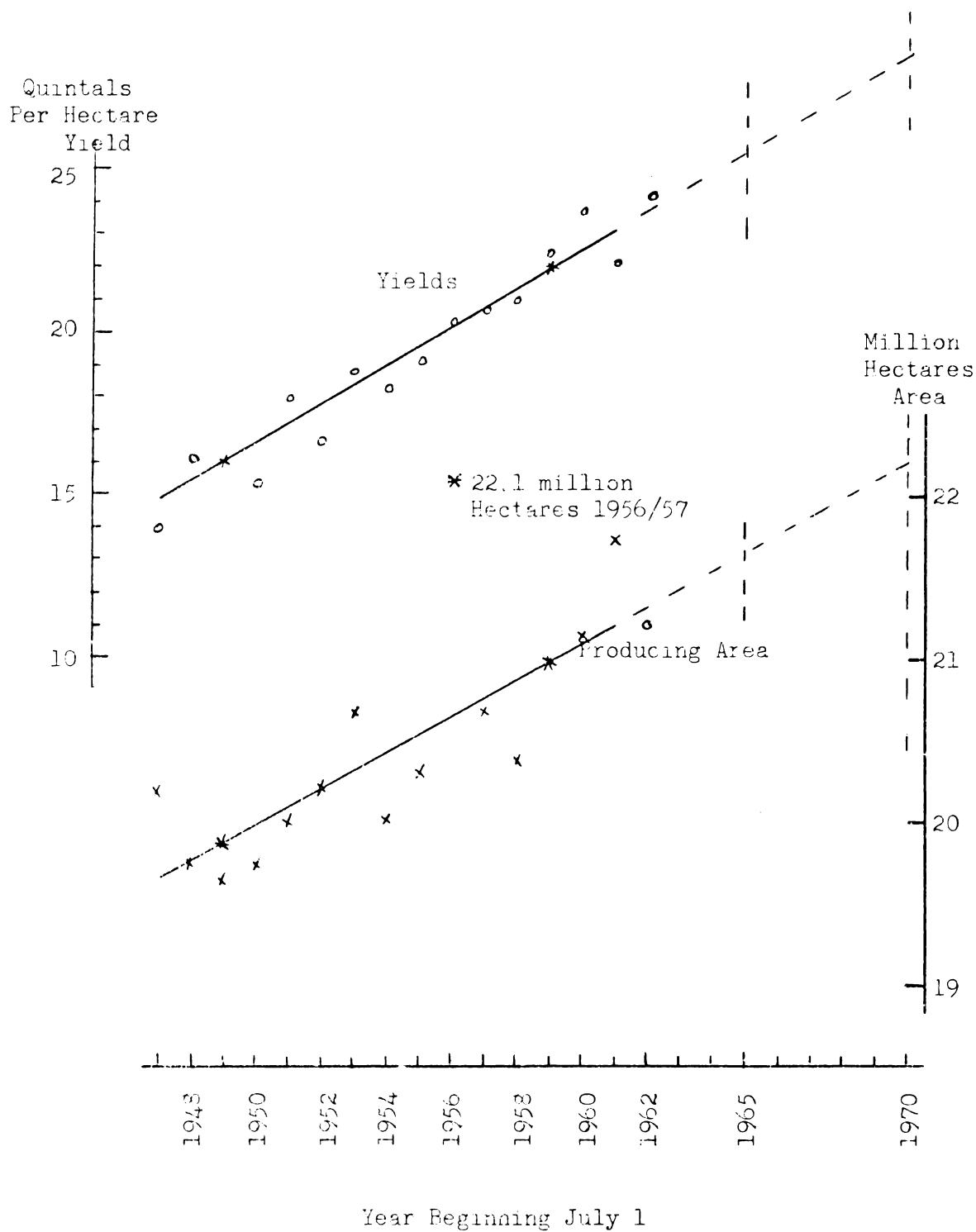1962), pp. II-2, II-3.

FIGURE IV-8

FEED GRAIN YIELDS AND PRODUCING AREA IN WESTERN EUROPE

in wheat yields will allow greater production on fewer hectares, thereby
releasing more land to feed grains. Grain prices received by producers
influence land adjustments also. The presently available information
on the level of future grain prices in Western Europe indicates that
Common Market feed grain prices may be at least 60 percent higher than
in the United States. Policies effecting grain prices are tied directly
to policies related to the production of pork, poultry, and eggs.

Within each country the total number of hectares devoted to the
production of barley, oats, and corn is influenced in varying amounts
by governmental policy decisions. The results of these decisions are
imposed upon individual producers by higher or lower price supports,
land area or marketing controls, and changes in research and educational
efforts. Even though an assumption of rational action by West European
governments to prevent surplus accumulations of wheat may be rather un-
realistic, it is included in this analysis as a basis for projections
of areas producing feed grains. It is also assumed that economic pressures
will continue to cause increasing amounts of land areas to be placed
in non-agricultural use, such as roads, housing developments, and rec-
reation for the steadily increasing population. In France, where an
estimated 2.6 million hectares (6.4 million acres) of land is now lying
idle or in grass, substantial new areas could be put into feed grain
production. Elsewhere in Western Europe, the development of new feed
grain producing areas will occur slowly since undeveloped land is scarce.
In some of the drier areas of Spain and Italy, irrigation would allow
a considerable increase in production if it should become economical.
Present water scarcity in these areas will likely continue, however,
unless major technological advances are made in irrigation methods or

new sources of water are discovered.[5]

Considering the changes that have occurred in total producing areas and in line with the above assumptions concerning potential adjustments, it is anticipated that the number of hectares producing feed grains will increase somewhat, while the area producing wheat will decline during the 1960's. A projection of current trends into the future indicates that, by 1965, an estimated 21.5 million hectares of barley, oats, and corn will be harvested. By 1970 the area in feed grains is projected to be approximately 22.0 million hectares. The average area in barley, oats, and corn production was estimated at 21.0 million hectares (5.2 million acres) during the period 1957-61. The four crop years from 1958/59 through 1961/62 have shown an increase in producing area of .4 million hectares per year, but this rate is about twice as rapid as during the previous ten years. A late, wet spring in 1961 caused farmers to shift some land from wheat to corn and barley production. As a result, 21.6 million hectares were planted to feed grains in 1961/62. It is anticipated that the increase in area over the next decade will be less than one percent a year. Deviations from the historic trend in the 1950's ranged as high as 1.4 million hectares or 7 percent for the year 1956/57. For all other years the area has been within 5 percent of the trend line shown in Figure IV-8. This trend line is obtained by connecting the average area harvested during the five-year period from July 1, 1947 through June 30, 1952 to the average for the five-year period 1957-61. Year-to-year variations in feed grain producing area is much greater than average annual increases.

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[5] P. Lamartine Yates, Food, Land and Manpower in Western Europe, (London: Macmillan & Co. Ltd., 1960), Chap. 5, pp. 99-131.

Trend in Yields

Yields have increased more rapidly than has the area planted to feed grains in Western Europe. Between 1947/48 and 1961/62, average yields increased from 14 to almost 24 quintals per hectare.[6] As a comparison during the same period, the average yields of barley, oats and corn in United States rose from 15.6 to nearly 27 quintals per hectare. Barley and corn yields each increased from slightly less than 15 to more than 25 quintals per hectare between 1947/48 and 1960/61. The yields of oats increased from 13.3 to 20 quintals per hectare in Western Europe during the same period. Increased use of fertilizer, development of newer and better varieties of feed grains, and improved control of insects and disease have all contributed to increased yields.[7] Figure IV-9 shows the trend in fertilizer consumption from 1947 to 1959. Average annual consumption of fertilizer during 1947-49 very closely approximated the amount consumed in 1938, an indication that, in one sense, by 1948 Western Europe had recovered from World War II. New technologies will undoubtedly continue to be used in the future, increasing fertilizer use and further contributing to increases in feed grain yields.

A special supplement to the 1962 FAO Commodity Review suggests that the greater increases for yields of wheat in the fifties occurred in countries where yields were already high.[8] This same relationship

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[6] A corn yield of 20 quintals per hectare would be equivalent to 31.4 bushels per acre. One quintal equals 100 kilograms or 0.1 metric tons and one hectare equals 2.471 acres.

[7] FAO, Problems of Animal Feeding in Europe, (FAO, Rome: June, 1955), pp. 28-34; and OECD, Fertilizers in Europe: Production, Consumption, Prices, and Trade, (OECD, Paris: 11th Study, 1959-62).

[8] FAO Agricultural Commodities-Projections for 1970, (FAO, Rome: 1962), pp. A-29, A-31.

Million
Metric
Tons

Total Nitrogen, Phosphoric Acid,
and Potash Consumed

Year Beginning July 1
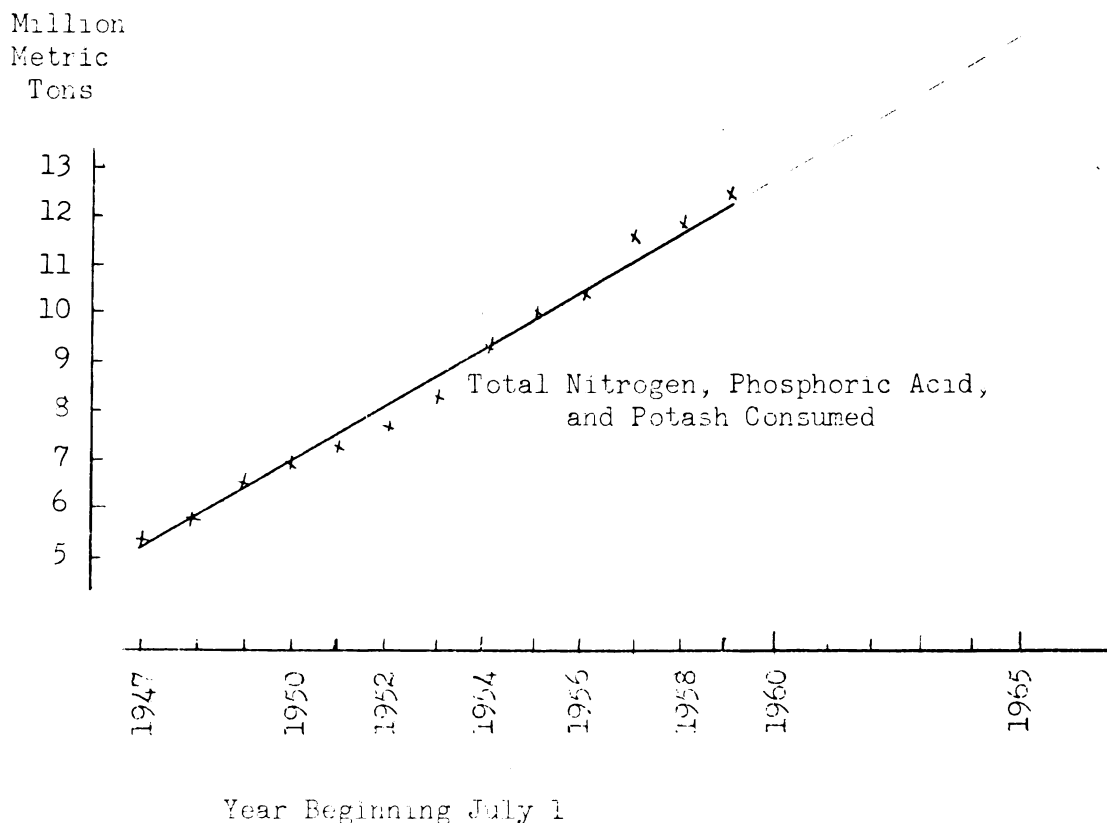
Source: FAO Production Yearbook

FIGURE IV-9

FERTILIZER CONSUMPTION IN EUROPE

might be expected to hold for yields of barley, oats, and corn also.

Farmers in general are becoming better informed concerning efficient

production methods, and in many West European areas, small farms are

being consolidated into larger producing units.

To project yields into future time periods, assumptions concerning

the rates of technological acceptance and limits to productivity are

necessary. It is fairly evident that the yields of feed grains in gen-

eral have not yet approached their upper limits.[2/] For example, in

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[2/] F. C. Schuffmer, "An International Comparison of Trends in Cereal
Yields During 1920-55, and Outlook - I and II" Monthly Bulletin of Agri-
cultural Economics and Statistics (FAO, Rome) Vol. V, Nos. 11(November,
1956) p. 13; and 12, (December, 1956), p. 1

1961 barley yields for all of Western Europe averaged 24 quintals per hectare. In individual countries, yields ranged from 13 quintals per hectare in Spain to 36 quintals per hectare in Denmark. Even though all countries may not attain the yield levels of Denmark, it is reasonable to assume that some progress will be made in many countries. Oat and corn yields also have varied widely from country to country in Western Europe. For oats, yields varied from 9 to 35 quintals per hectare; while for corn, yields ranged from 11 to 26 quintals per hectare in different West European countries in 1961. The assumption is made here that the individual governments of Western Europe will continue their attempts to increase the yields of feed grains and invest increasing amounts in research and education for producers. Feed grain yields in general are expected to continue their upward trend, though new developments may shift the trend of increasing yields among the different grains. Projecting the trends that occurred in the fifties, yields of feed grains would reach 25.5 quintals per hectare for 1970. These projections are shown in Figure IV-8 by a line connecting the average yields of the period 1947-51 to the average yields of the period 1957-61 and extended to the years 1965 and 1970.

Area projections multiplied by yield projections give projections of the total quantities produced. These figures are 55 million metric tons for 1965 and approximately 63 million metric tons for 1970. Projecting trends in production gives a similar result since yields were obtained from the quotient of production divided by area. Of course, if both yield and area trends are in fact linear, the trend of production would be curvilinear upward. It seems more likely that the trend in feed grain producing area will not be linear in the future, but increase at

a decreasing rate until an upper limit is reached. The production trend may very well remain linear, however, with increasing yields throughout the 1960's. By analyzing producing areas and yields separately, it becomes clear which of these factors was more influential in bringing about the increases in production. Feed grain production increased by 45 percent from 1947-51 to 1957-61 in Western Europe; but 86 percent of this increase was due to increased yields while only 14 percent of the increase occurred from shifts in grain producing areas (Table IV-5).

Even in United States, where fairly complete and accurate data on production are available, it is not unusual for variations between preliminary estimates and final tabulations to be as high as 5 percent. It is possible, therefore, that larger errors in data will occur where methods of collection are often not as advanced. In Western Europe the yearly production data have deviated from the trend line by as much as 9 percent for some individual years. If the trend projections could be assumed to be that accurate in the future, production could be expected to be within five or six million metric tons of the actual figures. A 10 percent error in estimates of production levels is quite possible for Western Europe, but as information gathering improves, these errors will be reduced. Table IV-5 summarizes the projections presented here and the changes that have occurred in West European feed grain production, areas, and yields during the fifteen-year period from 1947/48 through 1961/62 by comparing averages for the first five years with averages for the last five years.

Trends and Projections of Consumption Data

The preceding analysis of production trends and projections has

TABLE IV-5

FEED GRAIN PRODUCTION IN WESTERN EUROPE (BARLEY, OATS, AND CORN)
AVERAGES FOR 1947-51 AND 1957-61

Grain	Area			Yield			Quantity		
	1947	1957	Change Percent	1947	1957	Change Percent	1947	1957	Change Percent
	Million hectares			Quintals per hectare			Million metric tons		
Barley	5.8	8.5	+47	17.2	24.5	+42	10.0	20.1	+101
Oats	9.0	6.8	-24	15.9	18.9	+19	14.3	12.9	-10
Corn	5.1	5.6	+10	14.7	23.3	+59	7.5	13.1	+75
All Grain	19.9	21.0	+6	16.0	22.0	+38	31.7	46.0	+45

Projected Total	Area	Yield	Quantity
1965	21.6 million hectares	25.5 quintals per hectare	55 million metric tons
1970	22.2	28.6	63

Computed from data in FAO Production Yearbook, and Monthly Bulletin of
Agricultural Economics and Statistics. (FAO. Rome).

been based upon comparatively complete data over a fifteen-year period.

Similar data are not available concerning the uses for these feed grains

during this time period. At present there is no accurate information

on how feed grain has been used, how much was consumed by different

livestock in individual Western European countries, or what prices were

paid for this grain.

Data on availabilities are compiled from feed grain production

reports and net import figures. Availability figures include the total

quantity produced, the amount in storage, and the amount imported into

the area. Table III-1 in Chapter III presented information from a survey

of selected countries in the United Nations during the period 1955-1957

but did not include information on all West European countries. This

survey indicated that 77 percent of feed grain consumption is for animal

feed. By substituting Spain for Turkey and adding Belgium, Luxembourg,

Denmark, Greece, Sweden, and Yugoslavia, the area would be equivalent

to that for Western Europe and undoubtedly the percentage would be below

the 77 percent figure. As Western Europe becomes even more advanced,

a smaller proportion of feed grains will be used for human food and a

larger proportion for livestock feed.

If the assumption is made that wastes and losses are relatively

small and that changes in storage levels balance out over a period of

several years, then the remaining quantities used for livestock feed,

human food, industry, and seed would closely approximate the amount

available. The most important determinant of changes in the amount

used will be changes in the demand for livestock feed. As was shown

in Chapter III, rising standards of living exert pressures on dietary

changes to include more livestock products. These pressures in turn

TABLE IV-6

PER CAPITA SUPPLY OF LIVESTOCK PRODUCTS IN WESTERN EUROPE
AVERAGES FOR 1948-52 AND 1959

Product	Average 194_-__	1___	Percent Increase
	Kilograms Per Capita		Percent
Meat	33.34	48.03	44
Eggs	7.44	10.23	38
Milk			
Fat	4.61	5.50	19
Protein	5.21	6.02	16
Total	50.60	69.73	38

Computed from tables in FAO Production Yearbook, 1960 and earlier.

are felt by increases in demand for livestock feed. A projection of

trends of livestock production, human population growth, and incomes

indicates possible levels that feed grain consumption may attain in

the future.

All trends of the 1950's point toward a rising consumption rate

for livestock products in Western Europe in the 1960's. Table IV-6

shows the per capita supply of livestock products in the form of meat,

eggs, and milk which was produced on the average during the period 1948-

1952 and ten years later in 1959. It will be noted that the per capita

supply of meat increased 38 percent. Part of this increase occurred

because in the beginning period, 1948-1952, Europeans faced rationing

and price controls and could not obtain all of the livestock products

they desired. Producers were holding back sales and increasing numbers

in animal herds and poultry flocks to supply future demands.

TABLE IV-7

MEAT PRODUCTION FROM INDIGENOUS ANIMALS IN WESTERN EUROPE
AVERAGES FOR 1948-52 AND 1959

Meat Type	Average 1948-52	1959	Percent Increase
	Thousand Metric Tons Carcass Weight		Percent
Beef and Veal	3,502	5,142	47
Pork	3,585	6,029	68
Mutton and Lamb	537	748	39
Poultry	610	798	31
Horse	203	277	36
Total	8,437	12,994	54

Computed from tables in FAO Production Yearbook, 1960 and earlier.

Table IV-7 indicates the sources of increases in meat production over
a ten-year period from 1948-52 through 1959. During that period, pork
production increased most rapidly while the production of horsemeat in-
creased only slightly. Total meat production increased by 54 percent in
Western Europe over that ten-year period, or slightly over 5 percent a
year.

Incomes have increased consistently from the early 1950's, allowing
consumers to buy more of what they desired. Populations of West European
countries rose steadily since World War II adding to income pressures to
further increase demands for livestock products. Figure IV-10 shows pop-
ulation and income trends for Western Europe during the period 1949 to
1959 with an estimated population for 1963.

The trend toward increasing consumption of livestock products may
level off in the future, but it seems unlikely that this will occur any

Year Beginning July 1
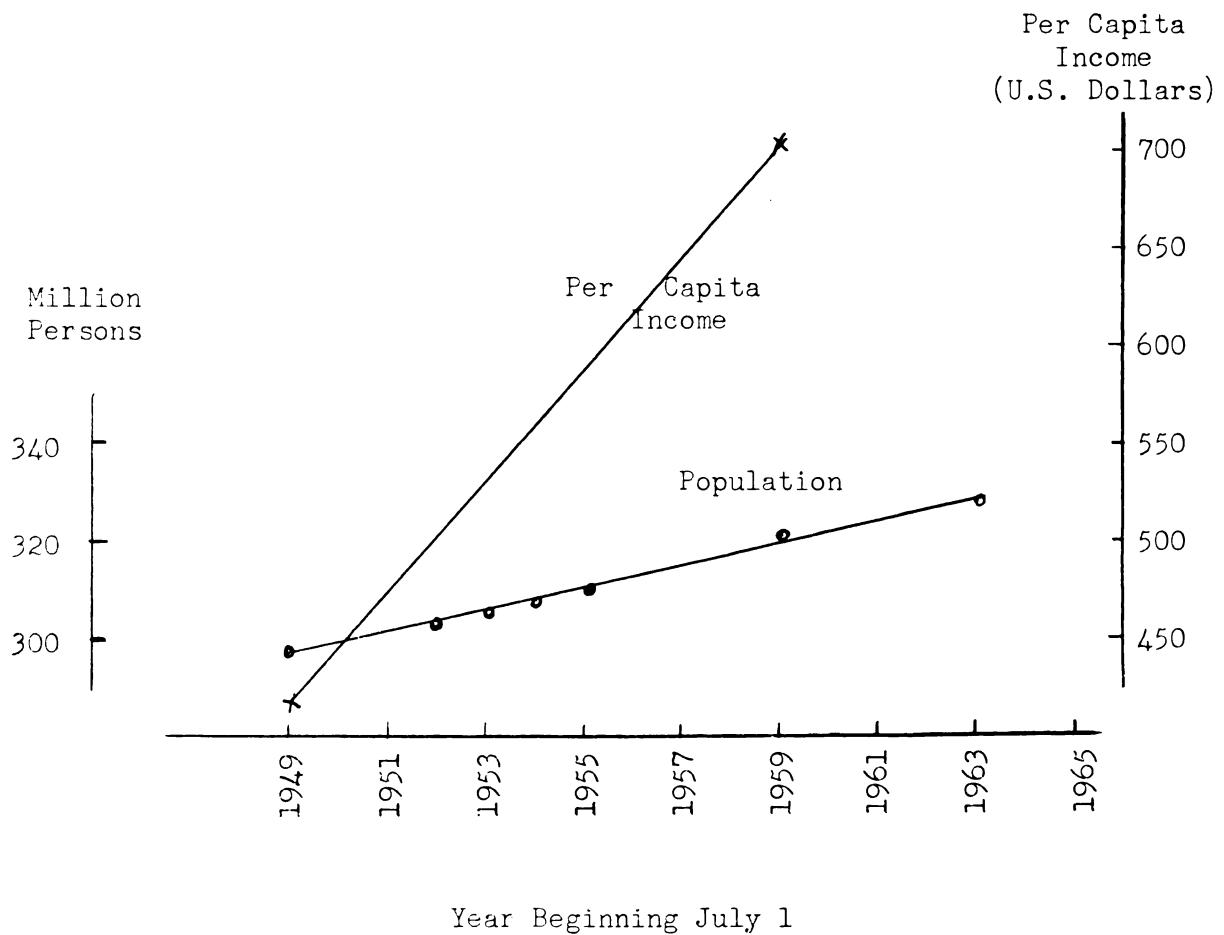
FIGURE IV-10

POPULATION AND INCOME IN WESTERN EUROPE

time soon. The growth in population and rising per capita incomes
will continue to increase demands for livestock products in Western
Europe if present trends continue. The national and per capita incomes
for Western Europe are shown in Table IV-8 for 1949 and ten years later.
In the compilation of these data, estimates and conversions were made
to present national incomes of the Western European nations in a common
unit, the United States dollar. These figures may contain some errors
because the national income figures were incomplete in some cases and
in others the conversion rates had to be estimated from a wide variation

TABLE IV-8

NATIONAL INCOMES, POPULATIONS, AND AVERAGE PER CAPITA INCOME
IN WESTERN EUROPE 1949 AND 1959

| | Year | | Percent |
	1949	1959	Increase
National Incomes (million dollars)	129,410	227,542	75.8
Populations (thousands)	297,560	320,415	7.7
Average Per Capita Income (dollars per person)	435	710	63.2

Source: Computed from National and Per Capita Incomes, Seventy Countries -
1949, Statistical Office of the United Nations, October, 1950, and
the United Nations Bulletins: International Financial Statistics
and Monthly Bulletin of Statistics.

in the annual exchange rates. It is assumed that the data for Western

Europe as a whole present a sound indication of the growth and develop-

ment that occurred during the fifties.

Whether or not the same rate of growth will continue during the

sixties is open to conjecture, but reliable sources tend to agree that

the countries in Western Europe will continue their economic develop-

ment and growth.[10] The growth and development that does occur may

be especially significant in the presently less developed countries

such as Spain where expansion might occur rapidly given greater sta-

bility in government policy.[11] Progress toward full integration and

[10] See for example the report published by the Economic Research
Service and the Foreign Agricultural Service, United Kingdom, Projected
Level of Demand, Supply, and Imports of Farm Products in 1965 and 1975,
U.S. Department of Agriculture, (Washington: January, 1962), pp. 6-11.

[11] "New Moves in Europe", Report on Western Europe, The Chase
Manhattan Bank, (New York: February-March, 1962).

the economic union of Western Europe has been slow and difficult, but
it is quite possible that by 1970 the Common Market may include ten to
fifteen countries. If the assumption is made that the effects of govern-
ment policy will be to encourage growth and development, high income
and demand projections can be considered as one likely outcome of European
integration. The assumption of government policies directed toward
expanded growth and development will be followed in this chapter. In
Chapter V some of the influences of various other governmental policies
will be investigated. Linear projections of per capita incomes into
the years of 1965 and 1970 will be used to show growth trends.

Table IV-8 shows that per capita incomes have increased in Western
Europe by 63 percent in the ten-year period from 1949 to 1959. A con-
tinued increase of the same relative magnitude would raise per capita
incomes to $875 by 1965 and to $1012 in 1970. As per capita incomes
rise in Western Europe, the demand for grains for human consumption
will decline, releasing more of these products for animal feed. On
the other hand, the tendency will be toward increased consumption of
foods such as lamb, poultry, veal, butter, bacon, and beef. This same
type of shift in diets has occurred historically in United States with
increasing levels of per capita income. The implications of such changes
in diets has been discussed in Chapter III.

A projection of the meat production trends of the 1950's into the
1960's is based on these premises of dietary shifts and rising per capita
incomes. It is assumed that beef, veal, and poultry production will in-
crease at a faster rate as the next decade progresses. The production
of pork will tend to increase at a slightly slower pace than it did in
the recent past, while horsemeat production will decline. The feeding

of horses for draft purposes will also fall as the use of tractors increases. Added together, these assumptions suggest that total meat production will continue to increase at about the same rate of 500 thousand metric tons per year as during the past ten years. If the rate of increase, as shown in Table IV-7, continued in the 1960's, by 1965 production would approach 16 million metric tons. Total meat production, projected to 1970, would reach approximately 18.5 million metric tons at this rate.

The poultry industry in Western Europe has been growing at the rate of 14 percent per year in recent years.[12] Since a high proportion of the feed intake of poultry is from feed grains, continued growth of this industry will require increasing amounts of feed grains. Increasing numbers of beef cattle and pigs also require greater amounts of feed grains. Potatoes are still an important portion of the feed of these livestock but the volume of potatoes used for livestock feed has not increased as rapidly as has the volume of feed grains. Using estimates for OECD countries, an average of 24.7 million metric tons of potatoes were fed to livestock in the period 1952/53 to 1955/56.[13] This quantity increased 7 percent in four years to 26.3 million metric tons in the period 1956/57 to 1959/60. It would appear that as more feed grains are consumed and feeding technologies and marketing methods improve, the use of potatoes for livestock feed may continue to increase only slightly.

Feed grain consumption by livestock has increased at a much more rapid rate than potato consumption. In the period 1948-52 approximately 40 million metric tons of feed grains disappeared annually. If the

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[12] "Grains: Recent Trends in Utilization". Monthly Bulletin of Agricultural Economics and Statistics, Volume 11, No. 5, (FAO, Rome: May, 1962), p. 8.

[13] Agriculture, (OECD, Paris: 1961), Table 5.

assumption is made that 75 percent of this disappearance was used for
livestock feed, about 30 million metric tons would have been fed to
livestock on the average during those years. An increase to 48 million
metric tons per year in 1959/60 would be a 60 percent increase over a
period of 9 years or almost 7 percent increase per year. In Table IV-7
it was shown that meat production has increased by 54 percent over the
nine-year period or an average of 6 percent a year. This rate is
slightly less than the estimated relative increase in consumption of
grains by livestock during the same period due to the substitution of
grain for potatoes and the increase in feed used in the poultry industry.
Feeding efficiencies are determined by the relationship between all
feed inputs going into livestock production and the total amount of
livestock products that are produced. The trend of livestock population
has been toward a relatively greater proportion of poultry and fewer
horses, requiring more feed grain input per unit of output of livestock
products. This trend in livestock adjustments is expected to continue
during the decade of the 1960's.

A projection of the trend in feed grain disappearance that has
occurred since 1947 helps in developing estimates of possible future
consumption levels. The total amount of feed grains used for purposes
other than livestock feed remained fairly constant between 1956 and
1960. The effects of two influences have offset each other in this
connection. The rate of per capita consumption of these grains for human
food has declined at about the same rate as the population has increased.
As production increases, a slightly greater quantity is used for seed,
but this change has been negligible compared to total disappearance. The
total quantity used for human food, seed, and industrial purposes has

remained between 10 and 12 million metric tons for Western Europe in
recent years. Therefore, increases in disappearance can be attributed
almost entirely to a greater livestock consumption of feed grains.

Since 1947, feed grain disappearance in Western Europe has increased
by an average of 2 million metric tons per year. If this same rate
continued during the 1960's approximately 62 million metric tons would
be fed to livestock in 1965/66 and 72 million metric tons used for this
purpose in 1970/71. Adding the 12 million metric tons per year for
other uses brings the total disappearance level to 74 million metric
tons in 1965 and 84 million metric tons in 1970. The present data are
not sufficiently reliable to allow estimates of future disappearance
levels to be made with a very large degree of confidence. In Chapter V
a range of disappearance levels will be investigated and compared to the
single projection figures presented here.

Projections of Production and Disappearance Compared

Analyzing production trends apart from disappearance trends may
lead to erroneous results since any short-run imbalances between demand
and supply are ignored. Imbalances between the forces of production and
disappearance will influence the price and policy decisions within a
country and may cause governmental program reactions which in turn may
influence future demand and supply conditions. In addition to these
influences within individual countries, six countries in Western Europe
are united in a strong, common market which will have considerable effect
on feed grain production and utilization levels in the future. This
relationship will be examined in greater detail in the following chapter.

TABLE IV-9

PROJECTIONS OF DISAPPEARANCE AND PRODUCTION OF FEED GRAINS
FOR 1964-66 AND 1969-71 IN WESTERN EUROPE

	Annual Increase		Projection to 1964-66	Projection to 1969-71
	Percent	--------- Million Tons ---------		
Disappearance	3.1 [a/]	3.0	74	84
Production	3.1 [b/]	1.5	55	63
Net Imports			19	21

a/Annual disappearance increase of 3.1 percent of the three-year average of 69.4 million metric ton disappearance from 1959 to 1961.

b/Annual production increase of 3.1 percent of the three-year average of 49.9 million metric tons produced from 1959 to 1961.

In projecting import levels, the disappearance and production trends are first compared as they were projected previously in this chapter. This will present a basis for considering the effects of different price relationships and different governmental policies. The combined influences of alternative combinations of price and policy relationships and their effects on both projections will be considered in the next chapter. From the individual projections of production and consumption, the magnitude of the feed grain gap can be examined. On Figure IV-11 both disappearance and production projections are shown. The gap between the disappearance and production trends is 19 million metric tons in 1965 and ... toward ... increase averages 0.5 million metric tons per year from 1960 through 1970.
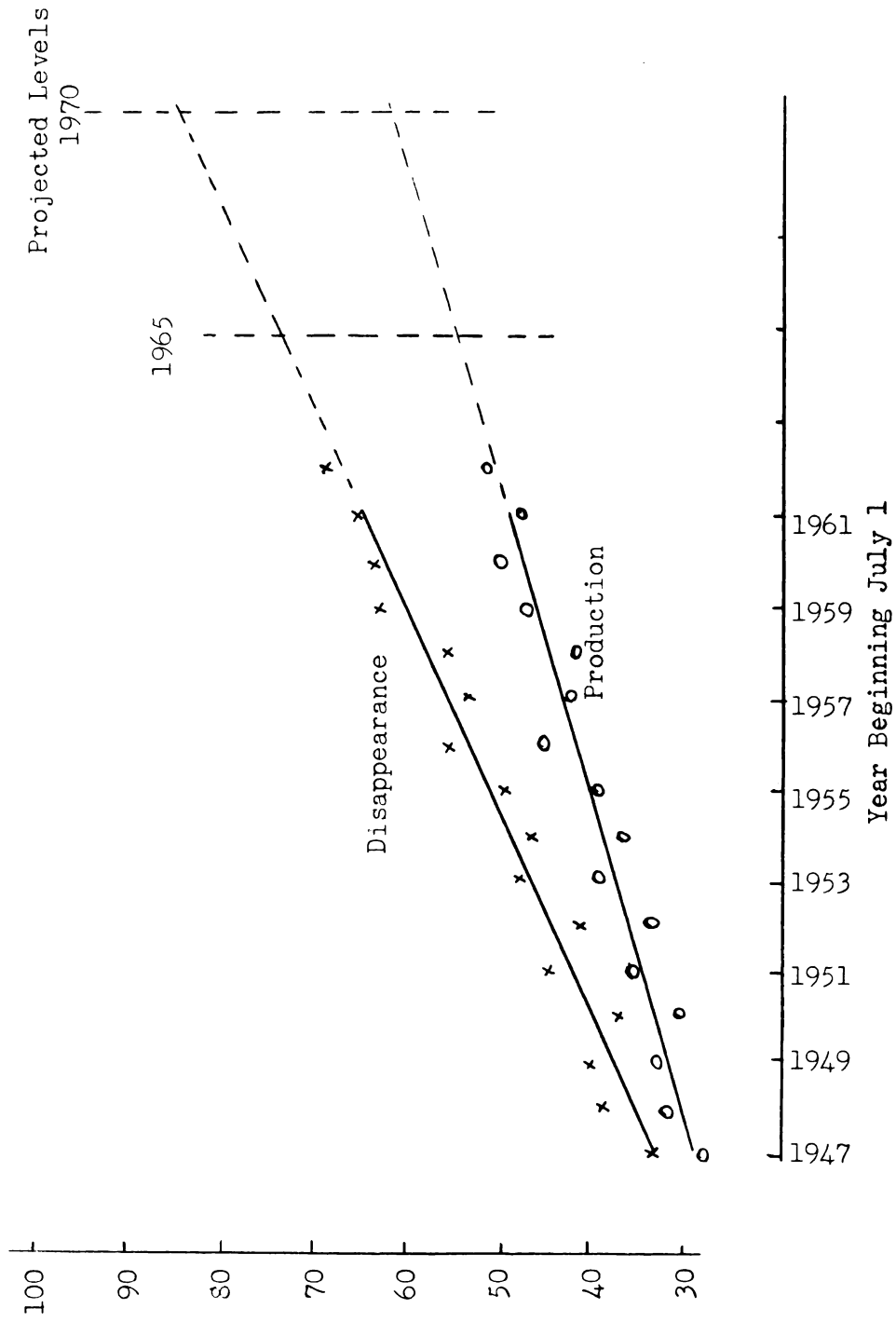
FIGURE IV-11

TRENDS OF DISAPPEARANCE AND PRODUCTION OF FEED GRAINS IN WESTERN EUROPE

The projections of disappearance and production levels are summarized in Table IV-9. The percentage increases shown in this table are computed from estimated annual increases as a percent of the average level disappearance from 1959-61 and the average level of production over the same period.

One indeterminant influence on feed grain production in the future will be caused by shifting land from wheat production to feed grain production. Such a shift has been suggested in reports by the Food and Agriculture Organization as a likely outcome of policy decisions of the West European governments.[14] The F A O projections for 1970 show the general direction of changes in consumption, production, and trade of individual commodities. A slight adjustment in their projected trends would have a considerable effect on assumed import levels of feed grains in 1970 for Western Europe. Under the F A O assumptions of the expansion of consumption of livestock products and feed grain production, import demand for feed grains in Western Europe would increase.[15] By 1970 the projections of import levels range from 17.6 to 21.3 million metric tons per year.[16]

Policies of the governments in both Western Europe and United States will influence the level of feed grain trade between the two areas. A further discussion of the extensions of this analysis and implications for policy is developed in the following chapter.

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14/ FAO, Agricultural Commodities - Projections for 1970, (FAO, Rome: 1962) II-2, II-3.

15/ Ibid., pp. I-9, and I-10.

16/ Ibid., p. A-91, Table M 12.

CHAPTER V

EXTENSIONS AND IMPLICATIONS OF THE ANALYSIS

The projections developed in Chapter IV for feed grains indicated

a widening gap between disappearance and production. If production of

feed grains increases at the same rate as has occurred in the 1950's

and at the same time the disappearance trend continues as projected,

imports would reach a level of 19 million metric tons in 1965 and 21

million metric tons in 1970. These projections are a linear extension

of the trends in feed grain production, utilization, and import levels

during the period from 1947 to 1960. Economic conditions or policy ac-

tions may influence trends of either production or utilization to an

extent that the average import level for the three-year periods centering

on 1965 and 1970 differs from the range projected. Farm incomes still

comprise an important segment of the national incomes in the majority

of the West European countries and therefore effect national per capita

income levels and the demand for high protein diets. In response to

demands for higher producer incomes, government programs such as price

supports and import controls, could be imposed to influence production

levels of feed grains to a considerable extent. Changes, such as land

reforms which expand farm size, uses of more specialized and advanced

production techniques, increased research and extension work, better

marketing facilities, and improved data gathering and processing methods

are occurring in many countries. If additional countries are admitted

into the European Economic Community, these countries may also benefit

from improved marketing techniques and lower trade barriers as well as

more freely convertible currencies. The eventual size and power of the

EEC is, of course, unforeseeable, but it is quite enlightening to consider

the previous projections of disappearance and production levels for

feed grains under alternative assumptions of rates of development in

the EEC.

Alternative Projections of Import Levels

If the assumption is made that by 1970 Western Europe has united

in one common market, the projected levels of feed grain disappearance

and production may be quite different from the levels which might arise

in a divided Western Europe. An addition of the United Kingdom, Greece,

Denmark, Spain, and Switzerland to the present six members of the EEC

would give Western Europe a very powerful organization. It is not at

all unlikely that such an organization would also include Norway, Sweden,

Finland, Ireland, Austria, Yugoslavia, Turkey, and Portugal as either

full or associate members.[1] Considering the difficulty experienced by

the United Kingdom in attempting to join the European Economic Community

in the winter of 1962, future expansion will not come readily. However,

if the EEC expands in number, it might be assumed that some of the char-

acteristics of the present growth patterns would be evident in the econ-

omic development of new member countries. The countries comprising the

the EEC in 1962 experienced a 5 percent average annual growth in per

capita output and 4.7 percent average annual growth in meat production

since 1953. Feed grain utilization has increased from 18.6 million

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[1] See Colin Clark, "Agricultural Economics, The Further Horizon",
(a paper presented at the Agricultural Economics Society's meeting, 17th
July to 20th July, 1962).

metric tons in 1952/53 to 32.0 million metric tons in 1962/63; an average

annual increase of 7.2 percent of the 1952/53 level. Production of feed

grains in the EEC also has increased more rapidly than in the rest of

Western Europe. Since its formation, the EEC experienced an increase

in the production of feed grains from 18.4 million metric tons in 1957/58

to 22.4 million metric tons in 1962/63. A more appropriate indication

of the potential rates of growth in production can be obtained from

the changes in three-year moving averages, as shown in Table V-1. It

appears reasonable to assume that Western Europe in general would re-

quire at least ten years to obtain the degree of development now evi-

dent in the European Economic Community even if new countries are added

to the Common Market within a reasonable time after they make application.

The growth rates through the 1950's of the countries comprising

the European Economic Community in 1962 give some indication of the high

rate of expansion that can occur under favorable conditions. Comparing

the three-year averages in those countries during the ten-year period

1949-1951 to 1959-1961, it can be seen that production of feed grains

has increased by an average of .75 million metric tons per year. The

annual increase during the period was 4.1 percent of the average pro-

duction level. The 4.1 percent annual increase was considerably above

the 3.1 percent average for all of Western Europe that was used in the

projection developed in Chapter IV. In order to present a high growth

rate assumption for Western Europe, the average rate of increase which

has occurred in the EEC countries between 1950 and 1960 of 4.1 percent

per year is used. Applying this rate to Western Europe and multiplying

the 4.1 percent average increase by the 48 million metric ton production

during 1959-61, an annual increase of 2 million metric tons is obtained.

TABLE V-1

FEED GRAIN PRODUCTION AND UTILIZATION TRENDS IN WESTERN EUROPE AND THE EUROPEAN ECONOMIC COMMUNITY FROM 1947-49 THROUGH 1959-61

Average of 3-Year Period	Western Europe				European Economic Community[a]			
	Production		Utilization		Production		Utilization	
	Million Metric Tons	% Increase Over past 5-Year Period	Million Metric Tons	% Increase Over past 5-Year Period	Million Metric Tons	% Increase Over past 5-Year Period	Million Metric Tons	% Increase Over past 5-Year Period
July-June								
1947-49	30.8		37.5		11.8		15.4	
1948-50	31.5		38.8		12.8		16.9	
1949-51	32.9		40.8		14.1		18.4	
1950-52	33.4		41.2		14.6		18.7	
1951-53	36.2		44.5		15.8		20.0	
1952-54	36.4	3.0	45.1	3.3	16.2	5.5	20.4	4.9
1953-55	38.2	3.4	47.7	3.8	17.2	5.2	22.4	4.9
1954-56	40.3	3.7	50.4	3.8	19.3	5.2	25.0	5.2
1955-57	42.3	4.2	52.7	4.4	19.8	5.0	25.8	5.4
1956-58	43.1	3.2	54.8	3.8	20.2	4.5	26.5	4.9
1957-59	43.8	3.4	57.3	4.2	19.3	3.1	26.6	4.5
1958-60	46.3	3.5	60.8	4.3	20.8	3.4	28.5	4.2
1959-61	48.3	3.5	63.6	4.1	21.6	2.1	29.8	3.4
1960-62	50.1	3.2	65.8	4.0	22.2	1.8	30.6	3.3

a/ Consisting of Belgium, Luxembourg, Netherlands, Germany, France, and Italy (prior to 1957, tabulated from individual country totals).

b/ Average annual increase during the past five years as a percent of the most recent 3-year period.

The 2 million metric ton increase per year can be projected to obtain

an average annual production level of 58 million metric tons by 1964-66

and 68 million metric tons by 1969-71 (Table V-2).

The same analytical approach can be used to develop an estimate

of a high utilization rate of growth. A high range for estimates of

utilization of feed grains can be obtained from an analysis of the rates

of disappearance in the EEC during the past ten years. During the period

from 1949-51 to 1959-61 the disappearance of feed grains in the countries

now integrated into the European Economic Community averaged 1.14 million

metric tons per year or 4.7 percent of the average disappearance level.

The increase in disappearance averaged 0.4 million metric tons per year

more than the increase in production during the 1950's in the Common

Market. This 0.4 million metric tons per year indicates the growth of

net imports to feed the increasing number of livestock and poultry.

For the entire West European area, an assumption of a high pro-

duction rate with a 2.0 million metric ton increase per year is 0.5

million metric tons per year more than the average annual production

increase during the 1950's. An assumption of a 4.7 percent annual in-

crease in disappearance for Western Europe would be an annual increase

of 3.0 million metric tons per year or one million metric tons more

than the average increase during the 1950's. Projecting both the high

levels of production and disappearance would indicate an increasing

need for imports at the rate of one million metric tons per year. If

Western Europe does unite into a strong common market during the decade

of the 1960's, it would be reasonable to assume a continually growing

market for feed grains.

Using the growth rates of the European Economic Community as bases

TABLE V-2

PROJECTIONS OF PRODUCTION, DISAPPEARANCE, AND IMPORT LEVELS OF
FEED GRAINS IN WESTERN EUROPE FOR 1964-66 AND 1969-71

Production of Feed Grains
Assumptions: Based on 3-Year Average of 48.3 Million Metric Tons
in 1959-61

	Annual Increase		Projected Levels 1964-66	1969-71
	Percent	--------Million Metric Tons---------		
High	4.1	2.0	58	68
Medium	3.1	1.5	55	63
Low	2.3	1.1	53	59

Disappearance of Feed Grains
Assumptions: Based on 3-Year Average of 63.6 Million Metric Tons
in 1959-61

	Annual Increase		Projected Levels 1964-66	1969-71
	Percent	--------Million Metric Tons---------		
High	4.7	3.0	79	94
Medium	3.1	2.0	74	84
Low	2.4	1.5	71	79

Import Levels

		Assumptions of Rates of Disappearance					
		1964-66 Average			1969-71 Average		
		High	Medium	Low	High	Medium	Low
		Million Metric Tons			Million Metric Tons		
Assumptions of Rates of Production	High	21	16	13	26	16	11
	Medium	24	19	16	31	21	16
	Low	26	21	18	35	25	20

Computed from assumptions discussed in Chapters IV and V.

for high-level growth rates of production and utilization in Western

Europe presents a reasonable upper limit to import levels that might

be expected by 1965 and 1970. Lower limits are more difficult to obtain

because of the numerous influences which could reduce either production

or disappearance to extremely low levels. An assumption was made that

extended periods of unfavorable weather would not occur and cause a

serious decline in production. Wars and the build up of international

tensions might have a depressing effect on feed grain utilization and

this possibility must be assumed away in this analysis. Depressed eco-

nomic conditions, periods of deflation, or economic recession also would

reduce the demand for livestock products and indirectly for feed grains.

Several alternative sets of assumptions concerning low-level pro-

jections were analyzed. In contrast to the six nations in the EEC used

as a basis for high-level estimates, the trends of several of the less

advanced countries could be projected to give low-level estimates.

However, it seems unreasonable to assume that economic growth rates of

the already advanced countries such as France and West Germany would

fall to the rates of countries such as Spain and Portugal even though

some slow-down seems likely. On the other hand, there is strong evidence

to support the belief that the growth of Spain and Portugal will be more

rapid in the 1960's with the implementation of new land reform laws.$\underline{2}/$

Since the high production level is 0.5 million metric tons per

year above the medium level developed in the last chapter, a low rate

of 0.5 million metric tons below the medium level could be set arbitrar-

ily. Likewise, a low utilization level of one million metric tons below

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$\underline{2}/$ Western European Branch, Regional Analysis Division, Economic
Research Service, USDA, The 1963 Western Europe Agricultural Situation,
Supplement No. 2 to the 1963 World Agricultural Situation, (Washington:
March, 1963), pp. 47-50.

the medium level could be set for projections to 1965 and 1970. Upon
analysis, it is apparent that this low range falls below the average
change over any five-year period since 1947-49. Since the extension
from 1959-61 to 1964-66 is a five-year projection, it is appropriate
to consider five-year changes in past three-year averages. The smallest
average increase over any five-year period occurred from 1947-49 to
1952-54 for both production and disappearance. The three-year average
of feed grain production increased from 30.8 to 36.5 million metric
tons between 1948 and 1953. During the same period the level of dis-
appearance increased from 37.5 to 45.1 million metric tons per year.
The average annual increase was 1.1 million metric tons per year for
production and 1.5 million metric tons per year for disappearance during
that five-year period. These rates are the ones selected as low ranges
for increases in production and disappearance during the 1960's. If
the increases in disappearance should average as low as 1.5 million
metric tons per year in the future, this would be a relative increase
of 2.4 percent per year based upon the 63.8 million metric tons per
year average of 1959-61. A projected low range for production in the
future based on 1.1 million metric tons per year would be at a level
of 2.3 percent increase per year based upon the three-year average of
1959-61.

The projections for the high and low assumptions of feed grain
disappearance and production range far enough apart to include the
most reasonable variations that might occur. Both disappearance and
production changes have been greater for year-to-year changes in the
three-year moving average than the limits of the high and low projec-
tions. In order to consider appropriate ranges it is not necessary

to go to the complete extremes of changes in three-year averages. Influences which may effect disappearances and production relationships in short time periods of one-to-three years cannot be anticipated completely. Weather has been mentioned as one variable which is hard to predict, while the policies of the individual governments is another. Price fluctuations may also cause disturbances that are unforeseen at present. Prices of feed grains paid to producers in many West European countries are well above the world F.O.B. quotations due to tariff restrictions.[3] If feed grain prices to producers should be allowed to fall to world price levels, the production levels would also be likely to fall after sufficient time had elapsed for producers to change to other crops. Of course, it is extremely unlikely that feed grain prices in Western Europe will ever be allowed to fall to the world price level. The stated objective of maintaining home production will continue to protect domestic feed grain producers in most West European countries. Extremely low rates of feed grain disappearance are just as unlikely also. Increasing consumer demand for livestock products will continue to exert pressure on the demands for feed grains to produce those livestock products unless domestic livestock production is replaced by imports. The desire to maintain domestic livestock production will undoubtedly protect these producers also and restrict imports. One example of such protection is the action by the EEC to raise import duties on chicken from 4½ cents to 12½ cents a pound in July, 1962.[4]

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[3] FAO Commodity Policy Series, "Agricultural Commodities and the European Common Market",(FAO, Rome: 1962), p. 21.

[4] "The Pot and the Kettle", Monthly Economic Letter, First National City Bank of New York, (New York: April, 1963), p. 49.

Table V-2 presents nine possible results of the high, medium, and
low range assumptions as applied to import levels for each of the years
1965 and 1970. Projected levels of feed grain imports range from 13
to 26 million metric tons by 1965 and from 10 to 35 million metric tons
by 1970. If it is assumed that high feed grain production levels will
be associated with high disappearance levels, medium production levels
associated with medium disappearance levels, and low production levels
associated with low disappearance levels, this range of imports becomes
18 to 21 million metric tons in 1965 and 19 to 26 million metric tons
in 1970. The basis for assuming this relationship between the levels
of growth in production and disappearance bears examination in greater
detail.

If the economy of Western Europe is prosperous and the consumption
of livestock products increases at a faster rate than it did in the 1950's,
there would logically be a greater demand for feed grains. An increased
quantity of feed grains can be supplied by increasing imports or increas-
ing domestic production or both. Of course, a positive shift in the demand
curve for feed grains will bring about higher domestic production only
if the supply curve is not perfectly inelastic and as long as increased
imports do not completely satisfy the increased quantity demanded at the
original prices. Shifts in the domestic supply curve of feed grains
may occur along with shifts in the demand curve and reduce price move-
ments. However, increases in production would seem a reasonable result
of increased demand as long as internationally free markets do not exist.

The situation which would bring about a reduced demand for feed
grain imports would be just the opposite of the above. If the demand
for feed grains does not increase as rapidly as the production of feed

grains, domestic production may replace some of the imports. Such a situation seems unlikely in view of the present conditions existing in Western Europe. During the past fifteen years, utilization has been increasing at an average rate of .7 million metric tons per year faster than production. In only four years between 1947 and 1961 did production increase by as much as or more than utilization.[5/] Weather played an important part in high production levels in 1956 and 1959, and high production in 1949 and 1951 produced carry-over levels the following years replacing some imports. Government support prices in many Western European countries have maintained domestic feed grain prices above the level of world prices and would seem likely to continue to do so in the immediate future.[6/] There has been an increasing domestic utilization of feed grains in spite of this artificially high price. A decline in consumption levels would seem very unlikely unless Western Europe experienced a general over-all decline in prosperity and consumer buying power should fall. Even then the increasing population in Western Europe would work against any decline in demand. Therefore, a condition of declining import demand would seem very unlikely unless the individual government took action (either separately or collectively) to raise import duties and artificially restrict imports. A question of major concern then becomes one of where Western Europe will obtain these increasing quantities of feed grains needed to satisfy the demand for higher livestock production. United States has been able to maintain a growing

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[5/] In 1949, 1951, 1956, and 1959, the increase in production over the previous year's level was greater than the following year's increase in utilization. For all other years during this period feed grain imports expanded from the previous year's level.

[6/] Agricultural Commodities and the European Common Market, (FAO, Rome: 1962), p. 21.

share of these markets since World War II and a close examination of
the trends in feed grain trade between United States and Western Europe
helps to point out possible future projections.

United States Share of West European Feed Grain Imports

The importance of United States feed grain exports in the total
imports of Western Europe was reviewed in Chapter IV. Table IV-1 gave
evidence that United States has supplied Western Europe with at least
one-third of her net feed grain imports since 1954 and by 1958 this had
increased to one-half. An average of slightly more than 8 million metric
tons of feed grains per year for the three-year period 1958-60 has been
shipped from United States to Western Europe. Trade policies between
United States and Western Europe will have a great influence on whether
or not United States maintains this share of their export market in the
future.

The graph in Figure V-1 indicates the quantities of feed grains
that Western Europe imported from United States from 1947/48 to 1962/63.
The upper dotted line indicates the percent share of the import market
that United States has maintained during the same period. Trade levels
are measured on the left vertical axis and percent share of the market
on the right vertical axis. It is evident that wide year-to-year fluc-
tuations have occurred, both in the quantities exported from United
States and in the relative share of the market that United States main-
tained. Canada and Argentina have been the major competitors of United
States for the European market as was shown in Table IV-2. In 1947,
Argentina alone supplied 63 percent of Western Europe's net imports;
while in 1953, Argentina, Australia, and Canada combined supplied 50

Million
Metric Tons
of
Feed Grains

Percent
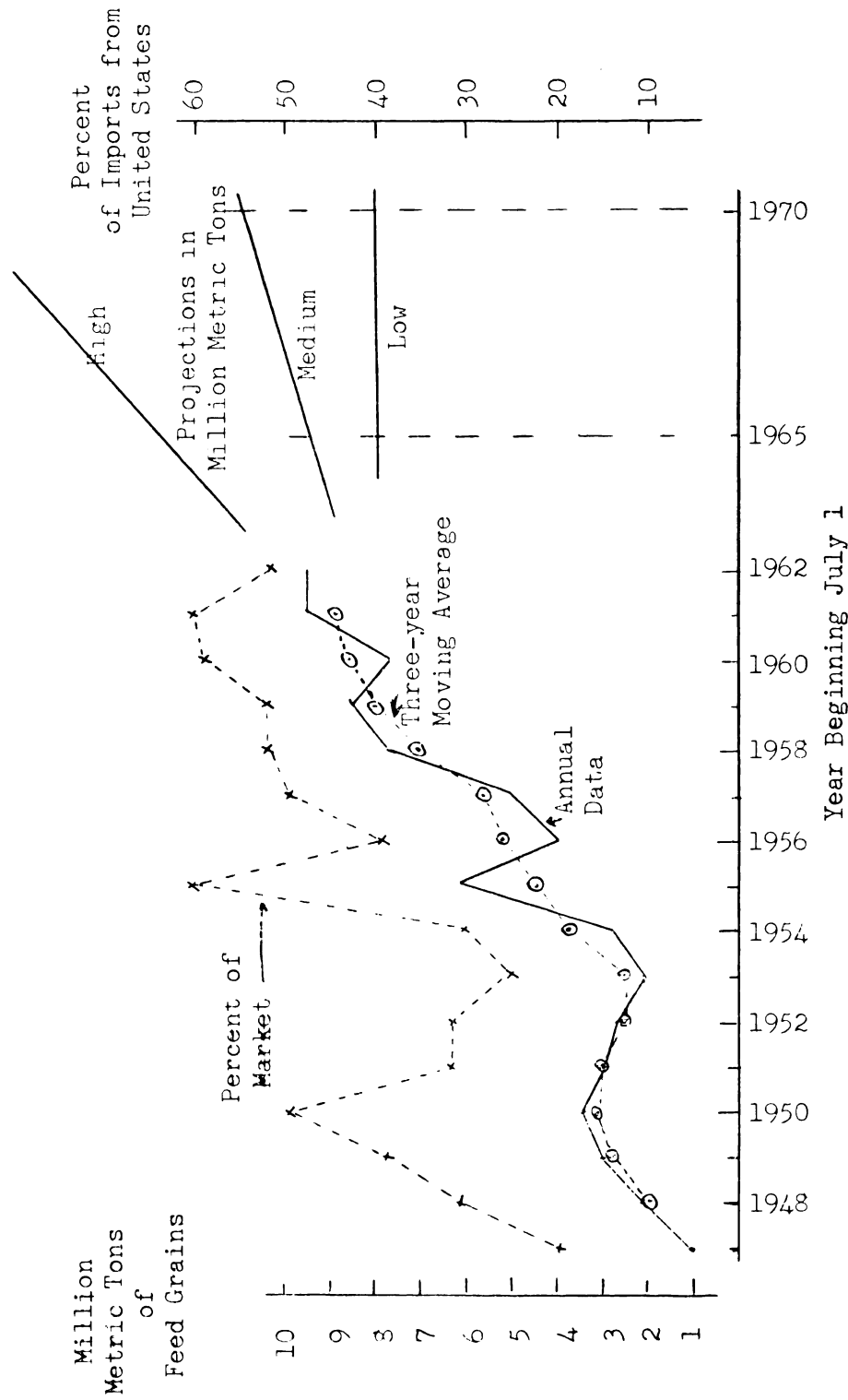of Imports from
United States

FIGURE V-1

UNITED STATES EXPORTS OF FEED GRAINS TO WESTERN EUROPE
THREE-YEAR MOVING AVERAGE AND PERCENT SHARE OF THE MARKET

percent of the net imports.

Projecting a trend with the wide variations in year-to-year data, as shown in Figure V-1, would appear to be rather hazardous. However, a three-year moving average (plotted as a broken line in Figure V-1) reduces the year-to-year fluctuations considerably. A projection of the nearly constant increase in the three-year averages since 1953 suggests that United States might increase exports to Western Europe by 0.9 million metric tons per year. By extending this projection, it can be seen that United States feed grain exports to Western Europe would reach 12.8 million metric tons by 1964-66 and 17.9 million metric tons by 1969-71. Obviously this is an extremely high projection in light of the previous projections of total import levels. If Western Europe were to attain the high projections of production and utilization, United States would be supplying 65 percent of the total imports to Western Europe by 1964-66 and 81 percent by 1969-71. Such a projection indicates one weakness of analyzing only the recent levels of United States exports to Western Europe.

A more realistic projection of future United States export levels to Western Europe might be based upon the assumption that United States would be able to supply 50 percent of the West European imports in the future. From 1955 through 1960 United States supplied Western Europe with an average of 53 percent of the net feed grain imports, ranging yearly from 60 percent in 1955 to 39 percent in 1956. Fifty percent of net imports derived from the medium projections of production and utilization would be 9.5 million metric tons in 1965 and 11 million metric tons in 1970. The assumption that United States will be able to maintain a 50 percent share of the West European market is considerably

below a straight line projection of the three-year moving averages since
1952-54. The projection of the three-year moving averages is considered
the high extreme, while the second projection of a 50 percent share of
the market is a medium level projection for United States feed grain
exports to Western Europe.

A third assumption considering a low range of exports from United
States to Western Europe is based on a continued export level of 8 million
metric tons per year. By 1965 this level of exports from United States
to Western Europe would be 42 percent of the total projected imports,
and by 1970 this would be only 35 percent of the projected imports at
the medium level. Under this assumption, other feed grain exporting
countries would have increased their exports to Western Europe by approx-
imately 15 percent a year while United States merely maintained its present
level. This obviously is a situation which would be very undesirable
from United States viewpoint and undoubtedly would bring about negotia-
tions to attempt to increase the amount of feed grain exports from this
country to Western Europe. The differences between the assumptions of
high and low export levels amount to 3.5 million metric tons in 1965
and 5.5 million metric tons in 1970. It is an important concern of the
United States government to determine if exports of agricultural products
to Western Europe will increase during the coming decade. The policies
and trade agreements of this government in connection with foreign govern-
ments in the early 1960's will determine the outcome of this issue.

Price and Trade Policy Influences in Western Europe

The growth of the economies in Western Europe will have considerable
bearing upon future demands for and production of feed grains in that

area. The projected levels of consumption and production developed
in the previous chapter assumed government policies would be favorable
toward both growth in feed grain consumption by livestock and expansion
of production of these grains. Judging from results of past agricul-
tural programs in United States, it is quite evident that governmental
policy does have effects on production and consumption of feed grains.
Price support policies in this country along with developments of new
production technology have encouraged growth in yields of feed grains.
This same result can be anticipated for Western Europe also. Increased
economic growth and higher per capita incomes expand the demand for
more meat type diets and consequently the demand for feed grains to
produce livestock is increased. An examination of policy implications
concerning feed grain demand and supply will help explain the projected
trends.

Western European policies related to the utilization and production
of feed grains were briefly reviewed in Chapter III. Government programs
in some countries have increased feed grain consumption and livestock
production by subsidizing livestock producers and setting controls on
grain handling and feed mixing. On the other hand, feed grain produc-
tion has been increased through price support programs and research and
education in many countries. High tariff levels and strict import
quotas have enabled several West European governments to maintain domes-
tic price levels above world prices.

An international condition where freely fluctuating market prices
are coupled with free world trade in feed grains is so unrealistic that
a question might be raised as to the value of even considering such a
situation. Yet, existing controls can best be analyzed as a deviation

from a free trade situation, and the effects of such controls can be compared to the theoretical conditions that might exist if the market were allowed to operate completely unrestrained. If existing controls are relaxed, there would be a shift toward those conditions hypothesized under free trade. It is quite unlikely that Western Europe would ever experience a situation approximating free trade with the rest of the world. Theoretically, under such conditions, the less efficient producers would be forced into declining income positions and eventually out of the market. Greater specialization in feed grain production would occur in those areas having natural or manmade advantages, and as a result, trade would increase. Feed grain prices would fluctuate with short-term and long-term supply and demand changes as would livestock prices. In addition to the short-term problems caused by these adjustments, the vulnerability of the resulting situation makes such a change extremely unlikely. If Western Europe became largely dependent on imports of grains to feed the increasing number of livestock, a disruption in trade resulting in the loss of imports would cause extreme hardships on live-stock producers as feed grain storage levels disappeared. Vivid memories of the war-time shortages of food make Western European producers ex-tremely hesitant to rely heavily on imports of feed grains from foreign areas. Therefore, it seems fairly reasonable to assume protectionistic policies will continue to exist in Western Europe.

The integration movement in Western Europe has been brought about largely by the European Economic Community.[7] Prior to its formation at the Treaty of Rome in 1957, other associations such as Benelux--a

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[7] Much literature is available concerning the European Economic Community and its influence on development in the European area. Some of these are mentioned in Chapter III and listed in the bibliography.

customs union between Belgium, Netherlands, and Luxembourg, and the
Organization for European Economic Cooperation (recently renamed the
Organization for European Cooperation and Development)--had influenced
the postwar redevelopment of Western Europe. The continued move to
build an integrated common market has had an important effect on the
feed grain balance in the area. The reduction of internal trade barriers
and the rapid economic growth have caused production to increase through
specialization and increased feed grain demand. As was mentioned earlier,
negotiations concerning the United Kingdom's application for membership
in the EEC were terminated in January, 1963, but Norway, Ireland,and
Denmark have applied for full membership,and on November 1, 1962 Greece
became an associate member. Austria, Switzerland, Sweden, Turkey, and
Spain have applied for associate status adding to the increasing pressure
to expand the EEC. The eventual acceptance of the United Kingdom is far
from being a certainty; but the remaining countries in the European
Free Trade Association have applied for some type of membership and
negotiations will be conducted individually with each applicant. How-
ever, many problems remain to be solved before any great expansion of
the EEC can be expected.

Within the European Economic Community, the growth in gross national
product has been steady and at a percentage rate more rapid than in
United States. Between 1953 and 1960 the gross national product increased
45 percent in the EEC, 22 percent in the United Kingdom, and 19 percent
in United States. In absolute terms the growth rate appears more in
favor of United States since between 1953 and 1960 United States had an
increase in GNP of $70 billion, while the GNP increase for the EEC was
$ billion, while the United Kingdom it was $11 billion. Per capita

growth in gross national product from 1953 to 1960 ranged from 6.2 percent

in United States to 18.4 percent in the United Kingdom and 36.5 percent

in the EEC. The per capita gross national product in the European Economic

Community is still below that in the United Kingdom, but the gap is being

closed rapidly. From 1953 to 1960, the per capita gross national product

in the United Kingdom rose $173 from $940 to $1,113, but in the EEC, it

rose $261 during the same period from $715 to $976. In United States

the per capita gross national product was $2,314 in 1953 and rose to

$2,458 by 1960, a growth of $144 in seven years. Historically, growth

rates have generally tended to level off as nations become more advanced

and attain more highly developed economies. Even though per capita

incomes in the EEC may never overtake those of United States, the period

of rapid growth experienced since its formation will very likely continue

through the 1960's and be a noteworthy influence on demands for livestock

products and indirectly for feed grains.

Implications For United States Policy

It has been implied in several places throughout this study that

the trade policy of United States in the future will be a major factor

in determining the level of feed grain exports. In order for United

States to maintain or increase its share of the feed grain imports en-

tering Western Europe, a favorable trade relationship must be maintained.

The growth potential of West European feed grain import demand has been

examined in this chapter and shown to range as high as 35 million metric

tons by 1969-71. It was also shown that United States could only obtain

a large share of this market with favorable trade arrangements between

these two areas. In the final analysis, physical limitations and potentials

of West European feed grain demand and supply can be projected with some
degree of confidence, Even the economic tendencies can be visualized,
but with our present state of knowledge, the political reactions of nations
cannot be forecast.

The development and recovery of the West European area was sponsored
and aided to a considerable extent by United States interests, only after
World War II. The European Economic Community has now become a major
force in world markets, and its internal and external policies toward
agriculture and trade will be a decisive factor in determining the level
of feed grain imports by 1969-71. Internal price policies will influence
production and disappearance levels while external trade policies will
set import levels. In order for United States feed grains to maintain
a favorable share of this import level, trade relations must be such
that United States exports can compete with grains produced in other
exporting nations, Without favorable trade relations and active foreign
marketing programs, it seems quite likely that the expanding West European
market will turn to other sources for its feed grain imports.

In spite of the preceeding arguments for more liberal trade relations
between United States and West European countries, it should not be as-
sumed that a complete and immediate relaxation of all United States trade
barriers would be beneficial to this country, With each concession of
reductions of United States tariffs granted, concessions should be ob-
tained in return to allow freer movement of United States products into
foreign markets, Skillful and effective bargaining is required to prevent
inequitable results and produce the most favorable trade climate between
these two economically developed areas,

The increased negotiating power provided by the Trade Expansion Act

of 1962 should enable United States to bargain more effectively at the so-
called "Kennedy Round" of GATT negotiations at Geneva in May 1964. Four
major points of the 1962 Trade Expansion Act will give American negotiators
unprecedented authority at the Geneva meeting. Specifically this Act.

1) Authorizes the President power to reduce tariffs and stimulate
   trade over the five-year period ending July 1, 1967;

2) Provides modernized safeguards for American Industry;

3) Offers relief for American businesses which may be injured by
   increased imports; and

4) Sets up the Office of the Special Representative for Trade Ne-
   gotions directly under the President to coordinate the conduct
   of trade policy.

The General Agreement on Tariffs and Trade is a multilateral agreement
to which all major trading nations of the world are parties. United States,
being one of GATT's sponsors, is firmly committed to a code of trade prac-
tices. This code specifies no discrimination among trading partners (most
favored nation treatment) and binding tariff agreements. It is anticipated
that across-the-board tariff reductions will be one basis of the negotia-
tions at Geneva along with non-tariff restrictions. United States is pre-
pared to offer West European countries access to her markets for industrial
products in return for reasonable terms guaranteeing access of United States
agricultural products to West European markets. The outcome of these nego-
tiations will play a vital role in the size of United States feed grain
exports in the future.

One additional factor may play an important role in determining the
share of the West European feed grain market which will be supplied by
United States in the future. The effectiveness of the promotional force

used to sell United States feed grains in new markets will be a vital
factor in expanding and holding these markets. Competition for customers
in the domestic market is an accepted practice, yet promotional efforts
to expand markets overseas is still ineffective for many products. United
States producers and exporters need to realize that their commodities
are competing with exports from all over the world and must be of equal
or better quality to remain competitive. Research is needed in the area
of promoting and advertising United States products for foreign markets.
Packaging, grading, storing, and handling studies must be made for export
shipments to satisfy the tastes and preferences of particular foreign
markets. It appears likely that promotion on the part of United States
feed grain producers and commodity groups would improve the acceptabil-
ity of such products in the West European markets. Such efforts may aid
in reducing trade barriers if a more favorable climate for United States
feed grains is developed.

Summary and Conclusions

The basic purpose of this thesis was to determine the potential ex-
port markets for United States feed grains in Western Europe. Feed grain
production surpassed domestic utilization in United States every year
from 1952/53 through 1963/64. During the first nine of those years, pro-
duction exceeded total utilization (domestic plus exports). Even though
exports more than doubled from 1950/51 to 1961/62, surpluses increased
by forty-five million tons. In order to determine the opportunity of
selling these surpluses for dollars in foreign markets, the West European
feed grain market was evaluated. Historically, the countries in Western
Europe have purchased the majority of the United States feed grain exports

and in 1960/61, nearly three-fourths of the exports as far the United States.

Feed grain demand in developed areas is a derived demand and primarily dependent upon the demand for livestock products. In Western Europe, the fairly steady increases in population and per capita incomes have been the major factors in bringing about the growth in demand for livestock products. Livestock production as well as feed grain production has shown considerable expansion in Western Europe since World War II. In order to obtain an estimate of future feed grain import levels, the potential expansion in the production of livestock and feed grains was compared. While limitations in land area and yields will restrict future feed grain production, the major limitation to the expansion of livestock production appears to be the available feed supplies.

Utilization of feed grains in Western Europe has increased more rapidly than has production, resulting in a growing demand for imports. Trade policies have influenced import levels in the past and will likely be more restrictive in the future. The policies developed within the European Economic Community during the early 1960's relating to agriculture and trade will have a considerable effect upon the level of imports ultimately attained in Western Europe. Such decisions are of major concern to United States feed grain producers and will determine to a large extent the size of the United States feed grain export market. The future export market for these grains in Western Europe will have an affect on, but not determine completely, the size of carryover levels during the 1960's.

West European feed grain production and disappearance levels were projected to the periods of 1964-66 and 1969-71 in this thesis. It was estimated that the three-year average production level of 48 million metric tons during 1959-61 would increase to approximately 55 million metric tons

by 1964-66 and 63 million metric tons by 1969-71. Following similar medium level projections of disappearance, it was estimated that the three-year average disappearance level of 63.6 million metric tons during 1959-61 would increase to 74 million metric tons by 1964-66 and 84 million metric tons by 1969-71. Additional high and low level estimates for these periods were developed, based upon different sets of growth and policy assumptions. These projections indicated that West European feed grain import levels might reach from 13 to 26 million metric tons by 1964-66 with the greatest likelihood being in range of from 18 to 21 million metric tons. This range of imports was projected to be from 10 to 35 million metric tons with the most likely levels ranging from 19 to 26 million metric tons by 1969-71. Such projections were of little help in determining the portion of West European imports which might be supplied by United States. It was evident, however, that even in the extreme case of high disappearance and low production levels, the expansion in United States exports to Western Europe would not be sufficient to solve the domestic feed grain surplus problem.

Feed grain carryover levels increased by an average of 8 million tons per year from 1956/57 to 1961/62 in United States. During this period, total exports from United States increased by approximately 2 million tons per year. Even under the extremely high projection of import levels for feed grains, the market in Western Europe would only absorb an additional 2 million metric tons per year. United States will be fortunate to secure 60 percent of the West European market; but if 100 percent of the increase in imports were obtained by United States, carryovers would continue to build up by 6 million tons per year under United States government programs similar to those of the 1950's.

The accuracy of these projections of West European feed grain pro-
duction, disappearance, and import levels can only be established in the
future. Their usefulness is already apparent, however. By projecting
recent trends and adjusting the projections to existing conditions it
was possible to obtain estimates for future periods with a relatively
short historical base period. Influences of prices, production, and
import policies were analyzed separately from the projections and their
potential affect was introduced in developing the ranges for the projected
estimates. Such projections suffered from a lack of information concern-
ing the methods of domestic feed grain utilization in the West European
area. As more information becomes available, the projections can be ad-
justed and perhaps greater accuracy can be attained. An extension of this
approach to other commodities and to other areas should prove of value
in developing estimates of potential markets for United States agricultural
exports.

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