THESIS

This is to certify that the

thesis entitled

IMPACTS ON SELECTED FEEDGRAIN AND
LIVESTOCK ENTERPRISES OF SPAIN'S ACCESSION
TO THE EUROPEAN ECONOMIC COMMUNITY

presented by

Albert Pelach Paniker

has been accepted towards fulfillment
of the requirements for

M.S. degree in Agricultural Economics

Harold M Riley

Major professor

Date June 1981

IMPACTS ON SELECTED FEEDGRAIN AND LIVESTOCK ENTERPRISES OF SPAIN'S ACCESSION TO THE EUROPEAN ECONOMIC COMMUNITY

By

Albert Pelach Paniker

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Agricultural Economics

1981

ABSTRACT

IMPACTS ON SELECTED
FEEDGRAIN AND LIVESTOCK ENTERPRISES
OF SPAIN'S ACCESSION TO THE
EUROPEAN ECONOMIC COMMUNITY

By

Albert Pelach Paniker

This research analyzes probable impacts on the profitability of feedgrain and livestock enterprises and likely adjustments in the utilization of feedstuffs as Spain becomes an EEC member.

Enterprise budgets, partial budgeting and least-cost ration formulation were used as the main analytical techniques. The data were cross-sectional and primarily referred to 1979.

Results of the analyses indicate that under the Common Agricultural Policy the profitability of dry-land barley production is estimated to increase considerably. Feedgrains will become more expensive and corn is likely to substitute for barley in rations for laying hens and swine. Sunflower meal and wheat have a potential as feed ingredients in least-cost rations.

The profitability of all livestock enterprises analyzed will decrease as Spain joins the EEC. Higher feedgrain prices will have the greatest impact on poultry enterprises. Dairy farmers will also be adversely affected by the expected decrease in the price of milk.

To my father,
JOAQUIN PELACH FELIU
in memoriam

in whom I find my
roots in agriculture.

ACKNOWLEDGMENTS

I am very grateful to the Department of Agricultural Economics of Michigan State University (MSU) for giving me the opportunity to undergo graduate studies and to contribute towards the research objectives of the Department. Both my experiences as a research assistant working for the Cooperative Extension Service and for the project to which this dissertation contributes have widened my educational experience at MSU.

I am indebted to Dr. Lawrence Libby and Dr. Harold Riley for serving as my major professors during two different periods of my graduate program. The continued interaction with Dr. Riley, who also served as my thesis supervisor, was most valuable in providing guidance and input throughout the preparation of this dissertation. The other members of my thesis committee were Dr. John Ferris, Dr. Vernon Sorenson and Dr. Daniel Chappelle and their guidance is also acknowledged.

This thesis would not have been possible without the cooperation of various feed manufacturing firms in Spain, I appreciate their openness and data contributions. My appreciation is extended to researchers in the "Instituto Nacional de Investigaciones Agrarias," the "Secretaría

General Técnica" of the Ministry of Agriculture and the other organizations which provided input during the data collection phase of this research. I am also grateful to the Western European Branch of the International Economics Division of the U.S. Department of Agriculture for their continued support and interest in the development of this study.

Wes Peterson, a doctoral candidate at MSU, has been a very good partner in our efforts to analyze EEC enlargement to Spain and a most enjoyable person to work with.

I am grateful to Linda Steinmetz, a research assistant in the Department of Animal Science at MSU, for her dedication in helping me understand and operate the program to formulate feed rations. Tom Mitchell from the MSU Information Services has helped with editorial suggestions. Eleanor Nooman and Sandy Bolton contributed well in typing the drafts and the final version of this dissertation.

Finally, I am indebted to Betina Askanazy, my wife, and to our friends at MSU for making my living experience in Lansing a most unique and enjoyable one.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Problem Setting

The current negotiations between Spain and the European Economic Community (EEC)[1] will lead to an accession treaty by which Spain will become an EEC member. It is expected that by January 1984 Spain will become a member of the EEC, and that it will adjust progressively to fully adopting the EEC policies within a transitional period of 5 to 10 years. This timetable is subject to the uncertainties of the political process and is by no means definite.

The process of Spain becoming an EEC member is a turbulent one. This is due, in part, to the great impact that the Spanish economy, especially its agricultural sector, is expected to have on the current political and economic equilibrium of forces within the EEC. Adding to the turbulence are the uncertainties about the future of the EEC institutions, especially its Common Agricultural Policy

---

[1] As of January 1981, the EEC had 10 members including the six founding countries: Belgium, France, Germany, Italy, Luxembourg and the Netherlands, plus Denmark, Ireland and the United Kingdom (which joined in 1973) and Greece (which joined in 1981).

(CAP),[1] and uncertainties concerning the young process of democratization in Spain.

Spain has applied for EEC membership on political grounds. The EEC has accepted the application, also on political grounds because acting otherwise would have been against the political principles of the Treaty of Rome.[2]

Conciliating political objectives and economic realities is proving to be a very difficult task as the history of the EEC itself evidences. However, it is the political will and not the purely mercantilistic interests which have made the EEC possible and may allow it to progress towards the aims of its founders. On this basis it is believed that Spain will gain access to the EEC by the mid-1980s, short of any major political disruption. This study is based on this expectation.

In accepting Spain's application for membership

---

[1] A research group at Stanford University has studied the future of the CAP in an enlarged community. In this study institutional EEC prices are projected into 1990 based on different assumptions about the EEC's budget and projected exchange and inflation rates for each member country. See, Timothy E. Josling and Scott R. Pearson, "Future Development in the Common Agricultural Policy of the European Community." Final Report submitted to USDA. Mimeograph. November 1980.

[2] The Treaty of Rome, signed in March 1957 by the six founding countries, is "the constitution" of the EEC. "The preamble to the Treaty establishing the EEC provides that other European states who share the ideal of strengthening peace and liberty may join the efforts of the member states." (Commission of the EC, Commission's Opinion to the Council Concerning Spain's Application for Accession (Com (78) 630 final. Brussels, November 1978), p. 2.)

(submitted to the EEC Commission in July 1977), the EEC clearly stated that "in order to reconcile the Community's fundamental objectives and its political will to accept three new members,[1] it will be necessary not to let the bases and objectives of the Community be called into question."[2] Clearly, in joining the EEC, Spain has to accept and adjust to the "acquis communautaire" (the existing Community legislation), and the lines of adjustment will be negotiated and implemented during a transitional period. Spanish agricultural policies will have to be adapted to the CAP.

The aims of the CAP, spelled out in Article 39 of the Treaty of Rome,[3] are: (1) to increase agricultural productivity; (2) to ensure a fair standard of living for the agricultural population; (3) to stabilize markets; (4) to guarantee regular supplies and (5) to ensure reasonable prices for supplies to consumers. The main mechanism used by the EEC to achieve these objectives is a price policy which provides a set of institutional prices and intervention measures, thus, shaping the environment in which farmers, processors, traders and consumers operate. The

---

[1] Refers to Spain, Greece and Portugal, all of which had applied to EEC membership about the same time.

[2] Commission of the EC, "Enlargement of the Community: General Considerations," Bulletin of the European Communities, supplement 1/78 (Belgium, 1978), p. 7.

[3] Cited in Adrien Ries, L'ABC du Marché Commun Agricole (Editions Labor, Brussels, 1978), p. 68.

price level of most agricultural products in the EEC reflects more political objectives than market interactions.[1]

As current Spanish farm prices are altered toward the CAP's prices, Spanish farmers will face a different set of absolute and relative prices. The impact that the CAP's set of prices is going to have upon Spanish farmers and the possible ways they may respond are the major concerns of this study.

Study Objectives

This study is part of a cooperative research project between the Western European Branch of the International Economic Division of the U. S. Department of Agriculture and the Department of Agricultural Economics of Michigan State University. The general objective of the study is to assess the probable impact of the enlargement of the EEC on the importation of U.S. feedgrains and oilseeds by the applicant countries (Greece, Spain and Portugal).

Among the three applicant countries, Spain has the largest agricultural sector, hence, a greater emphasis has been placed on the analysis of the Spanish

---

[1] "The crucial point about EEC farm prices is that they are fixed annually by a group of politicians -- the farm ministers -- each of whom wants and needs to extract the maximum benefit for his own country and his own farmers. Their interests often clash; and supply and demand barely come into the equation." In The Economist, 1 November 1980, p. 52.

feedgrain-livestock economy. The approach has been to study the impacts that Spain's accession to the EEC has upon its feedgrain-livestock subsector, using two main methodologies. One is based on time-series analysis at the aggregate level and forecasting under different scenarios.[1] The other approach is based upon cross-sectional data at the farm level using budgeting analysis. This thesis summarizes the results of the second approach and provides complementary information to the conclusions reached by the time-series and aggregate analysis. Hence, both lines of analysis focus on the adjustments in the Spanish feedgrain-livestock subsector that would likely occur under the EEC Common Agricultural Policy.

The specific objectives of this study are:

1. To describe the current structure of the feedgrain-livestock subsector in Spain, with emphasis on production systems and farm organization for the following commodities: wheat, barley, corn, broilers, eggs, swine, cattle (beef, veal and dairy) and sheep.
2. To identify probable adjustments in the utilization of feedstuffs as a consequence of anticipated price and policy changes as Spain adopts the CAP.

---

[1] E. Wesley F. Peterson, "The Adjustment of the Spanish Feedgrain-Livestock Economy Following Accession to the European Community." Ph.D. Dissertation, Michigan State University, 1981.

3. To assess the impact that adoption of the CAP may have upon the profitability of selected feedgrain and livestock production enterprises.
4. To draw tentative conclusions regarding the adjustment that EEC membership is going to impose on the Spanish feedgrain-livestock subsector.

Procedures and Organization of the Study

The preliminary step in carrying out this study was a review of the literature on EEC enlargement from sources in the USDA and MSU collections. This included a similar study done in 1971 to assess the impact of the first enlargement of the EEC on the feedgrain-livestock subsectors of the applicant countries (Denmark, Ireland and the United Kingdom).[1] Other studies on the first enlargement of the EEC and EEC agriculture were also helpful for methodological purposes.[2]

The next step in preparing this study was information and data collection in Spain. The author spent the summer

---

[1] J. Ferris, et al. The Impact on U.S. Agricultural Trade of the Accession of the United Kingdom, Ireland, Denmark and Norway to the European Economic Community. Institute of International Agriculture. Michigan State University, Research Report, No. 11, 1971.

[2] Especially the following two studies: G. R. Allen (editor). British Agriculture in the Common Market. School of Agriculture, University of Aberdeen, June 1972. F. A. Mangum, Jr. The Grain-Livestock Economy of Italy. Institute of International Agriculture. Michigan State University Research Report No. 2, 1968.

of 1980 visiting research institutions, government agencies and experts in industries related to the animal feed and livestock activities.[1] This proved to be an important task since most of the data needed for this study were not readily available.

The method used was to develop enterprise budgets for a selected number of case study farms. These farms are fairly representative of the commercially more important farms in the feedgrain-livestock economy. Enterprise budgets are presented in Chapter 4 and, together with the material presented in Chapters 2 and 3, they fulfill the first objective of describing the current structure of the Spanish feedgrain-livestock subsector.

In Chapter 5 a scenario is developed for the hypothetical case had Spain been an EEC member in 1979. The probable changes in agricultural policies are outlined, and more importantly, a new set of prices paid and received by farmers is developed. Those new prices are then used to derive least-cost poultry and swine feed rations to accomplish objective two. Objective three is achieved by performing partial budgeting analyses on the enterprise budgets developed for selected Spanish farms in 1979. The results of these analyses are presented in the third part of Chapter 5. Finally, Chapter 6 contains a summary and conclusions to

---

[1] Appendix 1 includes a list of references which contains the different materials collected in the field.

integrate the results presented in Chapter 5 with other information gathered so as to fulfill the fourth objective.

CHAPTER II

BACKGROUND AND SETTING

Following several years of food shortages and isolation from the international community due to a three-year war (1936-1939), Spain experienced rapid economic growth in the decade of the 1960's. Currently, judging from basic economic indicators, it is relatively less developed than the present EEC. In joining the EEC, Spain will enlarge the group of lesser developed countries within the EEC (Greece, Ireland and Italy).

Spain and the EEC

The relative lower level of economic development of Spain and its growth potential give it both strengths and weaknesses in facing integration into the EEC. Spain will join a free-trading group of countries which encourage the principle of comparative advantage in producing goods and services. However, comparative advantage should consider social as well as economic aspects. Otherwise, on purely economic grounds, Spain's integration in the EEC may cause

great

ebate

which

Yellow

Spanish

typical

duties

of the

fuses

tactics

to the

great disruptions to specific groups and regions.[1] The debate about the need to homogenize economic structures within EEC regions is going to be revived as Spain and other Mediterranean countries join the EEC.[2] In integrating Spanish agriculture, the EEC is primarily concerned with typically Mediterranean products such as wine, olive oil, fruits and vegetables. Currently the EEC is a net importer of these commodities but it is bound to produce large surpluses following enlargement.

In Table 2.1 some macroeconomic and agricultural indicators of Spain and the EEC are compared. Spain's accession to the Community is going to increase the EEC population by

---

[1] The Commission of the EC referred to the same issue in its Opinion to the Council with these words: "In a number of areas Spain competes most efficiently with the Community. In addition, its economy is a developing one and still enjoys conditions of competition, particularly with regard to social costs, which are especially favorable for its expansion. However, despite this assessment account must be taken of certain structural weaknesses in Spanish firms as to size, productivity and technology. If the necessary measures are not adopted in time or fail to provide adequate support over the integration period following entry, Spain's competitive position could result in sharp tensions affecting certain sectors of the Community's economy, notably in regions which, because of their economic structure or geographical location, are more vulnerable than others." Commission of the EC. Commission's Opinion to the Council Concerning Spain's Application for Accession, pp. 4-5.

[2] Roberto Pasca has written: "with the growing role of Mediterranean agriculture ... a call for major resource transfer from advanced to backward regions can no longer be refused if an explosion of political and economic tension is to be avoided in the enlarged community." In M. Tracy and I. Hodac, eds. Prospects for Agriculture in the EEC (College of Europe, Bruges, 1979), p. 212.

Unit	Year	Spain	EEC-9	$\frac{\text{Spain}}{\text{EEC}} \times 100$

Table 2.1. Selected Statistics For Spain and the EEC-9.

	Unit	Year	Spain	EEC-9	$\frac{\text{Spain}}{\text{EEC}}$ x 100
Population	millions	1978	37.1	259.1	14.3
% labor force in agriculture	%	1978	18.-	8.-	
GNP/capita	US $	1978	3,470	7,201	48.2
Growth rate (annual)	%	1960-78	5.0	3.4	147.1
Inflation rate (annual)	%	1970-78	15.0	10.6	141.5
Agriculture as % of GDP	%	1978	9[a]	3.8[b]	
Land area	1000 km^2		505	1526	33.1
Utilized agric. area	1000 Ha	1978	27,431	93,273	29.4
Arable land	1000 Ha	1978	20,578	46,013	44.7
Final value agric. prod.	10^9 Pts.	1977	1,038	7,803[c]	13.3
% crops	%	1977	54	41	
% livestock	%	1977	39	58	

[a] Refers to 1977.

[b] Ireland and Denmark not included, the Netherlands figure used for 1977.

[c] 1 EUA = 86.8245 Pts.

Table 2.1. *Continued.*

	Unit	Year	Spain	EEC-9	$\frac{\text{Spain}}{\text{EEC}}$ x 100
Degree of self-sufficiency	$\frac{\text{Prod.}}{\text{Util.}}$ x 100				
- cereals (excluding rice)		1977-78	83	92	
- meat		1977	98	96	
- eggs		1977	106	100	
- cow's milk		1977	100	100	

Sources:

World Bank, World Development Report, 1980 (IBRD, 1980).

Ministerio de Agricultura, Anuario de Estadística Agraria, 1978 (Servicio de Publicaciones Agrarias, Madrid, 1979).

Eurostat, Yearbook of Agricultural Statistics, 1975-1978 (Italy, 1980).

14 percent, its total agricultural labor force by 31 percent, its agricultural area by 29 percent and its arable land by 45 percent. Also, agriculture is relatively more important in the Spanish economy than in the EEC. In the Community, livestock products have a heavier weight than crops in final agricultural production. The reverse is true in Spain. Both Spain and the EEC have corn deficits. They are also net importers of beef. Sheep meat production in the EEC is also short of its requirement. Although the EEC is just self-sufficient in cow's milk, it produces large surpluses of dairy products (skim milk powder and butter).

Finally, a qualification is necessary. In analyzing Spain's integration into the EEC, agriculture is the major issue. This is because the CAP is the only common policy that the EEC member countries have managed to devise and it accounts for three-quarters of the EEC's budget. The secondary and tertiary sectors, which also include part of the food subsystem and account for more than 90 percent of the GDP, should not be forgotten when analyzing the pros and cons of Spain's accession to the EEC.

The Feedgrain-Livestock Sector in the Spanish Agriculture

As has been the case in the economic growth of most industrialized countries, the Spanish agricultural sector has performed a role of feeding the population and liberating labor for industrial use. Hence, the industrial sector has grown faster than the agricultural sector. Parallel to this

process

it the

ncome

Fo

rapidly

per cap

was low

ntives

crops a

very mu

Ta

annual

crops

period

percent

rapidly

is part

increas

but les

the tot

trains

particu

percent

train p

Replacem

has bec

Tab

process the level of personal income has increased and with it the demand for food products with a high and positive income elasticity (of demand).

Per capita meat consumption, especially poultry, has rapidly increased during the past 20 years. In contrast, per capita consumption of bread cereals in the late 1970's was lower than in the early 1960's. Other crops such as olives and fruits have grown in importance as major export crops and, hence, providing foreign currency to a country very much in need of it.

Table 2.2 provides evidence of those trends as average annual growth rates in the value of production of selected crops (in constant pesetas) are compared. During the period 1960-1978, total production increased by almost four percent a year with livestock production increasing more rapidly than crops. The increase of poultry meat production is particularly spectacular. Sunflower production also increased very rapidly, especially between 1968 and 1975, but its absolute level is still a very small proportion of the total agricultural production. Production of feed-grains increased faster than the average for all crops, particularly barley production which increased by almost nine percent a year between 1960 and 1978. The increase in feed-grain production, however, was not sufficient to meet the requirements of the growing livestock activities, and Spain has become a net importer of corn, sorghum and soybeans.

Table 2.3 shows the distribution of the total value of

Table 2.2. Average Annual Growth Rates in Spanish Agricultural Production 1960-1978 (Selected Commodities).

(In percentages)

CROPS		3.30
Food grains	0.48	
Feed grains	6.13	
Forage crops	3.61	
Olives	1.17	
Sunflower	36.00	
Sugar beets	5.12	
Cotton	-5.44	
Horticultural crops	4.13	
LIVESTOCK		5.30
Beef	6.19	
Pork	6.72	
Poultry meat	15.14	
Sheepmeat	1.46	
Rabbits	11.68	
Eggs	4.99	
Cow's milk	4.03	
AGGREGATE		3.94

Source:

Based on Crissman, C. "Sources of Growth in Spanish Agriculture: 1960-1978." M.Sc. Dissertation. University of Missouri-Columbia, 1981.

Table 2.3. Value of the Final Agricultural Production[a] and Gross Agricultural Value Added in Spain, 1977.

(Millions of current pesetas)

				% of FAP
FINAL AGRICULTURAL PRODUCTION (FAP)				
Crop Production			564,500	
- Cereals		101,654		9.8
Barley	39,274			
Corn	11,354			
Wheat	43,200			
- Industrial crops[b]		54,627		5.3
- Legumes and vegetables		150,346		14.5
- Citrus and fruits		105,070		10.1
- Wine and by-products		42,500		4.1
- Oil and by-products		34,055		3.3
- Other crops		76,248		7.3
Livestock Production			409,779	
- Meat		260,444		25.1
Beef	76,846			
Pork	70,773			
Poultry	56,006			
Sheep and goats	38,521			

[a] Final agricultural production = total production - intermediate use (seeds, feed, etc.).

[b] Mainly sugar beets, also cotton, sunflower, etc.

Table 2.3. Continued.

FINAL AGRICULTURAL PRODUCTION (FAP)				% of FAP
Livestock Production (Continued)				
- Cow's milk		77,815		7.5
- Eggs		42,662		4.1
- Other livestock products		28,858		2.8
Trees Production			36,010	3.5
Private Improvements			27,677	2.6
Total			1,037,966	100.0
PURCHASES TO OTHER SECTORS				
- Mixed feedstuffs		174,140		
- Fertilizer		43,884		
- Machinery		35,249		
- Other		76,487		
Total			329,760	
GROSS VALUE ADDED			708,206	

Source:

Based on Ministerio de Agricultura, Cuentas del Sector Agrario. No. 4 (Servicio de Publicaciones Agrarias, Madrid, May 1979).

agricultural production in Spain in 1977 and the derivation of its gross value added at current prices. Production of fruits, vegetables and meats account for almost 50 percent of the final agricultural production. A great proportion of the total fruits and vegetable production is for export, but meat production is almost entirely used in the domestic market. The cereal subsector follows in importance with about ten percent of the final agricultural production. In fact, in 1977, 38 percent of the total barley crop and 46 percent of the total corn crop were used directly for animal feeding (intermediate use) and they are not accounted for as final production. The final production of feedgrains shown in Table 2.3 was purchased back by livestock producers in the form of feed-compounds. This shows in the purchases from other sectors of which feedstuffs represent 53 percent of the total. The feedgrain-livestock subsector accounts for 45 percent of final agricultural production.

Spanish Agricultural Policy and Its Impact on the Feedgrain-Livestock Subsector

The main features of the Spanish agricultural policy affecting the cereals, oilseeds and livestock subsectors will be analyzed in the next chapter. This section presents the context in which such policies operate. Mention has already been made of the rapid growth of meat production, and of the feedgrains and oilseeds deficit generated by a growing difference between feed requirements of the

different livestock activities and domestic feed supply. The livestock sector is most often characterized as technologically and physically dependent. Dependent on foreign know-how for the feed manufacturing industry and physically dependent on foreign supplies of feedgrains (corn and sorghum), oilseeds (soybeans) and breeding animals. Table 2.4 shows the structure of Spanish agricultural imports and exports and their relation to total trade of the country.

In 1978, agricultural imports exceeded exports as they traditionally had. This traditional deficit in the agricultural balance of trade may have disappeared in 1980 following preliminary estimates by the Ministry of Agriculture of a positive balance within the first six months of the year.

Agricultural imports and exports account for 20 percent of the total foreign trade of the country. Fruits and vegetables (including canned) represent almost 50 percent of all agricultural exports and, with wine, oils and fats, account for more than two-thirds of all agricultural exports. Export of soyoil is an important item, because of the large amount of soybeans which Spain imports to satisfy its requirements for animal feeding purposes. Most soy is imported as beans and crushed in Spain.[1]

Imports of soy (beans and meal) represent 18 percent of

---

[1] The soybean crushing capacity in 1980 was of approximately 2,150,000 MT and it was being enlarged by another one million MT with the establishment of two new plants in the Barcelona port area. A ton of soybeans produces approximately 790 kg. of meal and 130 kg. of oil when crushed.

Table 2.4. Spain's Foreign Trade in Agricultural Products, 1978.

Commodities	IMPORTS			EXPORTS			Net Million Pts.
	Million	Pts.	%	Million	Pts.	%	
Livestock products		21,890.8	7.7		5,599.1	2.6	-16,291.7
Live animals	1,018.5			920.9			
Beef	7,321.0			66.9			
Pork	3,695.3			127.6			
Milk & dairy	6,181.8			304.4			
Eggs	34.4			1,538.0			
Fruits and vegetables[a]		12,069.1	4.2		104,972.3	48.9	+92,903.2
Coffee, tea, spices, cacao & derivatives		39,870.6	14.0		6,403.4	3.0	-33,467.2
Cereals		46,154.5	16.2		1,855.3	.9	-44,299.2
Corn	37,877.4			91.2			
Sorghum	4,175.8			3.9			
Oilseeds and meals[b]		55,466.1	19.5		2,847.9	1.3	-52,618.2
Soybeans	51,259.4			---			
Oils and fats		11,234.7	4.0		22,279.3	10.4	+11,044.6
Olive	---			8,570.8			
Soy	651.4			12,245.4			

[a] Includes canned fruits and vegetables.

[b] Includes meals of animal products (fish, meat and bone ...).

Table 2.4. *Continued.*

Commodities	IMPORTS			EXPORTS			Net Million Pts.
	Million	Pts.	%	Million	Pts.	%	
Wine & other beverages		7,794.8	2.7		23,137.2	10.8	+15,342.4
Tobacco		18,262.2	6.4		936.5	.4	-17,325.7
Leather, skins, cotton, wool and derivatives		33,980.7	11.9		19,342.0	9.0	-14,566.7
Wood, cork & veg. coal (peat)		24,595.6	8.7		12,806.1	6.0	-11,789.5
Other agri. prod.		12,855.6	4.5		14,587.3	6.8	+ 1,731.7
Total Agricultural Trade		284,102.7	100		214,766.4	100	-69,336.3
All other products		1,146,930.3			786,616.6		
Petroleum & derivatives	406,580.0						
Total trade		1,431,033.0			1,001,383		-429,650

Source:

Ministerio de Agricultura, Anuario de Estadística Agraria, 1978. Banco de Bilbao, Informe Economico, 1979. (Servicio de Estudios, Bilbao, 1980).

all agric

especiall

total. I

stock pro

1300 pork

n their

egetable

inter-ucc

and A. Ch

Spanish a

gided.*

Many

agricultu

the count

all agricultural imports. Imports of other feedstuffs, especially corn, account for another 18 percent of the total. In spite of that, Spain is a net importer of livestock products, particularly beef and milk. However, in 1980 pork and milk imports decreased substantially compared to their 1978 level. This surplus production of fruits and vegetables and the feedstuffs deficit, coupled with the under-utilization of Spain's natural resources led A. Gomez and A. Checchi to conclude that the path followed by Spanish agriculture between 1965 and 1975 has been misguided.[1]

Many authors have documented the dependence of the agricultural policy upon the industrialization priorities of the country,[2] and this has been the focus of the criticism

---

[1] "En resumen, la 'dirección fundamental' que ha tomado la producción agraria española, especialmente durante los años 1965-1975, ha sido 'descarriada.'" La Agricultura Española, Rezagada o Descarriada? (Moneda y Crédito, Madrid 1980), p. 155. For a detailed discussion of the development of Spanish agriculture refer to the classic work by J. M. Naredo, La Evolución de la Agricultura en España (Editorial Laia, Barcelona 1977 -- first edition in 1971). For a more recent treatment, see E. Sevilla-Guzmán, La Evolución del Campesinado en España (Ediciones Península, Barcelona 1979).

[2] On February 2, 1979, the government published a decree for the promotion of extensive livestock operations linked to the land base and for livestock in mountainous areas. It is early to assess its accomplishments but many analysts are very skeptical based on the observation of previous similar undertakings. Refer for an example to R. Rodriguez Zuniga, et al. "El Desarrollo Ganadero Español: un Modelo Dependiente y Desequilibrado." Agricultura y Sociedad, no. 14. (Enero 1980), pp. 165-193. For the important question of the energy use in agriculture and the impact of the abandonment of traditional practices in this aspect, see the various articles in Agricultura y Sociedad, No. 15, April 1980.

of the Spanish agricultural policy. Today the main priorities are in improving the competitiveness of the more traditional subsectors (e.g., cereals, cotton, olive oil, dairy, sheep), especially in anticipation of their integration in the EEC.

Table 2.5 allows insights into the current policy priorities by examining the expenditures of the FORPPA ("Fondo de Ordenacion y Regulacion de Producciones y Precios Agrarios," counterpart of the EEC's FEOGA) in 1978. More than 50 percent of all credits extended by this governmental agency went to the SENPA ("Servicio Nacional de Productos Agrarios") for the purchase of wheat and other cereals. Intervention expenditures in the sugar and olive oil markets were also important.

Subsidies to cereal and cotton production represented almost 60 percent of all subsidies to the agricultural sector. Due to the unusually large potato crop, the government subsidized its storage and commercialization. Subsidies to the fertilizer industry are primarily in the concept of subsidies for purchase of napthas (petroleum by-product) which is used in the production of nitrogen fertilizers. In 1978, cereal and livestock subsectors used 62 percent of the FORPPA funds destined for agricultural support.

Table 2.5. FORPPA's Disbursements in 1978 (Million Pesetas).

Subsector	Subsidies	Credit
Cereals	2,850	25,680
Industrial crops	3,028	8,264
Olive oil	---	4,164
Fruits and vegetables	804	1,620
Potatoes	971	255
Other crops	124	292
Beef	---	305
Sheepmeat	704	671
Milk	241	1,243
Poultry	146	---
Sub-total	8,868	42,494
Compensation to oilseed crushers	682	
Fertilizer industry	3,084	
Freight costs	897	
Interest		7,293
Total	13,531	49,787

Source:

FORPPA, Memoria 1978, Resumen.

CHAPTER III

THE ORGANIZATIONAL STRUCTURE OF THE FEEDGRAIN-LIVESTOCK SUBSECTOR

Given the diversity in location, type of farms and production practices of most of the subsectors within the feedgrain-livestock system, the information contained in this chapter is basic in assessing the representativeness of the case study farms presented in the next chapter. A map showing the Spanish provinces and agricultural regions is presented in Figure 3.1 for future reference.

Location and Characteristics of Production Systems

In 1978, 13.3 percent of Spain's total agricultural land was under irrigation. The availability of water is a major factor influencing cropping systems. Basically, almost any crop can be grown on irrigated land, as opposed to a much more limited number of alternatives on dry land.

Figure 3.2 shows the average rainfall distribution in Spain. The area of more than 40 inches a year, which includes the northwest and northern part of the Iberic Peninsula, is known as the wet Spain. The proportion of agricultural area under irrigation varies from 30 percent in Levante to 1.6 percent in Norte. Thus, most farming

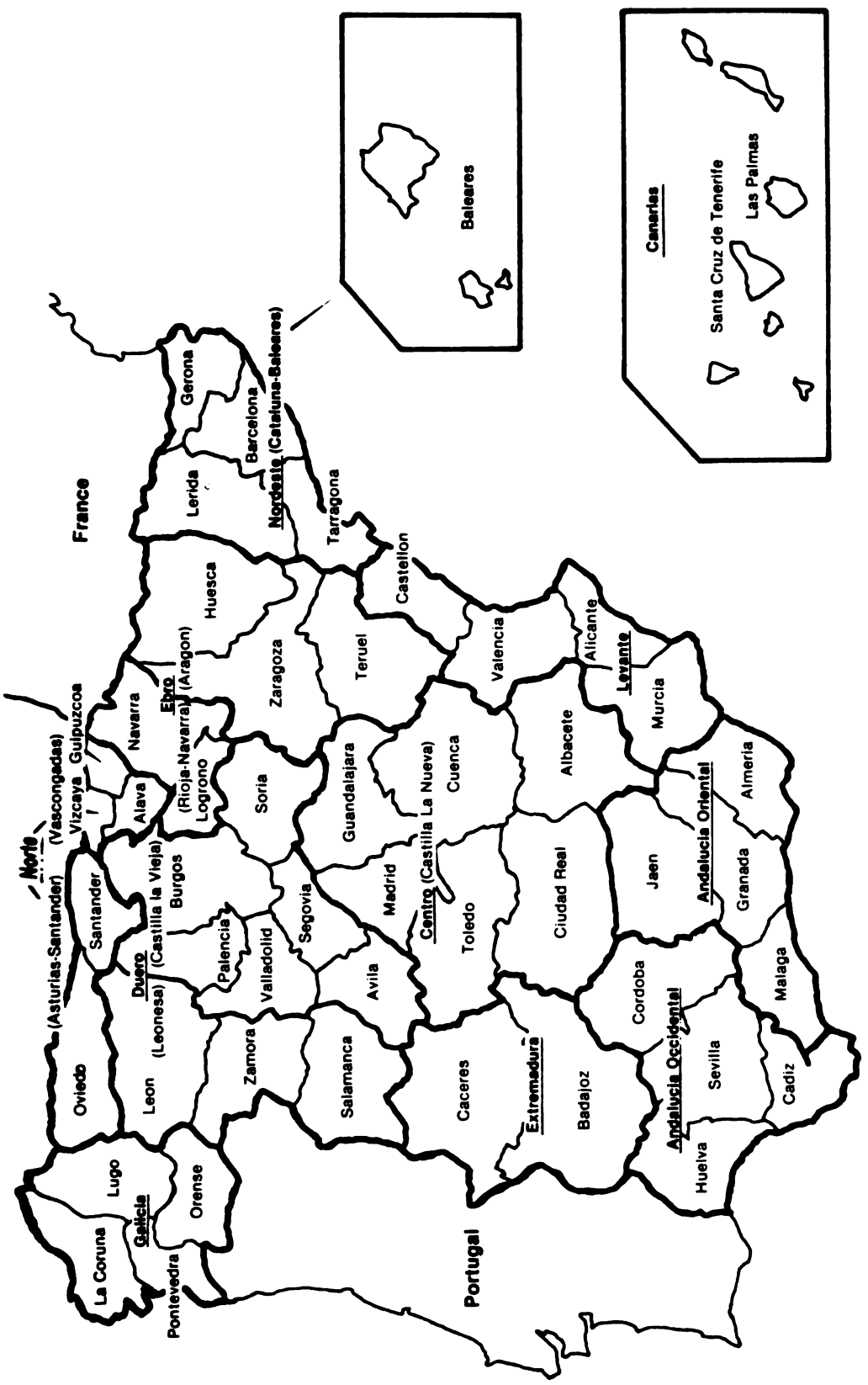


Figure 3.1. Map of Spain - Provinces and Agricultural Regions.

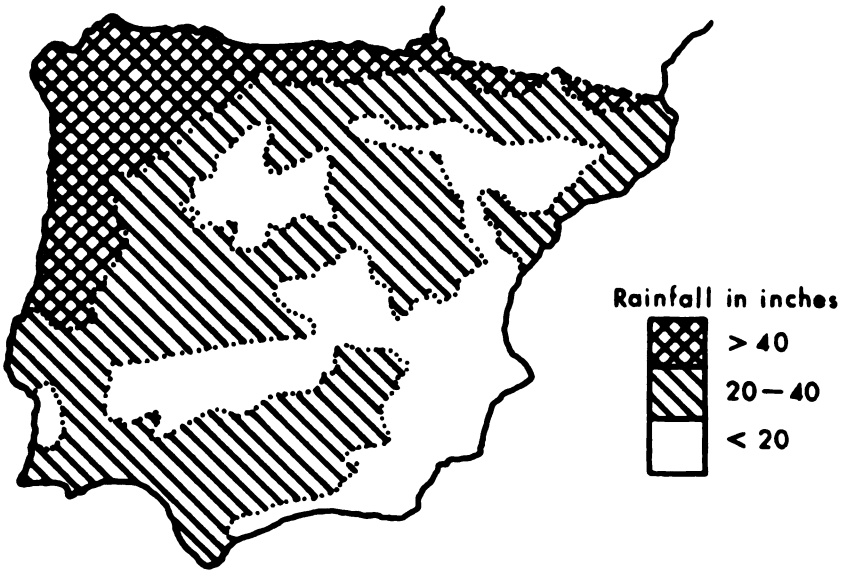


Figure 3.2. Average Rainfall Distribution in the Iberian Peninsula.

Source: Crissman, "Sources of Growth in Spanish Agriculture," p. 9.

activities are conducted on dry land and the environmental conditions of each particular region become very important in determining production activities and practices, crop yields and other factors affecting farming enterprises.

All Spanish regions produce cereals. Duero, Centro and Ebro account for 64 percent of all cereal area. The main grain cereals grown in Spain are wheat, barley, oats and rye (fall-winter cereals) and corn and sorghum (spring-summer cereals). Table 3.1 shows the production levels of these major cereals and their distribution between irrigated and dry land production. Clearly corn and sorghum are mainly grown in irrigated land and all other cereals are produced primarily on dry land. Irrigated land production allows double cropping in some areas, although double cropping is not a common practice in Spain.

The main types of the three more important grains are (percentages refer to the total 1978 production of a given grain):

wheat:	soft (97 percent of all wheat)
	durum (3 percent of all wheat)
barley:	type I - 2 rows (46 percent) the so-called beer-barley
	type II - 6 rows (54 percent) the so-called feed-barley
corn:	hybrid types account for more than 75 percent of all corn produced.

As opposed to the irrigated, non-irrigated classification used for crops, livestock production systems can best be divided into intensive and extensive systems. A typical

Table 3.1. Grain Production and Yields in Spain, 1978.

	Total Production MT	Percent TGP	Total Dry-land Production MT	Total Production Under Irrigation MT	Percent of Total Production	Yields on Dry-land MT/Ha	Yields Under Irrigation MT/Ha
Wheat	4,805,890	29.4	4,017,121	787,117	16.4	1.596	3.353
Barley	8,068,307	49.4	7,053,843	1,013,772	12.6	2.174	3.696
Oats	553,199	3.4	532,632	20,428	3.7	1.227	2.614
Rye	250,637	1.5	249,941	535	.2	1.096	1.667
Corn	1,968,912	12.0	465,269	1,503,700	76.4	2.645	5.624
Sorghum	283,729	1.7	18,122	265,589	93.6	2.137	5.897

TGP = Total Grain Production in 1978 (= 16,340,781 MT).

MT = Metric Tons

Ha = Hectare

Source:

Based on data from the Ministerio de Agricultura, Anuario de Estadística Agraria, 1978.

intensive system is one that keeps the animals in permanent confinement and feeds them with compounded feeds. An extensive system is one in which the animals are kept loose in pastures or stubble fields and they eat whatever they find. In this system they are often supplemented with a concentrated feed and sometimes confined overnight.

Between the intensive and the extensive production systems there are many possible combinations. A typical semi-intensive system consists of an initial growing and fattening period on the pasture and later confinement of the animal for finishing on concentrates. The "mountain system" practiced in the valleys of the Pyrenees is another example of a semi-intensive system. Typically, cattle remain confined from December to April. In the periods October-December and April-June, they eat pasture and crop residuals in the valley and from June to October they are loose in the communal pastures of the mountain.

Figure 3.3 shows the main areas of oak and cork trees, the so-called "dehesa," which locates the most traditionally extensive livestock production system (sheep, cattle and pigs). Other extensive systems are scattered all over Spain, but primarily in the Duero, Centro and Galicia regions.

The poultry sector is very much limited to production of chicken meat and eggs. Broiler production accounts for 90 percent of all poultry meat produced, the remaining 10 percent being cull hens and other poultry meat (3-4 percent).

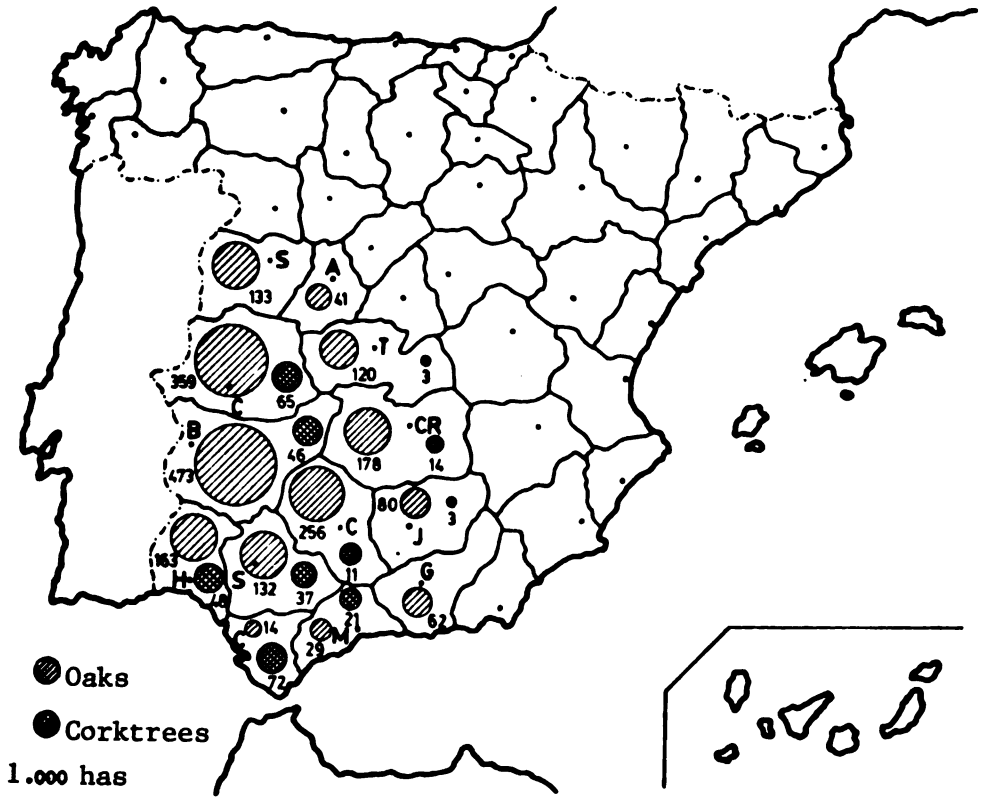


Figure 3.3. Area of Oak and Cork Trees ("dehesa") Where Most of the Extensive Livestock Activities are Concentrated.

Source: J. M. Hernández Benedí, Manual de Nutrición y Alimentación del Ganado (Publicaciones de Extensión Agraria, Ministerio de Agricultura, Madrid 1980), p. 208.

Production of eggs from certified layers (modern production) accounts for 88 percent of all eggs produced. The remaining 12 percent is produced by "campera" hens, a more rustic type of bird. Most broiler and layer breeds are of North-American origin. Spain is a large importer of breeding hens from the U.S.

Production of poultry products takes place on highly specialized farms, including 20 selection or breeding farms, 278 hatching egg-producing farms, 113 hatcheries and an undetermined number of broiler, pullet growing and egg-producing farms.[1] A common characteristic of these farms is their near independence from an agricultural land base for cropping purposes. All inputs are purchased, none are produced on the farm, and poultry products represent over 90 percent of the total output of the farm. In this sense, the poultry industry follows an intensive production system and is fairly homogeneous.

Regarding geographic location, two features need to be highlighted. First, it is not unusual to find a concentrated nucleous of poultry farms close to big cities which are large centers of consumption. Hence, the provinces of Madrid, Barcelona, Valencia, Sevilla are among the leading provinces in broiler and egg production. The second feature is the interrelationship between the feed manufacturing and

---

[1] Ministerio de Agricultura. "Adhesión España, trabajos preparatorios. Agricultura." (Documento no. 9), p. 7. Data for 1978.

the poultry industries. It is not accidental that the most important feed compound producing areas are also the most important in poultry production. Thus, Lerida, Barcelona, Tarragona, Valencia, Madrid, Valladolid, Zaragoza coincide as the top feed producing provinces and poultry producing provinces.

In 1978 the Northeastern ("Nordeste") region of Spain produced 38.4 percent of all Spanish poultry meat and, together with the Duero region, they produced 35 percent of all eggs.

The swine sector is more diverse than the poultry sector, although it is also following a very strong trend towards specialization and increasing farm size. Extensive pork production is very much limited to the "Iberic" breed which accounts for four percent of all pigs in Spain (livestock census of March 1978). The great majority of pigs are raised intensively and come from crosses of foreign breeds (55 percent) and pure breeds such as Landrace (20 percent) and Large White (3 percent).

It is said that intensive commercial hog raising farms produce approximately 80 percent of all Spanish pigment and "about 50 percent of Spain's hogs are raised under some form of contractual arrangement between livestock producers and feed manufacturers."[1] A number of swine farmers operate in

---

[1] Jose E. Vidal, "Spain's Mixed-Feed Industry Continues Dramatic Expansion." Foreign Agriculture (May 8, 1978), pp. 14-15.

closed cycle, i.e., they produce piglets and raise them to slaughter weight. The majority of swine farms, however, are specialized in either breeding or fattening farms, thus, generating an interprovincial movement of weaners to be fed in a different place than they were farrowed.

Fattening operations tend to be located in feed-compound manufacturing zones. As a result, the Mediterranean regions of the Northeast and Levante produce 45 percent of the total number of hogs slaughtered in Spain, and they have 40 percent of all porcine animals in Spain. There are also a small number of breed selection and reproduction farms.

An important problem of the swine sector is African Swine Fever. Since this disease was introduced in the country in 1959, it has caused a number of animals to die each year and prevents Spanish pork from being exported. A great effort is being made to eradicate African Swine Fever. Although this has not been achieved, the extension of the disease in Spain has declined in the late 1970's.

Finally, a comment on the hog cycle. P. Caldentey[1] has shown a cycle of almost 3-1/2 years for the period 1959-1977. This is the observed period that it takes for a high price/low supply situation to go through a high supply/low price situation and back to the initial situation. M. Sanz points out that "... in intensifying production, hog cycles which

---

[1] P. Caldentey, "El Ciclo del Cerdo en España en el Periodo 1959-1977." Agricultura y Sociedad, no. 14, pp. 127-163 (Enero 1980), pp. 127-163.

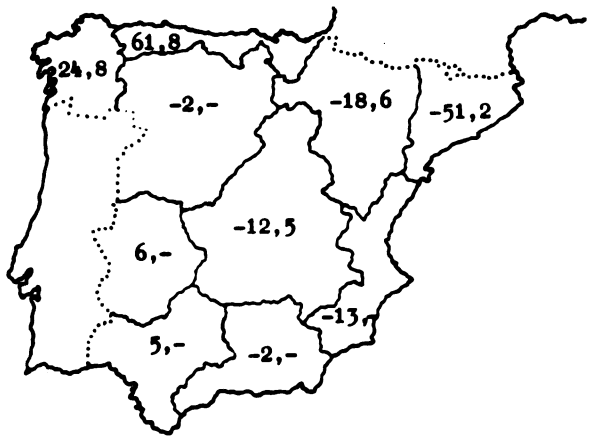
used to last five years are reduced to every three years ... due to the shortening of the biologic cycle."[1]

The bovine sector is certainly the most heterogenous of all livestock sectors in Spain, in terms of breeds, farm size and typology and products. Very strong links exist between the beef and dairy sectors. It appears that most of the calves raised as beef cattle are mainly dairy-type breeds, or are the results of cross-breeding of dairy cows (most commonly Friesian) with beef-type bulls (such as Charolais). The Friesian breed accounts for over 40 percent of all bovine animals in Spain. Other breeds are Brown Swiss (8 percent), Charolais (1 percent), crosses of foreign breeds (12 percent) and domestic breeds and their crosses (34 percent).

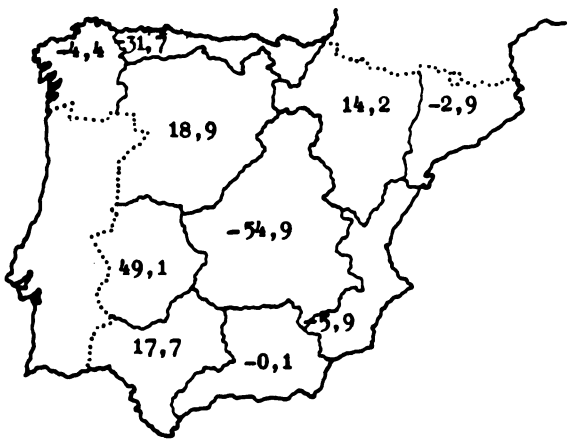
Almost 40 percent of all cattle are in the six north-western provinces of Oviedo (or Asturias), Santander and the four Galician provinces. In 1978 these provinces produced 45 percent of all cow milk produced in Spain and 22 percent of the beef and veal meat. There is a very clear calf exporting activity from Galicia, Asturias and Santander to the other regions. Extremadura and Andalucia Occidental, which are extensively beef-producing regions, have a self-contained cattle herd and they also export calves for fattening to other regions. This is shown in Figure 3.4-a

---

[1] M. Sanz, "Situació i Avenir de la Ramadería de les Comarques Meridionals." Paper presented to the "Jornades Agraries" (Reus 1980). Mimeograph, p. 3. My translation.



3.4-a. Animals for Fattening.



3.4-b. Animals to Slaughter.[1]

Figure 3.4. Net Balance of Interregional Trade of Live Cattle.

Source: M. Rodriguez Zuñiga, J. Ruiz Huerta y R. Soria Gutierrez, El Desarrollo Ganadero Español: el Sector Vacuno (Departamento de Economía Agraria, CSIC Monografías no. 8, Madrid 1979), p. 79.

[1] Part of the signs in the map were omitted in the original publication and the author has filled them in according to the text, pp. 79-85.

where the numbers in the map represent the percentage of each region's total exports or imports (negative sign).

Figure 3.4-b shows the movement of animals just before slaughter. Galicia and Norte are now net importers. In fact, the beef deficit in the Norte region is primarily due to the deficit of the Basque provinces, an important consumption area, and not due to a shortage of beef in Oviedo and Santander. Figures 3.4-a and 3.4-b also suggest that Duero and Ebro are basically cattle fattening regions since both import calves and export ready-to-slaughter animals. Both are important cereal producing regions.

The main beef product is meat from yearling calves ("añojo"), which in 1979 accounted for 50 percent of all beef produced. The average carcassweight per anojo slaughtered in 1979 was 279.6 kilograms for male animals. Veal production represented 24 percent of the total 1979 beef production and the average carcassweight per calf was 158 kilograms. The remaining 26 percent of the total beef production is accounted for by cows and bulls.

In 1978, yearly yields of milk per dairy cow were 2,870 liters. The national average milk yields per cow has never been greater than 2,900 liters, although a number of specialized farms are obtaining more than 4,000 liters of milk per cow a year.

Table 3.2 provides information on the production systems used for cattle husbandry in Spain in 1974. Most dairy cows are kept in a mixed system with periods on

pasture and periods of confinement. Beef cattle are most commonly raised in permanent confinement.

Table 3.2. Distribution of Cattle Production Systems in Spain.

(All figures are in percentages)

Production Systems	Cows	Beef-Cattle
Only on pasture	20.40	10.42
Open lot	2.75	8.02
Permanent confinement	18.33	63.11
Mixed system	58.53	18.45
	100.	100.

Source:

Ministerio de Agricultura, Mapa Ganadero, 1974, as reported in J. Briz, ed. España y la Europa Verde (Editorial Agrícola Española, Madrid, 1979), pp. 577-8.

The sheep and lamb sector remains a traditional livestock sector, but intensive production systems are being increasingly adopted. With a declining number of animals the sector has gained in productivity and sheepmeat supply has remained stable, around 130 thousand MT. Lamb is the main product of this sector (85 percent of total sheepmeat), but the production of sheep milk for the cheese industry should not be overlooked.[1] Productivity gains (increasing lambings per year and shorter production cycle) have

[1] In 1977 sheep milk production amounted to 20 percent of the value of total sheepmeat production.

intensified production. This process has moved sheep production from its traditional areas of Extremadura and La Mancha (Centro) to better dry lands and even irrigated areas of the Duero and Ebro regions, and it has also been associated with the decline of the traditional breeds (Merino) in favor of other domestic (Aragonesa, Manchega, Churra, Castellana) and foreign breeds (Early Merino, Landschaf, Rumanov, Ile de France).

The transition towards more intensive sheep farming systems has also been encouraged due to the increasing difficulty of finding shepherds. The few shepherds who remain, tend to own their own flocks and thus, the shepherd-owner is increasing in importance.

Another important characteristic of sheep farming is the strong seasonality of supply (highest in the spring months and lowest in October-February), which does not correspond to demand (highest at the Christmas period). As production systems become more intensive and efficient, it will be possible for farmers to market lambs throughout the year, and, hence, reduce farm level price fluctuations.

Size and Type of Farms

There are important differences between the wet and dry areas of Spain. Farms tend to be larger in the dry areas of Spain than in Galicia and Norte, with the exception of Levante which is an important horticultural and intensive livestock producing region. Dry land farms in the Duero,

Ebro, Centro, Extremadura and Andalucia Occidental regions tend to be very arid and suffer summer droughts. Under such conditions the only economically viable farm size requires a large extension of land on which to grow cereals, olive trees and/or raise livestock on natural pastures.

In the hilly and wet lands of Galicia and Norte, smaller farms can provide an adequate living for the farm household, but it is generally agreed that the Galician farm size is too small to accomplish such a purpose. The 1972 census data shows an average farm size of 6.4 hectares divided into 19 plots for Galicia. Farm size is heavily influenced by land tenure systems. The Galician heritage system which favors the division of a family's properties has been a major factor in the fragmentation of land holdings (minifundia). On the other hand there are farm owners in the dry Spain who possess very large farms. Therefore, the majority of the rural population are landless agricultural workers, especially in Andalucia and Extremadura (latifundia).

The most recent agrarian census was done in 1972 and some experts question its accuracy. In an attempt to bring more up-to-date data to the reader, Table 3.3 is presented based on data from the "Red Contable Agraria Nacional"

Table 3.3. Number and Average Size of Farms in the 1979 RCAN Sample and 1972 Census.

	General agriculture dry-land mainly cereals		General agriculture irrigation[a]		Poultry independent of ag. land		Swine independent of ag. land	
	# farms in RCAN	aver. size	# farms in RCAN	aver. size	# farms in RCAN	# layers	# farms in RCAN	# swine
Galicia	1	5.0	-	-	2	3655	1	883
Norte	27	48.6	6	58.7	1	5000	-	-
Ebro	141	123.3	102	41.8	3	2950	15	419
Nordeste	4	41.9	25	35.7	9	1531	14	223
Duero	484	127.3	287	40.6	7	8615	53	326
Centro	220	130.6	64	31.7	-	-	12	319
Levante	3	127.5	14	6.9	-	-	10	269
Extremandura	4	117.4	105	7.5	1	12000	1	242
And. Ori	31	92.7	41	17.4	-	-	2	556
And. Occ.	35	101.9	15	32.6	4	4705	7	147
Canarias	-	-	-	-	-	-	-	-
Spain	950	122.6	659	32.3	27	3766	115	317

Farm size in hectares.

[a] Mainly cereals, sugar beets, cotton.


Beef-cattle
Dairy-cattle
Sheep-goats
Census

Table 3.3. Continued.

	Beef-cattle with ag. land base			Dairy-cattle with ag. land base			Sheep-goats with ag. land base			Census 1972	
	# farms in RCAN	aver. size	# cattle[a]	# farms in RCAN	aver. size	# cattle	# farms in RCAN	aver. size	# sheep	aver farm size	# plots per farm
Galicia	4	30.1	15.4	133	15.9	34.9	-	-	-	6.4	18.9
Norte	78	9.4	28.7	319	11.5	27.1	-	-	-	11.1	8.7
Ebro	25	95.5	55.9	20	14.3	17.3	54	116.7	283.6	28.7	11.8
Nordeste	-	-	-	2	15.8	20.7	2	11.8	241.5	16.1	3.8
Duero	49	48.8	47.8	101	23.4	32.5	122	210.7	322.1	27.3	26.5
Centro	18	39.4	53.1	81	6.7	18.8	44	129.1	262.9	31.8	13.4
Levante	4	29.9	380.3	3	-	4.5	5	12.8	138.6	7.7	4.1
Extremandura	20	66.0	22.6	22	35.8	22.8	19	162.6	243.0	29.4	5.4
And. Ori	2	411.5	125.5	-	-	-	4	261.8	688.6	14.4	3.2
And. Occ.	17	427.1	80.1	8	15.5	102.6	20	255.9	572.1	29.3	2.7
Canarias	-	-	-	-	-	-	-	-	-	5.9	3.2
Spain	217	73.1	48.8	689	14.4	28.8	270	174.2	319.1	17.8	10.8

Farm size in hectares.

Sources:
Based on Ministerio de Agricultura, Red Contable Agraria Nacional (RCAN), 1979 results.
Instituto Nacional de Estadística, Censo Agrario, 1972.

[a] Includes milking cows, especially important in Galicia and Norte.

(RCAN).[1] A total of 4,724 farms were surveyed in 1979 and the results presented for every region and 36 farming activities. The seven activities more relevant to this study are the ones included in Table 3.3 which shows the number of farms in the sample for each region and the farm size, either in terms of hectares, number of animals, or both. The last column of Table 3.3 reports the average results of the 1972 agricultural census in terms of farm size and number of plots per farm. In some cases, the sample of the RCAN is very small and nonrepresentative. The data for Galicia, Nordeste and Levante are especially weak.

In observing the first columns in Table 3.3 it is clear that dry-land farms tend to be much larger than farms with irrigated land. Cattle farming results for the Norte region are considered to be fairly representative. The RCAN results suggest the greater importance of dairy farms in Galicia and Norte as opposed to beef farming which is the most important cattle activity in cereal producing areas and areas of extensive livestock farming. The Ministry of Agriculture estimated that in 1973 there were more than half a million

---

[1] Ministerio de Agricultura, Red Contable Agraria Nacional. Resultados empresariales 1979 (Servicio de Publicaciones Agrarias, Madrid 1980). The purpose of the RCAN is to survey farms and present annual results on their economic characteristics, as a policy tool to know the economic viability of the different types of farms in the different regions. The RCAN only considers farms which use at least one man work unit a year (2400 hours). Thus, it does not include any of the 2.5 million farms of the 1972 census which are considered part-time farms.

cattle farms in Spain, with an average number of cows of 5.13 per farm, ranging from 3.07 in Galicia to 18.4 in Andalucia Occidental. In 1973, 77 percent of the farms had less than six cows.[1]

Sheep farming generally takes place in relatively large dry-land farms where sheep can economically use stubble fields. As it can be implied from the figures in Table 3.3, Ebro, Duero and Centro are the main sheep farming regions.

Poultry and swine farms independent of a land base represent intensive and specialized farms. Unfortunately, the results of the RCAN do not report numbers of broilers in poultry farms and broiler and egg producing farms may be mixed in the sample. Information from the Ministry of Agriculture reports the following distribution of egg producing farms.[2]

Size of Flock	Percent of Farms
Less than 500 layers	7
From 501 to 5,000 layers	39
From 5,001 to 15,000 layers	41
More than 15,000 layers	13
	100.-

A. Gomez and A. Checchi classify poultry farms as industrial, if they house 5,000 birds or more, speculative

---

[1] Results presented in the "Mapa Ganadero" (1973) and cited in Ministerio de Agricultura, "Adhesión España, trabajos preparatorios. Agricultura." (Documento no. 10), p. 12.

[2] Ministerio de Agricultura, "Adhesión España, trabajos praparatorios. Agricultura." (Documento no. 9), p. 8.

("produce according to price variation and they disappear in periods of crises") if they house between 1,000 and 5,000 birds, and traditional if they have less than 1,000 birds.[1] There is no reliable information available on the distribution of broiler farms by size of operation. There are reasons to believe, however, that traditional broiler farms represent a small proportion of the total number of broiler farms.

Finally, estimates of the swine farm structure for 1976 made by the Ministry of Agriculture report the following results:[2]

Production Farms (production of piglets for sale for fattening)

No. of sows	No. of farms
10 - 25	4,237
26 - 50	3,248
51 - 100	2,240
101 - 200	1,300
over 200	779

Fattening Farms (hogs)

No. of pens	No. of farms
51 - 250	5,915
251 - 500	2,501
501 - 750	617
751 - 1000	292
over 1000	225

---

[1] A. Gomez y A. Checchi, La Agricultura Española, rezagada o descarriada?, pp. 40-41.

[2] Ministerio de Agricultura, "Adhesion España, trabajos preparatorios. Agricultura" (Documento no. 15), p. 13.

Organizational Characteristics

Main Features of Government Intervention Affecting the Feedgrain-Livestock Economy

This section outlines the main characteristics of the government support policies for cereals, oilseeds and livestock products. Emphasis is placed on those measures affecting farmers directly.[1]

Cereals. Government intervention is substantial in the cereal subsector. The intervention is not limited to pricing policy, but includes an aggressive credit and subsidy policy to influence production and grain commercialization. SENPA is the only buyer and seller of Spanish wheat.[2]

All farmers have to declare to the SENPA their surface planted, crop obtained, utilization of the grain for seed, self-consumption and that available for sale for any type of cereal they may grow. At the beginning of each crop year the government publishes the regulations for the forthcoming crop year. This includes setting all institutional prices and complementary measures. Institutional cereal prices are:

1. Basic guaranteed prices to producers for soft

---

[1] The sources of information for this section were government publications from the Ministry of Agriculture, SENPA and FORPPA (see list of references at the end of this thesis) and J. Briz, ed., España y la Europa Verde.

[2] The estimated wheat "escaping" SENPA commercialization was 10 percent of total production in recent years.

wheat (types I to IV), durum wheat (types I and II), barley (types I and II), oats (types I and II), rye, canary seed and triticale. Monthly increases to account for storage and financing are also established.

2. Buying price for corn and sorghum (guaranteed to producers).
3. Selling price of wheat, barley, oats and rye increased by a fixed percentage marketing margin, monthly increases and any bonus or depreciation due to quality standard.
4. Selling price of corn and sorghum per province so that the monthly average will not exceed $\pm$ two percent of the corresponding "entry price."
5. "Entry price" for imported corn, sorghum, millet, barley and canary seed (for September first) and monthly increases on these prices from October to May.

Traditionally, relative cereal prices have been manipulated to encourage the production of one grain versus another depending on the perceived needs of the country. In recent years (1974-79) the average soft wheat price has been 35-45 percent higher than barley price, and corn (guaranteed) price has been 26-36 percent higher than the barley price.

Spain only produces a third of the corn it consumes and the entry price of corn is normally set at 10 percent lower than the price guaranteed to producers. Recall that the

selling price of corn is ± two percent of the entry price, therefore, the Spanish government is subsidizing domestic corn production with a guaranteed price 8-12 percent higher than the domestic market price, which is the price at which feed manufacturers and livestock farmers buy corn. Note that the entry price of cereals is fixed every week when the variable import levy is published. The import levy is a cost added to the imports by the Spanish government to bring the world price of the imported grain up to the desired level at the Spanish port of entry.[1] At some point, grain imports may be restricted, as occurred during the latter part of 1978 due to the very large domestic production of barley.

Other measures of the cereal policy include:

1. Provision of subsidized credit for the purchase of seeds and fertilizer for cereals grown on dry-land.
2. Cereal crop insurance program which allows farmers to protect the value of their crops due to fire and freezing rain losses (except for wheat under irrigation).
3. Service of free selection of seeds for farmers who want to use part of their grain as seed for the next crop.
4. Subsidized credit of a maximum of 21,000 pts./ha

---

[1] Roughly the arithmetic whereby the variable import levy is calculated is the following: import levy = price of entry - (FOB price on foreign port + freight + freight insurance + unloading in Spanish port).

for the production of corn in areas no greater than five hectares.

5. Contracting with associated organizations (wheat millers, feed compounders, farmers' associations or agricultural corporations) for the purchase, assembly and storage of cereals.
6. Credit and subsidies to encourage construction of storage facilities and corn and sorghum drying facilities.

Oilseeds. Spain is highly dependent on imported soybeans to satisfy its requirements of soybean meal. As a consequence, Spain is the largest western European exporter of soy oil. This is a consequence of the government policies aimed at protecting the consumption of olive oil and domestically produced sunflower oil. The government has put a quota of 100,000 MT (25,000 MT per quarter) as the maximum amount of soy oil which can be sold in the domestic market. There is also a limit on retail prices for oilseed oils and a maximum retail marketing margin.

Each crop year, the government fixes a guaranteed price for soybeans, sunflower, safflower and rapeseed, all these prices being considerably higher than the international prices of these commodities. Imports of soy and other oilseeds, be it in bean form, meal or flour, are subject to the variable import levy system as described for grains.

Poultry. Prior to each poultry year (starting April 1) the government fixes the following prices:

1. Price for consumer protection, which is the maximum wholesale price level acceptable.
2. Indicative price to producers.
3. Intervention price and basic intervention price (which is not higher than 90 percent of the intervention price).

Government intervention occurs in two instances. One occurs when the reference price, a weighted average wholesale price of the most representative wholesale markets, falls below the intervention price. In this instance the government, through the FORPPA, finances storage of eggs and chickens and may provide export restitutions to encourage chicken and egg export. The second instance occurs when the reference price reaches the consumer protection price, in which instance eggs and chickens being stored under FORPPA financing have to be released. As an alternative, and in order to increase supply, the government may import eggs and frozen chickens. Import of these two commodities is reserved to the government (state trading).

Pigmeat, beef and sheepmeat. These three sectors are regulated jointly in each year's meat campaign, which generally begins March 1.[1] For pigmeat and beef the government fixes the following prices in Pts./kg of carcass weight:

---

[1] The 1979-80 campaign began on August 29 due to the delay in publishing the regulations of the campaign.

1. Guaranteed price to farmers.
2. Inferior intervention price which sets the market price level at which the intervention mechanism is started.
3. Indicative price which represents the desired market price level.
4. Superior intervention price which sets the level for government intervention in increasing supply (by releasing carcasses in storage from previous purchases or by importing meat).

These prices are referred to a standard type of carcass and they are contrasted to a reference price representative of the prices received by farmers.[1] The FORPPA finances intervention operations and the CAT ("Comisaría de Abastecimientos y Transportes") executes them. They also involve the participation of an associated slaughter house and/or a storing firm.

In each campaign reserve levels for pigmeat and beef are established and they are used to determine whether the government should import meat or not when the reference

---

[1] The reference price in pts./kg of carcassweight is derived from weighting wholesale prices at slaughter house level (for selected slaughter houses) minus slaughter costs and the commission charged by the agent entering the animals to the slaughter house. A. Cobos y P. Gaona, in Briz, ed., España y la Europa Verde, p. 584, "it does not represent the price received by the farmer who sells his cattle live, due to the complexity of the commercialization of live cattle and the yields live/carcass quoted by the buyers."

price is higher (for 15 consecutive days) than the superior intervention price. All imports of beef, sheepmeat and pigmeat products, except for live animals of certified breeds (for breeding purposes) are a perogative of the government. The government is entitled to give export restitutions for export of sheepmeat. A regulation of the Ministry of Commerce establishes maximum marketing margins for beef and sheepmeat as a constant proportion of the cost of the produce at the farm level.[1]

There is also a set of measures regulating production. A recent government regulation prohibits the establishment of hog fattening operations and requires them to be closed cycle operations (i.e., production of weaners and fattening). This regulation is expected to contribute to the control and isolation of the African Swine Fever. Regarding ruminant stock, the Spanish government is promoting farming practices which make use of Spain's natural resources -- pastures and forage crops. In this effort the Agency for Livestock Development ("Agencia de Desarrollo Ganadero"), born of a World Bank financed project in the late 1960s, plays an important role. It provides subsidized credit and

---

[1] A study done by IRESCO, an institute within the Ministry of Commerce, concluded that "... the 15 percent legal margin (for butchers) seems fictitious." They found evidence that it was neither respected nor enforced, and in fact butchers operate with much larger margins. IRESCO, Comercialización de la Carne, Colección de Estudios IRESCO, Ministerio de Comercio y Turismo, no. 16 (Madrid 1977), pp. 70-75.

technical assistance to cattle (beef and dairy), sheep and goat farms to improve their use of pastures and increase their productive capacity. The FORPPA also provides credit for the same purpose. Other policy measures include:

Beef cattle -- minimum calf carcass weight of 125 kg per animal.

-- in 1977 the "anojo" premium for carcasses heavier than an established minimum was terminated.

Sheep -- it is prohibited to slaughter lambs of less than 10 kg (liveweight) and to circulate carcasses of less than 5 kg.

-- the government gives a premium to farms for the production of lambs of more than 26 kg (liveweight) in closed cycle farms, or 31 kg in fattening farms, in a relatively short period.

Dairy. Twice a year (January first and July first) the government establishes a minimum price at which the industry has to purchase cow's milk from dairy farmers. Target and superior intervention prices and a minimum retail price are also established. When the market price (represented by a weighted milk price at the farm level in the areas of production) reaches the superior intervention level, it is indicative of a milk deficit and the government initiates measures to ensure adequate supplies.

Trade in fresh milk is controlled by the government.

The government is also promoting producer associations, especially in the processing stage. It subsidizes structural improvements on family and cooperative dairy farms, including the purchase of mechanized milking facilities.

In 1980 the Ministry of Agriculture submitted the "milk statute" bill to the Parliament. The milk statute is aimed at reforming the structures of the Spanish dairy sector. It has been a very controversial piece of legislation, still unapproved, and indicative of possible radical measures needed to improve the competitiveness of the dairy sector.

Marketing Structure

Approximately 90 percent of the wheat produced in Spain is bought, stored and distributed by the SENPA in cooperation, for purchase and storage, with associated organizations ("entidades colaboradoras"). The SENPA marketed only one percent of the 1977-78 barley crop and 40 percent of the corn and sorghum crops (up from one percent in 1976-77). The remaining grain was commercialized in the marketplace by private businesses.

Imported feedgrains, mainly corn and sorghum, are commercialized by the few private firms which import grain. This small number of firms operate under fairly tight government control through the mechanism of the variable levies and the requirement to use Spanish flag ships.[1]

---

[1] See J. Cornejo Garcia, "Operativa de las Importaciones de Cereales-Pienso y de Soja an España," Agricultura, no. 581 (November 1980).

Trade between producer or importer and feedgrain buyer can be direct or indirect through elevator operators or contracting markets such as the cereals "Lonja" of Barcelona.

The SENPA has its own storage facilities with a capacity (at the end of 1977) of 49 percent of all grains purchased. The remaining 51 percent storage capacity is rented from private organizations. The SENPA distributes wheat directly to the milling and baking industry, a total of 649 plants in 1979. The SENPA also distributes durum wheat to the seven semolina factories.[1]

Over half of the durum wheat used by the semolina industry is imported and Spain is a net exporter of noodles. The Ministry of Agriculture has estimated that the semolina industry is operating at almost full crushing capacity or 98 percent of 700 MT of durum wheat per day. There are also four corn starch (hominy) producing factories and three wheat starch factories, 12 beer and malting factories and six malting-only factories in Spain. In distributing feedgrains the SENPA markets barley, a ground feed mix and a feedgrain-mix especially for farmers in deficit areas. The typical feedgrain-mix is composed of barley (70 percent), corn (15 percent) and sorghum (15 percent) although abnormal wheat, residual products of the seed selection activity and other grains may also be included in the mix. In 1977-78 the

---

[1] Flour and bread factories are also entitled to purchase durum wheat.

SENPA distributed 106,561 MT of feed-mix and 23,000 MT of barley which are small percentages to the country's requirements. In the next section the feed-mixing industry will be analyzed in greater detail.

The marketing channels through which livestock products flow from farmers to consumers are very different for poultry products than for swine and ruminant animal products. In the following pages the typical meat marketing channels will be outlined (especially relevant for pork, beef and sheepmeat) as well as the main characteristics of the slaughter activities.

A study carried out by the IRESCO[1] divides meat marketing into three basic stages. First, commercialization of livestock for slaughter -- from farmer to slaughter house. Second, commercialization of fresh meat -- from slaughter house to the consumer, and finally, commercialization of processed meat -- from slaughter house to processor to consumer. Here we are primarily interested in the first stage.

The slaughtering activity takes place in any of the following types of slaughter houses: municipal, "refrigerated" (or "matadero general frigorifico") and industrial. A small proportion of the total number of animals are slaughtered on farms. Table 3.4 shows the relative importance of the three types of slaughter houses in terms of cattle, sheep and pigs slaughtered in 1977. Municipal

---

[1] IRESCO, La Comercialización de la Carne.

Table 3.4. Slaughtering of Cattle, Sheep and Pigs By Type of Slaughter House. Spain 1977 (Thousand MT of Carcassweight)

	Municipal	%	Refrigerated	%	Industrial	%	On-farms	%	Total
Cattle	243.4	56.4	179.5	41.7	6.5	1.5	1.6	.4	430.8
Sheep	100.6	76.7	25.8	19.7	.5	.4	4.2	3.2	131.1
Pigs	180.5	24.6	396.3	54.0	86.7	11.8	70.9	9.6	734.5
Total	524.2		601.6		93.8		76.7		1,296.4
Percent	40.4		46.4		7.2		5.9		100.0

Source:

Ministry of Agriculture, reported in E. Diez Patier, "Mercado de Carnes," Agricultura (mimeographed copy undated).

slaughter houses are publicly owned and operated facilities which perform two functions: (1) industrial (i.e. livestock slaughtering and transformation in carcasses and offals), and (2) commercial market centers. In 1974, 19 cities of more than 100,000 inhabitants had a central meat market located in the same facility as the municipal market. Most municipal slaughter houses without central meat markets are important in rural areas and they tend to lack the most elementary services for a minimal hygienic slaughter.

These conditions seem to improve in municipal slaughter houses with central meat markets, but still the facilities tend to be old and have managerial problems typical of the public sector. In 1974 there were 2,165 municipal slaughter houses with a total slaughter capacity of 1,549,108 MT of carcass weight. Of the meat marketed by central meat markets, over two-thirds were handled by markets in Madrid and Barcelona. Refrigerated slaughter houses are gaining importance in the slaughtering activities. They are private enterprises and primarily perform a commercial and processing function. They buy livestock (either through contacts or in the market), transform them into full, half or quarter carcasses and sell them either fresh or refrigerated with a very small proportion being frozen. Most of these businesses are also meat canners and meat processors. In 1974 there were 123 refrigerated slaughter houses with a total slaughtering capacity of 843,431 MT. Clearly the average size of refrigerated slaughter houses is much larger than

that of municipal slaughter houses.

Industrial slaughter houses operate exclusively for meat processors and canners and are not allowed to sell fresh meat; they slaughter mainly pigs. In 1974 there were 633 industrial slaughter houses with a capacity of 99,473 MT.

Marketing channels from the farmer to the slaughter house may become very complex and involve several agents. Figure 3.5 depicts in a single diagram some of the more common channels to bring stock to slaughter. The single most common channels are:

cattle: farmer - (livestock market) - "tratante" / "comisionista" - "entrador"[1] - municipal slaughter house

sheep: farmer - "tratante" - "entrador" - municipal slaughter house

pigs: farmer - "comisionista" - refrigerated slaughter house

The "corredor" also plays an important role. His function is to bring potential sellers and buyers together, for which he charges a commission. The "entrador" is a

---

[1] The "tratante" and "comisionista" are traders of livestock whose main function is to assemble animals and obtain a sufficiently large lot to meet the requirements of slaughter houses. The "entrador" may operate on his own or in representation of another person. In the first instance he owns the stock at slaughter, in the second case he charges a commission to the owner.

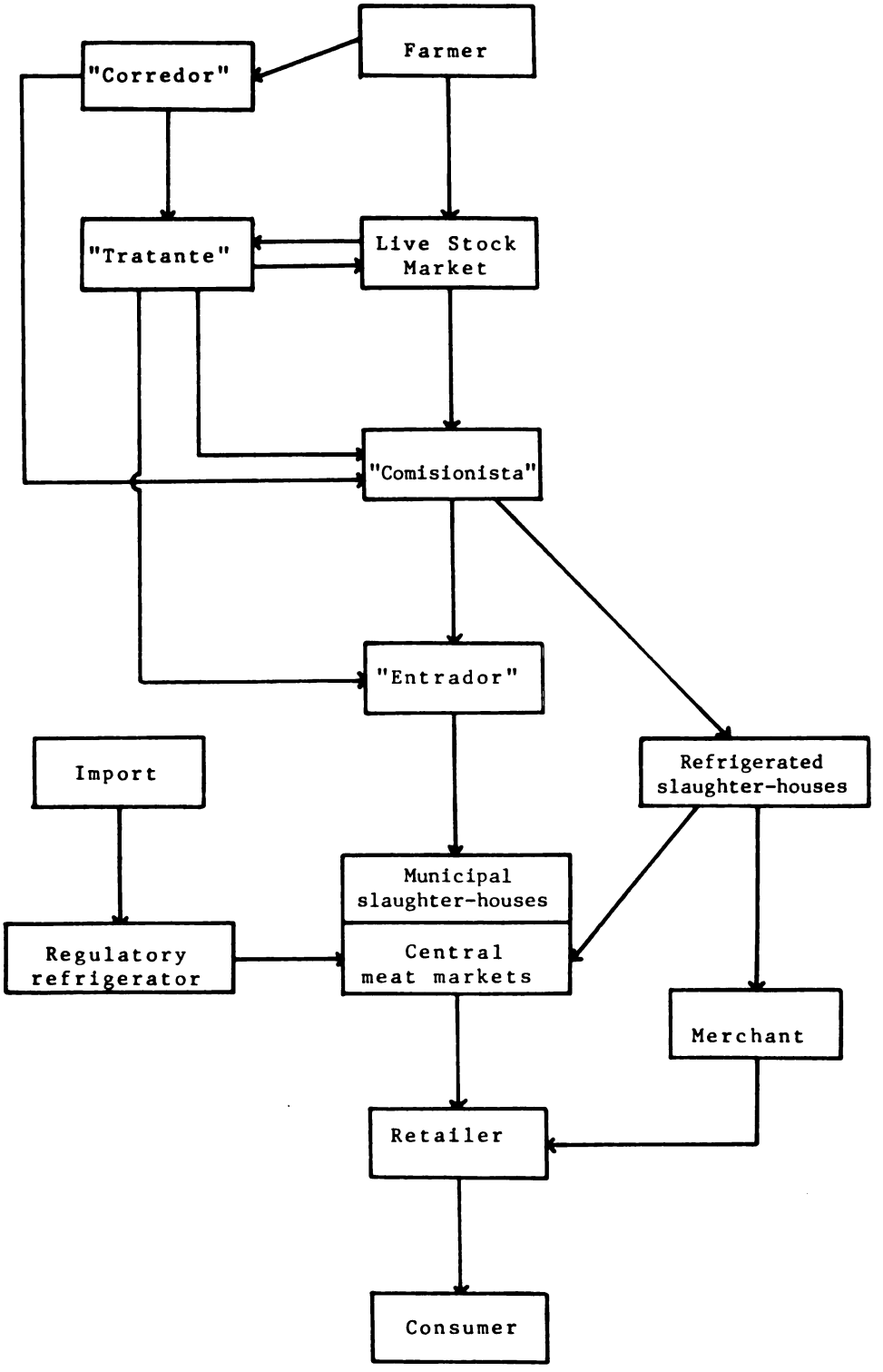


Figure 3.5. Meat Commercialization Channels in Spain.

Source: Based on IRESCO, Comercialización de la Carne.

central figure in the system and he benefits from having an oligopolistic position.[1] These channels involve a relatively large number of middlemen and numerous transactions, especially for beef and sheep. They are also responsible for a large marketing spread which increases the farm level prices to retail levels which make beef and sheep meats less competitive in respect to other meats.[2] The IRESCO study identifies a number of deficiencies and bottlenecks in the meat marketing system which could be lessened, resulting in a gain to both farmers and consumers.[3] The government is making an effort to improve meat commercialization, especially in marketing livestock. This is a complex problem closely linked to the production structures.

Marketing channels of meat from the slaughter house to the consumer are much more efficient because they usually only involve a retailer who purchases carcasses in central meat markets.

---

[1] "Los entradores dominan el proceso de distribución a un nivel suficiente como para dificultar que ganaderos individuales puedan romper su posición oligopolistica," Ibid., p. 38.

[2] "El aparato distributivo no solo traslada los altos costes de producción sino que los amplía desproporcionadamente por la cantidad de figuras comerciales que resultan necesarios para llevar a cabo la distribución de los productos," Ibid., p. 112.

[3] For a summary presentation of these deficiencies and bottlenecks, see Ibid., pp. 95-100.

Milk marketing is more concentrated than meat marketing.[1] In March 1974 there were 51 firms, of which 13 were cooperatives, operating a total of 58 fluid milk processing plants. The first marketing stage, i.e. from the farm to the processing plant, involves assembling and transportation. These functions are generally done by the plants themselves which pick up the milk from farms or assembly centers and transport it to their receiving room. In other cases, farmers bring their milk to the plant by their own means, or collectively.

The Feed-Mixing Industry

In 1978 there were approximately 750 feed compounding plants in Spain. Some of these plants belong to a single nationwide firm, but the majority are regional or local in character. It is estimated that feed-compound production by cooperatives represents 20-25 percent of the total and it has gained importance primarily in Catalunya. The total capacity for feed-compound production is estimated at 10.4 million MT per year, with a production of 9.2 million MT in 1978.[2]

The growth of the feed-mixing industry from its birth

---

[1] For a discussion of milk marketing channels see E. Diez Patier, "Efficient Organization of the Fluid Milk Subsystem in Spain." Ph.D. Dissertation. Michigan State University, 1976, pp. 28-37.

[2] Data from Ministerio de Agricultura, "Adhesión España, Trabajos Preparatorios. Agricultura," Documento no. 16, p. 5.

in the late 1950's to the present level has been rapid and linked to the growth and industrialization of the poultry sector, and later the swine and other livestock sectors. The industry was promoted by the government in its early stages when the major producers, most with foreign capital and technology, entered the Spanish market. The dimension of the feed-compounding firms[1] and plants is limited by the livestock activity in their area since the maximum economically profitable transportation raduis has been estimated at 150-250 kilometers.[2]

Today there is no agreement on whether the structure of the industry is best described by a highly competitive pattern or an oligopolistic model in which the top firms have a large share of the market. In fact, both views are partly correct. There are few firms producing broiler feed-compounds, and they dominate the sector through contracting arrangements. The level of concentration decreases in the egg sector, and almost all manufacturers produce swine feeds.

Contracting arrangements, however, are increasing in the swine sector and there is fierce competition among feed manufacturers to reach farmers and contract with them. This trend is also increasing concentration. Unfortunately, there

---

[1] The term "firm" is used in a wide sense to include private firms as well as cooperatives. (There are no public firms in the feed-mixing industry.)

[2] Ministerio de Agricultura, idem., and A. Fernández Rojas, "La Industria de Piensos Compuestos en España," Agricultura, no. 581 (noviembre 1980), p. 744.

are no empirical studies showing evidence of the level of concentration in the feed-mixing industry. The popularity of contractual arrangements may, however, encourage dominance by the larger firms, especially in periods of crisis (as in 1980 when farmers were willing to lock their production under contracts). As A. Fernandez Rojas states, "the most important feed manufacturers in Spain are also the most important stock farmers of the country."[1]

Table 3.5 shows the distribution of total feed compound production in MT and its value in Pts. for 1978. Clearly poultry and swine feeds account for 75 percent of the total feed compound production.

In producing feed compounds the costs of purchasing the different feeds is the largest single cost. Table 3.6 contains a summary of the different raw materials used by the feed-mixing industry in 1978 and their value. Corn, barley and soybean meal account for 72 percent of all feeds used to process feed-compounds.

---

[1] "No debe olvidarse que las más importantes fábricas de piensos compuestos de España son a su vez los más importantes ganaderos de este pais," Ibid., p. 749. In the subject of concentration within the feed-mixing industry, A. Langreo says that only four large firms control, in one way or another, over 50 percent of the total production of feed compounds: NANTA, SANDERS, HENS and BIONA, all of them with a majority of foreign capital and related to multinational corporation. She also writes that the amount paid in royalties is much larger than profits distributed in the firms in the industry with a minority foreign capital participation. Alicia Langreo, "La integración vertical en España," Agricultura y Sociedad, No. 9 (Octubre 1978), p. 194.

Table 3.5. Production of Feed Compounds in 1978.

Feed Compound	1,000 MT	Percent	Million Pts.
Cattle:			
dairy cows	599.4	6.7	8,584.6
beef	712.	8.0	12,420.2
others	151.4	1.7	2,278.6
	1,462.8	16.5	23,283.4
Sheep and goats	301.7	3.4	4,846.4
Swine:			
weaners	434.8	4.9	8,353.3
hogs	2,358.8	26.5	38,527.1
other	520.8	5.9	8,467.6
	3,314.4	37.3	55,348.
Poultry:			
broilers	1,695.2	19.1	32,110.4
layers	1,611.4	18.1	26,061.0
	3,306.6	37.2	58,171.4
Rabbits	329.1	3.7	4,832.6
Other animals	142.9	1.6	3,014.1
Supplements	27.7	.3	1,457.5
	499.7	5.6	9,304.2
Total	8,885.1	100.	150,953.3

Source:

Instituto Nacional de Estadística, Estadística de Industrias de Piensos Compuestos, 1978.

Table 3.6. Utilization of Raw Materials By the Feed-Mixing Industry and Their Value in 1978.

Feed	1,000 MT	Percent	1,000 Pts.
Vegetable			
Corn (import)	2,266.6	--- 32.8	27,127.5
Corn (domestic)	688.9		8,149.
Barley	2,076.9	23.1	21,889.8
Oats	41.3	.5	409.9
Other cereals	527.9	5.9	5,211.5
Soybean meal	1,439.4	16.	29,952.4
By-products oth. seeds	183.7	2.	2,712.4
Alfalfa	206.6	2.3	1,962.
Millfeed	504.2	5.6	6,073.4
Molasses	70.4	.8	487.8
Sugar by-products	43.6	.5	355.1
Rice by-products	45.3	.5	363.6
Starch by-products	66.2	.7	812.6
Legumes grain	23.9	.3	382.6
Other	145.8	1.6	495.
Animal			
Meat by-products	125.2	1.4	2,497.5
Milk by-products	69.8	.8	2,496.5
Fish by-products	68.	.8	2,518.
Fats	75.	.8	2,649.9
Other	10.8	.1	206.3
Minerals	319.1	3.4	2,074.7
Vitamins	---	-	4,424.9
Total	8,998.6	100.	123,252.4

Source:

Instituto Nacional de Estadística, Estadística de Industrias de Piensos Compuestos, 1978.

Feed compounds are marketed freely, but their prices must be "communicated" to a government agency. The agency analyzes the cost component of producing feed compounds and monitors the price level to ensure that farmers, and ultimately consumers, are charged a fair price. In terms of feed formulations, there are more than 20,000 formulas registered with the Ministry of Agriculture.

The location of feed-compounding plants is closely related to livestock production areas and the supply of raw material. Hence, Catalunya, in which 38.4 percent of the broiler sector, 16.1 percent of the egg sector and 31.1 percent of the swine sector are concentrated, produced 32 percent of the total value of the feed-compound production in 1978. The four Catalan provinces have 140 feed-mixing plants, or 24.5 percent of the Spanish total. Other important areas of production, in percentage of the total value of Spanish feed-compound production, are the provinces of Valencia -- 5.4 percent, Zaragoza -- 5.3 percent, Navarra -- 5.1 percent, Madrid -- 4.9 percent, Valladolid -- 4.3 percent and Sevilla -- 3.8 percent.

There are no specific numbers indicating how much feed-compounds are produced on farms, i.e. non-commercial. There is evidence, however, that large swine and ruminant enterprises produce their own feed-mix by purchasing concentrates which are then mixed with cereals; or alternatively they produce their own mix and buy a vitamin-mineral supplement. Surveys in the Ebro region have shown that this is not a

generalized practice. Most farmers prefer to purchase commercial feed and receive technical assistance. Lack of know-how in formulating feed rations and the relative high cost of obtaining raw materials for individual farmers are other possible causes of the preference for commercial feed-compounds by livestock farmers.

Vertical Integration

Currently about 95 percent of the broiler production, 35 percent of the swine production and 20 percent of laying hens are integrated according to data from the integrating firms.[1] Poultry is a highly integrated industry and the following discussion will help us understand the channels that move poultry products. Vertical integration refers to the control of two or more stages in the production-marketing system by a single business organization.

Several methods are available to exercise control over vertical stages of the supply system. One way is by ownership of the means of production; another would be by

---

[1] Langreo, "La Integración Vertical en España," p. 201.

contracting.[1] There is a general concensus that vertical integration enhances coordination and contributes to a more efficient production-marketing system "... unless a nontrival degree of monopoly exists."[2]

---

[1] Refer to W. E. Black and J. E. Haskell, "Vertical Integration through Ownership," Marketing Alternatives for Agriculture, E. M. Bonn, ed. (Cornell University, November 1976) for a description of vertical integration through ownership. For a short overview of vertical integration in the food industries see A. C. Hoffman, "Vertical Integration in the Food Industries," Coordination and Exchange in Agricultural Subsectors, NC Project 117, Monograph no. 2 (January 1976). W. R. Henry and R. Raunikar, "Integration in Practice - The Broiler Case," Journal of Farm Economics, vol. XLII, no. 5 (December 1960), pp. 1265-1274, use a definition of vertical integration very similar to the one given above and they comment: "The definition embraces control by acquisition of facilities used in the separate stage, by contracting these facilities, or by an informational understanding kept effective by mutual benefits."

[2] Oliver E. Williamson, Markets and Hierarchies: analysis and antitrust implications (The Free Press, New York, 1975), p. 115. The following quotation should also illustrate this point. Williamson, Markets and Hierarchies, p. 115: "the enforcement of antitrust with respect to vertical integration ought to be restricted to the monopolistic subset. Elsewhere, the maintained hypothesis ought to be that vertical integration has been undertaken for the purpose of economizing on transaction costs." Hoffman, "Vertical Integration in the Food Industries," p. 168, "to the extent that a vertically-integrated firm is operating in competitive markets, I think it is usually in the public interest because it results in savings and improved efficiency which can be passed on to the public." To illustrate this point, Spanish feed manufacturers keep reminding the public of the spectacular increases of meat consumption in Spain with its nutritional benefits for the population, and also that chicken and egg prices have traditionally increased less than the inflation rates (decline in real prices). Henry and Raunikar, "Integration in Practice - The Broiler Case," p. 1270: "When a hypothetical non-integrated broiler industry is subjected to realistic operating conditions, spot market communication among stages of production is inefficient and several general types of problems arise. Vertical integration is an effective way of dealing with each type of problem and must extend into the broiler growing stage in each case."

The concern then for the policy analyst is whether the vertical integration process in a given industry enhances concentration and potentially a consumer overcharge. Another concern in the case of integration, which includes the farm producing stage, is the new role of the farmer -- more a laborer than an independent producer -- and his bargaining power with the integrating firm when negotiating a contract. These are two complex issues which have been argued for a long time.

It is not without reason that integrating forms of vertical coordination are most common in the poultry subsector, and in particular, in the broiler industry. As Henry and Raunikar state, "None of the [other livestock] sectors inherently have advantages of vertical integration comparable to those in the broiler industry."[1] Those inherited advantages refer to the different stages in the system and the potential for large variations in quality, volume, hence, seasonality and price instability, and spatial organization.

Figure 3.6[2] illustrates the different vertical stages of the poultry industry and integration possibilities.

---

[1] Henry and Raunikar, "Integration in Practice - The Broiler Case," p. 1274.

[2] Figure 3.6 is based on USDA, The Chicken Broiler Industry, ERS Agricultural Economic Report no. 381 (August 1977), p. 3 and NC Project 117, The Egg Subsector of US Agriculture: A Review of Organization and Performance. Monograph 6 (June 1978), pp. 23-25.

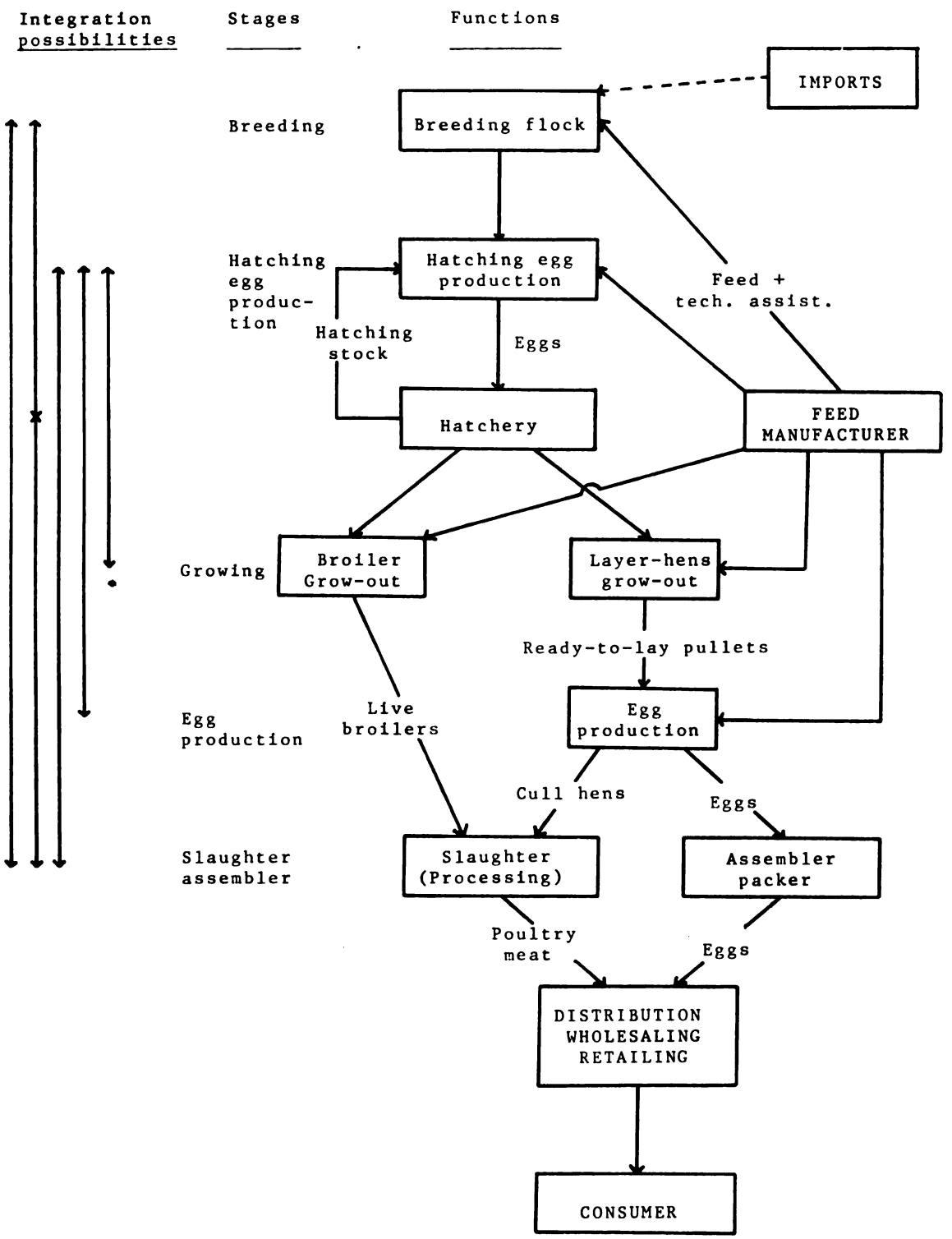


Figure 3.6. Poultry Subsector Organization.

These stages are not exhaustive. When referring to Figure 3.6 the broiler and egg sector should be considered as two different industries. In the whole vertical productive system, the feed compounder plays a central role since it provides feed and technical assistance to five different stages.

As Langreo points out, in a first phase of the integration mechanisms (starting in the early 1960s), the feed manufacturing firms integrated forward by bringing under their control the growing activities.[1] This was primarily achieved by contracting with farmers for the provision of feed. The form of the contracts have evolved to the present situation which contains the following main features. The compounding firm provides: (a) the offspring to be grown (the pullets in case of layers); (b) all feed required in the production process; (c) technical assistance including medicants and vaccinations. The farmer agrees to: (a) use all inputs from the integrating firm; i.e. not to purchase chicks, feed, medicants, etc. outside the integrating firm; (b) sell all his products to the integrating firm meeting certain quality standards.

The financial aspects may vary, from the cases in which the farmer receives a pre-determined price for his products (payment for labor and use of facilities), to the

---

[3] Langreo, "La Integración Vertical en España," pp. 195-197.

cases in which the farmer has to purchase his inputs and sells his products at a price linked to the market level. In most cases, the integrating firms provide financing for feed and fowl.

These contracts are fairly similar between different firms and variations concern additional aspects, such as incentives (premiums for low feed conversion rates and mortality rates). In all cases the integrating firm tends to bear most of the risk but controls the whole process.

Langreo mentions a second phase in the history of vertical integration arrangements -- refrigerated slaughter houses integrating backward.[1] This process has led towards contractual arrangements not only between individual farmers and refrigerated slaughter house firms, but also between the firms and feed manufacturers. As a result, whether the integrating firm is a feed manufacturer or a slaughter house and processing firm, this firm controls the whole process from the hatchery to retailing level.

Broiler production also follows very closely the vertical integration pattern through contracting. However, such arrangement is less popular among egg and swine farmers basically because the nature of their industry permits coordination to be achieved through less integrated processes and a more extensive use of the market mechanisms.

---

[1] Ibid., pp. 197-201.

CHAPTER IV

ENTERPRISE BUDGETS (1979)

This chapter deals with budgets for a selected number of case study farms. These budgets reflect production practices and prices under 1979 conditions.

Methodological Notes

Enterprise Budgeting Analysis

The main analytical tool of this study is the enterprise budget. Budgets are developed for each of the following products: barley, soft wheat, corn, broilers, eggs, swine, beef, veal, milk and lambs. The different budgets are derived to reflect the organization of the different enterprises under 1979 conditions.

The budgets contain technical input-output relationships, and economic information to help provide insights into the feedgrain-livestock sector at the farm level. More importantly, the enterprise budgets, derived under 1979 conditions, allow the performance of partial budgeting analysis by modifying the set of prices paid and received by farmers. (In the next chapter these prices will be changed, hence, "creating" a scenario within which farmers would have operated had Spain been an EEC member in 1979.)

In bringing the prices received by farmers, up or down, to the EEC level, the gross revenue of farmers will change. The change in feedgrain prices will also tend to modify the feed ration and its price, hence, increasing or decreasing total variable costs. The new situation will yield a different gross margin and will help us identify the change in the relative profitability of each enterprise, comparing the Spain out-of-the-EEC and in-the-EEC situations in 1979.

Therefore, the objective in building enterprise budgets for 1979 is twofold: (1) to describe current production practices and their profitability for certain types of enterprises and (2) to perform partial budgeting analysis to compare the relative profitability of two different situations, "out and in the EEC."

The budgets presented here reflect synthetic cases. Moreover, the synthesis does not produce typical cases in the sense of representing the average type of farm in a particular subsector. The ideal would have been "to choose the case which best represents all of the individual cases in the group," where the groups are defined "so that the range in resource ratios within a group is quite limited."[1] Such a procedure would allow making inferences from the individual representative cases to the group, hence,

---

[1] James F. Thompson, "Defining Typical Resource Situations," Farm Size and Output Research. Southern Cooperative Series. Bulletin no. 56 (June 1958), p. 42.

facilitating a meaningful process of aggregation. Given the heterogeneity of all sectors analyzed and, more importantly, the deficiency of census and farm structure data, such an ideal approach could not be followed.

Instead, an effort has been made to define a base farm for each budget which best represents the group of farms of most interest to this study, i.e. farms that are commercially important in the feedgrain-livestock economy, either being grain producers or grain and concentrate users. For example, such an approach excludes all types of extensive livestock activities and only considers intensive and semi-intensive livestock feeding operations. An exception in the latter category of farms is intensive dairy enterprises which could not be analyzed for lack of data. Although the assumed base farms, from which the different enterprise budgets were derived, are representative of a number of farms, they have been characterized as case study farms because the degree of representativeness could not be specified.

Budgets were formulated with three components: gross revenue, variable cost and a gross margin (equal to the difference between the two other components). Fixed costs (depreciation on fixed capital, interest on fixed capital and repairs of fixed assets) were not derived and were marginally considered. This is justified by the static nature of this study which assumes the basic farm structure to remain unchanged.

Typically, partial budgeting techniques are designed to

compare two alternative situations when the basic organization of the farm remains unchanged. They are aimed at helping the farmer decide on his best alternative. Generally, a partial budget contains four basic items:

Costs	Benefits
(a) additional costs	(c) reduced costs
(b) revenue foregone	(d) additional revenue

The difference between (a) + (b) and (c) + (d) will indicate whether the change is profitable $(c + d) > (a + b)$ or not $(c + d) < (a + b)$.[1] The use of partial budgeting techniques in the next chapter is aimed at helping the analyst evaluate the impact of two alternative price policies at the farm level. The activities compared are the same, the prices different. Thus, the typical items of concern are (a) change in revenue, (b) change in costs and (c) change in gross margin.

Data

A deficiency of farm level data exists in Spain. Due to budgetary constraints, this study was limited to the use of available information. The primary concern in the data collection activity was to obtain cross-sectional data for

---

[1] Description of partial budgeting techniques can be found in almost any farm management basic textbook. See, J. H. Herbst, Farm Management, Principles, Budgets, Plans (Stipes Publishing Co., Champaign, 1976), Chapter IV and Maxwell L. Brown, Farm Budgets (The John Hopkins University Press, 1979), Chapter 3.

the period 1977-80 on enterprise budgets, i.e. revenues and costs, and technical relationships describing production practices. Secondary data was obtained from several different sources.[1] Research institutions, especially regional centers of the INIA ("Instituto Nacional de Investigaciones Agrarias") provided most of the data based on farm surveys. The Agency for Livestock Development also provided farm level data.

The most valuable information, however, was obtained from feed compounders with vertically integrated poultry and swine operations. These sources will remain anonymous. It is sufficient to say that the author met with four cooperatives and three private firms, all feed compounders in the Catalunya Region.

The only farm level data produced by the Ministry of Agriculture are the results of the RCAN and the agricultural census which is done every ten years, next to be done for 1982. Reference has already been made to both sources.

The "Secretaría General Ténica" of the Ministry of Agriculture was helpful in providing the questionnaires submitted to the EEC Commission. Ironically, these questionnaires do not answer the EEC questions on costs of production. However, the documents were useful in providing descriptive information, and monthly price series (other than

---

[1] The data sources used in deriving farm budgets are listed in Appendix 1.

those reported in the "Boletín Mensual de Estadística Agraria").

The 1979 Agricultural Year

The 1979 climatic conditions for crops, especially in dry lands, were not as favorable as in 1978. The 1979 real crop output was close to four percent lower than the record output level of the previous year. The decline in crop production was particularly important in cereals grown on dry land: barley (-23%) and wheat (-14%). Corn production, mostly grown under irrigation, increased by 13.6 percent in 1979 over the 1978 crop. Overall, the 1979 crop output was considerably higher than the average for the period 1970-78, but can be considered "normal."

Livestock production in 1979 continued its growing trend, but at a lower rate than in the previous eight years, increasing by 2.2 percent relative to 1978. Production of red meat lagged behind demand during the first months of 1979. As demand lessened later in the year, supplies of red meats slightly exceeded demand. In 1979 demand continued to shift from beef and lamb to pork, a cheaper meat. Pork production increased by 6.3 percent relative to 1978. Beef production remained at approximately the same level as 1978, although average weight at slaughter increased by three percent. Lamb and sheepmeat production decreased by 6.5 percent in 1979. Chicken meat production also declined by one percent. Production of eggs was up by 12 percent. Many

people believe this increase in supply over-saturated the market, however, export of eggs did increase sharply from 1978 levels, especially when some markets were opened in North African countries. Cow milk production increased 1.8 percent in 1979.

In 1979 prices received by farmers increased by 6.8 percent, prices paid by farmers increased by 14 percent and the inflation rate was 15.7 percent. Clearly, the real income of many agricultural producers declined in 1979.

Cereal prices are very stable due to the rigid controls imposed by the government and relative prices between wheat, barley and corn were maintained within the range of previous years. Nominal prices received by farmers for these three commodities increased by about 10 percent in 1979.

Farm level prices of livestock and eggs tend to fluctuate more than retail market prices of meats and eggs. Live beef cattle prices followed a declining trend throughout the year. However, in an attempt to cause an increase in producer prices, the government initiated the intervention mechanism, and purchased more than 20,000 MT of beef in the later half of 1979. Variations in hog prices tend to be smaller than variations in beef cattle prices. In 1979 live hog prices reached a peak in April, and the lowest price in October.

The lamb market traditionally peaks around Christmas when demand is highest, and lows generally occur in the spring months. In April, responding to pressures from

producers, the FORPPA decided to intervene and bought 100,000 carcasses of lamb. In September prices recovered and in a very few days, reached very high levels, at which time the FORPPA released the carcasses it previously purchased. Another characteristic of the lamb market is that regional differences in prices and product, i.e. age and weight of the animal, are important.

Live chicken prices were strong throughout the first seven months of the year. Expecting an increase in consumption due to the tourist season and highly attractive prices, supply increased. Due to the high temperatures, a large number of birds had to be sent to slaughter before the normal fattening period was completed. This, coupled with a lower number of tourists than expected, caused prices to rapidly fall within a few weeks. September prices were 20 percent lower than in July. In January 1980, the FORPPA started purchasing chickens for storage. The egg market also suffered a downward trend during the summer months but recovered by the end of the year. Milk prices followed a fairly steadily increasing trend because the industry buys at a minimum price fixed by the government.

The highest increases in input prices were in fuel and fertilizers (over 20 percent nominal price increase compared to the 1978 price level). The price of these two products is closely linked to the international price of oil.

Seed prices increased by an annual average of 13 percent and feed prices rose by 9.5 percent as compared to

1978. Average increases were fairly steady month-by-month throughout the year.

In 1979 agricultural imports increased by 8.78 percent and exports by 14.31 percent in real terms. The value of total agricultural exports became 87 percent of the value of imports, up from 75.5 percent in 1978. Two major factors contributed to the relative low level of imports; the large 1978 grains crop, and the 6.1 percent appreciation of the peseta versus the dollar. Feedgrains and soybeans topped the list of imported agricultural commodities as usual. Imports of live feeder cattle rose fourfold, and imports of beef, pork, milk and dairy products also increased from their 1978 levels. Egg exports increased 49 percent relative to their 1978 level.

In summary, 1979 was a fairly normal agricultural year, both in terms of supply and demand and in terms of prices. Moreover, the economic conditions prevailing in 1979 were considered by many to be characteristic of the early 1980s, i.e. inflation rate at least 15 percent; the government making every effort to control food prices and limiting agricultural price increases; prices paid by farmers increasing at a faster rate than prices received; demand for meat growing much slower than in the past 20 years.

Enterprise Budgets

Technical relationships and prices are the main components of agricultural budgets. Both are subject to change.

The variation of coefficients (such as yields, feed conversion rates, and mortality rates), from one production cycle to the next, depends primarily on climatic and biological factors. Some of these can be influenced by the farmer, for example, by making decisions concerning fertilizer use, culling rates, length of fattening period, force molting versus flock replacement, etc.

Prices are primarily affected by supply and demand conditions and government policies. The farmer is basically a price taker. His influence on the price level of the products he sells and the inputs he buys is negligible.

In developing farm budgets the first step was to identify a type of farm which represents the average type of farm as reported by the different sources. Also, a hypothetical location of the farm was determined to be consistent with the data.[1]

Technical Coefficients. Using the available data for the groups of farms represented by the previously defined case study farm, the technical relationships used in the budgets were "the most common." When the sample of observations was large, averages were taken. These relationships were compared to experts' opinions and other extraneous information available. Since feed costs tend to be the

---

[1] Clearly there was a priority selection of geographical regions, for which the activity of collecting data followed. Selection of these regions was made in relation to their importance as producers of the commodities under consideration.

single most important cost in livestock enterprises, emphasis was placed in obtaining accurate feed conversion rates.

Prices. Table 4.1 presents monthly average prices received by farmers in 1979, the average 1979 price, the average 1978 price in 1979 pesetas and the price used in the budgeting analysis. Prices of cereals and milk are strongly influenced by institutional prices. For these commodities the prices used were those prevailing in May-June 1979. For lamb, the price used was the 1979 average for the "pascual" lamb. Prices of the other livestock products considered in this study were the average of the 1978 and 1979 prices at constant 1979 pesetas, by using the general index of prices received by farmers. This was done in order to diminish the seasonal effects or monthly fluctuations caused by unusual situations.

The following assumptions on labor, traction and cost of capital are made:

Crops:
- cost of one hour of labor = 175 pts. in Ebro
  = 150 pts. in Andalucia
- cost of one hour of tractor = 400 pts. (wheel tractor 60-80 HP)
- interest rate per annum = 11 percent

Livestock:
- units of labor are estimated in full time equivalence (FTE) per year (one FTE = 2400 hours). The cost of one annual FTE is 756,000 pts. or 14 monthly salaries at 40,000 pts. plus 35 percent for social

Table 4.1. Prices Received By Farmers.

	Jan. 1979	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec. 1979	Average 1979	Average 1978 at '79 pts.[a]	Price used in budgets
Wheat															
soft II (kg)	15.3	15.5	15.6	15.8	15.8	15.6	15.6	15.6	15.7	16.9	16.0	16.2	15.7		15.60
soft III (kg)	14.7	14.8	15.0	15.1	15.1	15.1	15.1	15.2	15.3	15.4	15.6	15.7	15.2		15.15
Barley (kg)	10.9	11.0	11.0	11.1	11.3	11.3	11.1	11.5	11.7	12.0	12.4	12.8	11.5		11.30
Corn (kg)	13.3	13.2	13.5	13.5	13.5	13.9	14.2	13.9	13.7	14.5	14.5	14.7	14.1		13.55
Chicken (kg lw)	77.0	83.0	84.4	89.0	88.9	84.3	92.6	84.9	74.0	73.4	71.1	73.4	81.3	73.4	77.36
Eggs (dozen)	56.7	53.9	55.2	55.5	53.2	50.3	51.4	51.0	54.8	58.3	56.4	60.6	54.8	61.5	58.12
Pig (kg lw)	97.5	98.8	98.7	99.2	96.8	96.4	96.1	93.6	93.9	91.6	92.3	94.7	96.0	94.9	95.45
Beef (kg lw)	144.7	148.9	146.9	146.6	142.9	142.7	140.2	135.8	138.6	137.2	134.4	133.1	140.7	132.4	136.55
Veal (kg lw)	167.6	171.9	173.9	178.3	174.7	178.4	173.2	169.1	171.9	171.3	167.8	166.9	172.0	158.7	165.35
Milk (liter)	18.9	19.1	18.9	19.0	19.0	19.3	19.3	19.9	20.0	19.7	19.7	20.1	19.4		19.3
Lamb (kg lw)	184.5	189.6	161.8	155.5	155.9	149.9	143.8	146.8	170.2	187.9	187.9	189.0	166.1		166.1

Sources:

Ministerio de Agricultura, Boletin Mensual de Estadistica Agraria, June 1980.

Idem, Adhesion Espana, Doc. No. 1-1.

[a] Conversion 1979 = 1.0, 1978 = .939.

security and taxes

- interest rate per annum = 16 percent.[1]

Feed-compound prices correspond to May-July 1979 as reported by the "Comision de Vigilancia de los Precios de los Piensos Compuestos" and published by the Ministry of Agriculture. The same source provides prices at which farmers and feed compounders purchase the different feeds. Those prices were used for the least-cost ration analysis performed in Chapter V. Other input prices were taken directly from different sources used in deriving each budget.[2]

The budgets developed in this chapter are presented so that the effect of technical factors and prices may be separated. This will allow the use of a different set of prices representing the hypothetical case of Spain being an EEC member in 1979 and the performance of a partial

---

[1] The difference between interest rates for crops and for livestock farmers results from a reflection of the data used. The length of the loan does not appear to be an explanation for this difference since capital requirements vary greatly among different activities. A possible explanation suggested by the author is that crop farmers, especially cereal producers, seem to have more facilities than livestock farmers to obtain subsidized credit. The Ministry of Agriculture provides subsidies to financial institutions for the reduction of interest rates, and there are several programs such as "purchase of seed and fertilizer," "crop promotion," "improvement of dry-land agriculture" in which farmers can participate and obtain subsidized credit. Unfortunately this argument cannot be backed empirically.

[2] The reader should refer to Appendix 1 for a complete listing of data sources. See also Tables 5.1 and 5.2 in Chapter V for a complete list of prices used in budgeting and least-cost ration analyses.

budgeting analysis assuming that technical relationships remain unchanged.

Cereal Crop Enterprises

In this section budgets for the production of the main cereal crops grown in Spain will be compared. Barley and corn are major animal feed products used both as straight feeds and in the production of feed compounds. Wheat is the major crop competing with barley on dry land and is also an important competitor of corn on irrigated land. Short of making an optimization model to analyze land allocation in Spain, a major undertaking in itself, costs and returns of growing wheat (soft-type III) and barley (six rows) on dry land in the Ebro region will be compared, as well as wheat (soft-type II) and hybrid corn production on irrigated land in the Ebro and in the Guadalquivir valleys.

Production systems on dry land. In 1979 the Ebro region accounted for 26.5 percent of the total national production of barley and 17 percent of total soft wheat production. The most extended practice is that of "año y vez" by which approximately 40 to 50 percent of the agricultural land remains fallow each year. The remaining 50-60 percent of the land is usually planted with either wheat or barley. Also when farm size exceeds 50 ha it is usual to find sheep and/or goats as a complementary activity. The amounts of seeds, and particularly fertilizer and herbicides, used per hectare vary according to different types of soils. There are, however, a few generalizations which can be made.

Barley:

- Seed: 120-180 kg/ha. Seeding takes place in fall.
- Fertilizer: It is usual to apply fertilizer before sowing. A few farmers topdress with nitrogen. The total amount of nitrogen applied is also a function of whether barley is planted on a previous fallow soil or following wheat or even barley.
- Harvest: Takes place in summer and is generally mechanized. Most farmers hire a harvester combine.
- Varieties: The main choice is between the two-row (beer-barley) and six-row (feed barley).[1] Yields are higher for six-row barley than for two-row barley, although the latter has a slightly higher price. In recent years, the proportion of six-row barley planted has grown faster than that of two-row. In 1979, 62 percent of the barley produced in the Ebro region was feed-barley and 38 percent was beer-barley.

---

[1] Beer-barley is also fed to animsls. In fact, it yields more digestible protein and less crude fiber than feed-barley, having a great potential for animal nutrition, especially for hogs. See J. Perez Lanzac, P. Corcuera Muguerza y A. Gonzalez Carbajo, "El Marco General de la Demanda de Alimentos Concentrados por la Ganadería Española y su Proyección para 1980," ITEA no. 33 (1978), pp. 13-28.

Wheat:

- Seed: The amount of seed planted per hectare ranges from 80 to 200 kg/ha, however, using 200 kilograms of seed per hectare seems to be the most common practice.
- Fertilizer: It is usual to apply a compound fertilizer before sowing and a topdressing of nitrogen.
- Harvest: Takes place in summer and is generally mechanized.
- Varieties: There are many varieties of soft wheat used, depending on the type of soil and the preference of the farmer. (The assumption was made that farmers grow a soft wheat, commercial type III, e.g. Aragón 03).

Table 4.2 presents the budgets for barley and wheat enterprises for a case study farm of between 50 and 150 hectares of dry land, mechanized (except for a hired combine harvester) and which follows the "año y vez" rotation. There is no accounting for straw as a source of revenue because, in many cases, it is left on the field as stubble for sheep. In other cases, it is burned, but sometimes it is baled and sold.

The government policy that allows farmers to obtain subsidized credit for the purchase of seeds and fertilizers has been taken into consideration in computing interest on circulating capital. Specifically, the amounts of capital

Table 4.2. Barley and Wheat On Dry Land.

Estimated Costs and Returns from Barley and Soft Wheat Activities on Dry Land in the Ebro Region (Pts. 1979)

	BARLEY -- six row Yield: 2,440 kg/ha			WHEAT soft-type III Yield: 1,900 kg/ha		
	Quantity	Pts/unit	Pts/Ha	Quantity	Pts/unit	Pts/Ha
I GROSS REVENUE						
Grain (kg)	2,440	11.3	27,572	1,900	15.15	28,785
Total Gross Revenue			27,572			28,785
II VARIABLE COSTS						
Seed (kg)	150	15	2,250	200	21	4,200
Fertilizer						
base: units of N	45	42.5	1,912.5	60	42.5	2,550
units of P_2O_5	45	35.5	1,597.5	75	35.5	2,662.5
units of K_2O	30	21.4	642	50	21.4	1,070
top dressing nitrogen				60	42.5	2,550
Herbicides			250			1,000
Preparation of Soil						
labor (hrs)	11	175	1,925	12	175	2,100
tractor (hrs)	10	400	4,000	10.5	400	4,200
Seeding						
labor (hrs)	1.5	175	262.5	1.5	175	262.5
tractor (hrs)	1.5	400	600	1.5	400	600
Fertilizing and Spraying						
labor (hrs)	3	175	525	3.5	175	612.5
tractor (hrs)	2.5	400	1,000	3	400	1,200
Harvesting (hrs)	1.2	2,500	3,000	1.2	2,500	3,000
Loading and Transport (kg)	2,440	.50	1,220	1,900	.50	950
Interest on Circulating Capital			703			766
Total Variable Cost			19,887.5			27,723.5
III GROSS MARGIN			+7,684.5			+1,061.5
Revenue per kg.		11.30			15.15	
Variable Cost per kg.		8.15			14.59	
Gross Margin per kg.		3.15			.56	

ASSUMPTIONS: Farm area: 50-150 has.
Mechanized except for harvester combine.

required for the purchase of seed and fertilizer have been deducted from the total circulating capital on which interest was calculated.

Wheat is more costly to produce than barley (40 percent higher per hectare), due primarily to greater fertilizer and herbicide requirements. Wheat also has a higher selling price (34 percent) than barley. The difference in profitability in favor of barley is mainly due to difference in yields. Indeed, wheat yields in the Ebro region on dry land appear not to be very competitive with barley yields. There are three additional aspects which need to be considered to understand the real competitiveness of wheat and barley on dry land. First, at planting time the farmer only knows the guaranteed prices, if published, which establishes a greater relative difference between wheat and barley prices as the one observed in practice.

As stated by Gros and Alejandre, prices received by farmers in 1979 were higher than intervention prices,[1] especially for barley. Recall that all wheat is purchased by the SENPA at the established price. Second, dry land cropping is highly dependent on climatic factors, hence, yields are bound to change greatly from year to year. Although barley yields are traditionally higher than wheat

---

[1] J. Gros Zubiaga y J. L. Alejandre Gimeno, "Costes de Producción de Trigo y de Cebada en Secano" (Departamento de Economía Agraria, INIA-CRIDA 03, Zaragoza. 1980 Mimeograph), p. 9.

yields, the proportion by which the former exceeds the latter changes (barley yields exceeded wheat yields by 42 percent in 1978, by 12 percent in 1979 and by 28 percent in the case study represented in Table 4.2). These differences influence the profitability of one crop relative to the other.

A third set of aspects to consider in understanding farmers' behavior in growing wheat will require more information about crop rotations, allocation of labor at different periods of the year and the availability of fixed assets on the farm. All of these considerations may be important in the decision making process of farmers.

Overall, the figures presented in Table 4.2 are consistent with the observation made by Gros and Alejandre. Farmers have a preference for planting barley, a crop which in 1978 occupied between 58 and 71 percent of the land of the farms surveyed by the RCAN in the Ebro region.[1]

Production systems on irrigated land. The Ebro Valley and the Guadalquivir Valley were chosen as the irrigated areas in which to compare wheat and corn production. Both areas, plus the Guadiana Valley (Badajoz) account for a large proportion of all corn produced in Spain. Moreover, they have shown a potential for increasing production, mainly due to an upward trend in yields.

A common characteristic in these irrigated lands is

---

[1] Ibid., p. 2.

that wheat is a main competing crop. Other important competing crops are barley and alfalfa in the Ebro Valley and cotton and sugarbeets in the Guadalquivir Valley.

Wheat and corn in the Ebro Valley. In 1978 total irrigated area in the Ebro region was 469.5 thousand hectares. Figure 4.1 shows the evolution of crops grown on the irrigated lands of the Ebro region. Barley follows a well-defined increasing trend. In fact the Ebro region is the one devoting a greatest proportion of its irrigated land to barley production. Area of wheat grown under irrigation follows an inverse trend to that of barley (though reversed in the 1975-76 crop year). During this same crop year the corn area decreased sharply.

Alfalfa area is not included in Figure 4.1 for lack of historical data. Current trends for 1978, 1979 and estimated 1980 are fairly stable, just over 60,000 ha (approximately the same level of corn area in 1978).

Table 4.3 suggests that corn is more costly to produce than wheat, particularly since it requires more fertilizer, more water and, hence, more labor. The gross margin per kilogram produced is substantially higher for wheat. Thus, at equal yields, wheat is much more profitable than corn. However, yields of hybrid corn varieties have been increasing to current levels between 6 and 8 MT per hectare, at 14 percent moisture content, compared to wheat yields of 3.8 to 5.5 MT per hectare, mostly type II varieties ("Siete Cerros" and "Anza" predominantly). Such a situation makes

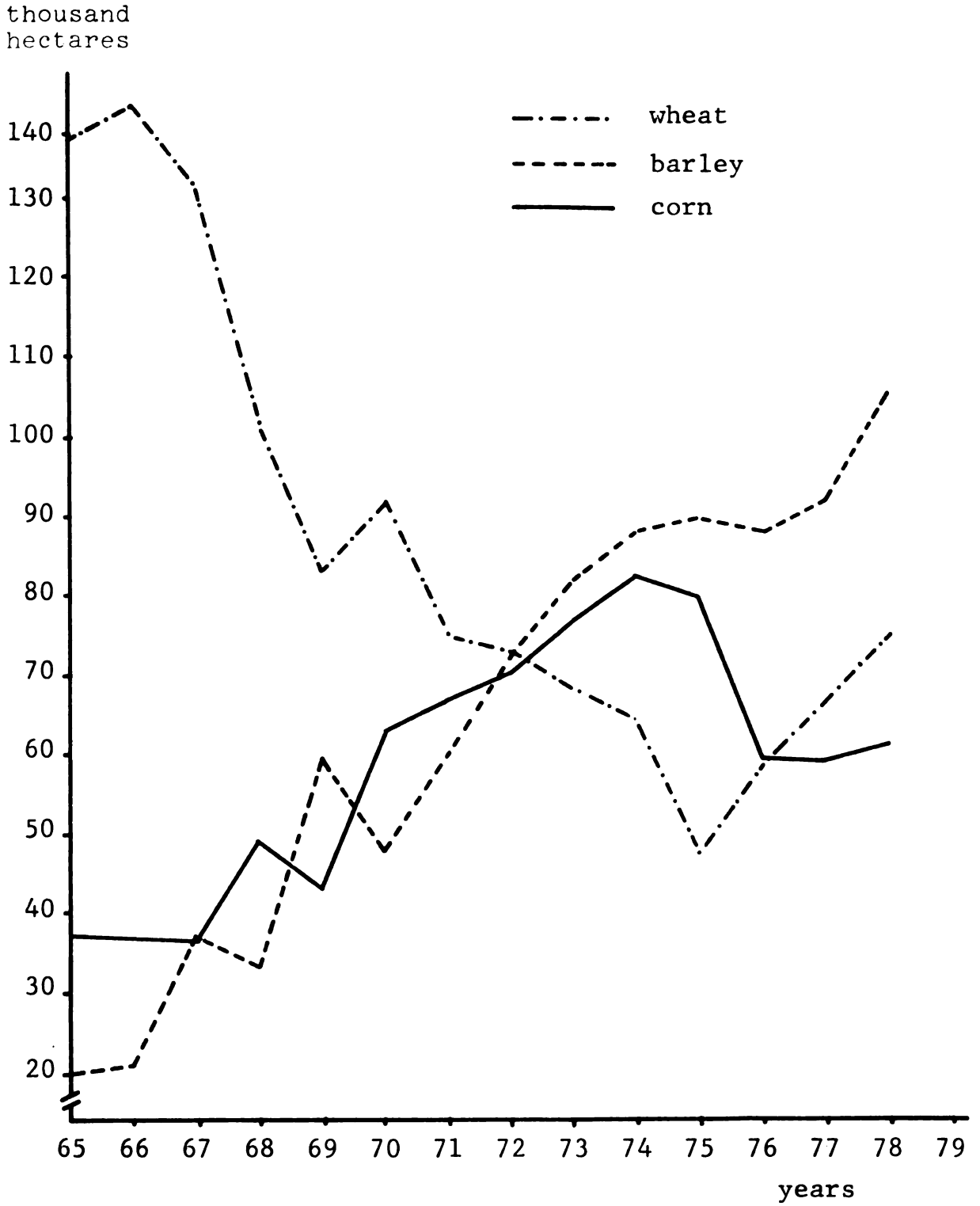


Figure 4.1. Irrigated Wheat, Barley and Corn Area in the Ebro Region (1965-1978).

Source: USDA. Selected Agricultural Statistics on Spain, 1965-76. Washington 1980.

Ministerio de Agricultura, Anuario de Estadística Agraria 1978.

Table 4.3. Wheat and Corn On Irrigation - Ebro Region.

Estimated Cost and Returns from Wheat and Corn Activities on Irrigated Land in the Ebro Valley (Pts. 1979)

	WHEAT soft-type II Yield: 4,300 kg/ha			CORN hybrid Yield: 6,800 kg/ha		
	Quantity	Pts/unit	Pts/Ha	Quantity	Pts/unit	Pts/Ha
I GROSS REVENUE						
Grain (kg)	4,300	15.6	67,080	6,800	13.55	92,140
Total Gross Revenue			67,080			92,140
II VARIABLE COSTS						
Seed (kg)	250	21	5,250	23	140	3,220
Fertilizer (kg)						
base: 12-24-12	450	18.12	8,154			
15-15-15				700	16.61	11,627
top dressing nitrogen	380	11.05	4,199	600	13.64	8,184
Herbicides			400			1,800
Other Phytopathologic Treatment						800
Preparation of Soil						
labor (hrs)	12	175	2,100	17.5	175	3,062.5
tractor (hrs)	10.5	400	4,200	15.5	400	6,200
Seeding						
labor (hrs)	1.5	175	262.5	2.5	175	437.5
tractor (hrs)	1.5	400	600	2	400	800
Fertilizing and Spraying						
labor (hrs)	4	175	700	26	175	4,550
tractor (hrs)	3.5	400	1,400	6	400	2,400
Irrigation						
labor (hrs)	12	175	2,100	35	175	6,125
energy			2,000			4,000
Harvesting (hrs)	1.5	2,500	3,750	2.5	2,600	6,500
Loading and Transport (kg)	4,300	.50	2,150	6,800	.50	3,400
Interest on Circulating Capital			2,050			3,471
Total Variable Cost			39,315.5			66,577
III GROSS MARGIN			+27,764.5			+25,563
Revenue per kg.		15.6			13.55	
Variable Cost per kg.		9.1			9.80	
Gross Margin per kg.		+6.5			+3.75	

ASSUMPTIONS: Farm area: 10-25 has.
Mechanized except for harvester combine.

wheat and corn very competitive on irrigated land as shown in Table 4.3.

The budgets presented in Table 4.3 have been developed for a farm of between 10 and 25 hectares of cropping land. It has been assumed it is mechanized except for a combine harvester.

On irrigated land, wheat has no government credit support. Credits for corn are given only to farms with a maximum corn area of five hectares. In 1976 and 1977 farmers allocated 25 to 45 percent of their land to corn. This suggests that the corn grown in the case study farm assumed in Table 4.3 amounts to approximately 5 hectares. The corn budget in Table 4.3 does not account for government credit. For those farms growing corn under the 5 hectare limit, interest costs would be 964 pesetas lower than the 3,471 pesetas shown in Table 4.3. They also would have obtained a gross margin of 26,527 pesetas, still slightly lower than the wheat gross margin.

Corn is harvested between the months of November and January and the great majority of farmers hire combine harvesters. A number of farmers with livestock harvest corn over a period of three to four months, depending on the needs of their animals. Another important reason for varying harvest dates is the moisture content of the grain at any given point. It has been observed, however, that most farmers sell their corn wet, with a moisture content above 20 percent. Of course, farmers selling dry corn (14

percent) get a better price (note that the corn budget in Table 4.3 is for corn adjusted -- yields and prices -- to a 14 percent moisture content).

Gros and Arieta found that a majority of farmers in the region thought wheat was more profitable than corn, and only a minority thought corn was more profitable.[1] These findings are consistent with the budgets presented in Table 4.3, namely, that wheat is more profitable than corn. However, when a farmer reduces costs on corn by receiving government credit and/or obtains a better price by drying his corn, then corn may become more profitable than wheat. Yields also play an important role and corn yields have been increasing more rapidly than wheat yields.

Before turning to the analysis of wheat and corn activities in Andalucía, it should be noted that several researchers in the Ebro regional center of INIA believe that there is a great potential in the area to produce corn fodder and corn silage as part of a three-crop cycle per year. This could be a good complement to beef cattle enterprises. Off-farm employment opportunities, more work per farmer required and investment requirements were mentioned as the main constraints preventing such a production system from being implemented. At present, most irrigated land produces one crop a year.

---

[1] J. Gros Zubiaga y F. Arieta y Gonzalez Tablas, El Maiz en Zaragoza (Departamento de Economía Agraria, INIA-CRIDA 03, Zaragoza, 1978), p. 31.

Wheat and corn in the Guadalquivir Valley. The following refers to the irrigated areas of the "Campiña Sevillana" and "Campiña Cordobesa," which are located in the southern side of the Guadalquivir river basin in Andalucía Occidental and account for 203,000 hectares. Andalucian farmers have gained the reputation of being the best in Spain. As an example, some of the highest yields in Spain for several crops are found in the Andalucian provinces. In Table 4.5, wheat and corn yields are assumed to be substantially higher than in the Ebro region.

The socio-economic conditions of Andalucian agriculture are important to understand farmers' decisions on land allocation. The traditional Andalucian crops are olives, cotton and sugarbeets, all labor intensive activities which provide temporary employment to a large agricultural labor force especially at harvest.

The farm structure is such that a relatively small number of medium size, often irrigated and capital intensive farms coexist with a large number of labor intensive farms, most of which are large in size and owned by an absentee landlord.[1] The competitiveness of the traditional crops relative to other crops require productivity gains, especially in labor. As production processes are mechanized part of the agricultural labor force becomes unemployed.

---

[1] In the context of this discussion a medium size farm can be thought of up to 100 ha and a large farm would be one having more than 100 ha of crop land.

The region does not offer much off-farm employment opportunities and, in the past, agricultural workers tended to migrate to more industrial regions. The current situation of generalized unemployment is limiting out-migration and, more importantly, it is bringing unemployed workers back to the Andalucian country side. The result is a high level of unemployment in agriculture and increasing social unrest.

The historical evolution of irrigated land allocation practices in Andalucia Occidental is shown in Figure 4.2. Total land under irrigation in 1978 accounts for 269,300 hectares of which 231,000 hectares are irrigated by the Guadalquivir river in the provinces of Cadiz, Cordoba and Sevilla. Of these 231 thousand hectares, 100 have been placed under irrigation by government action and 131 by private initiative.[1]

Clearly, cotton has been the dominant crop on irrigated land until 1975. Sorghum area could not be shown in Figure 4.2 for lack of historical data, but, after 1976 it rose sharply from its traditional 10,000 hectares to 32,500 hectares in 1978. In 1979 and 1980, however, sorghum irrigated area declined slightly from its maximum in 1978. In 1979 sugarbeet area continued to decline, wheat area continued increasing and cotton and corn area increased

---

[1] Grupo E.R.A., Las Agriculturas Andaluzas (Servicio de Publicaciones Agrarias, Madrid 1980), pp. 186-188.

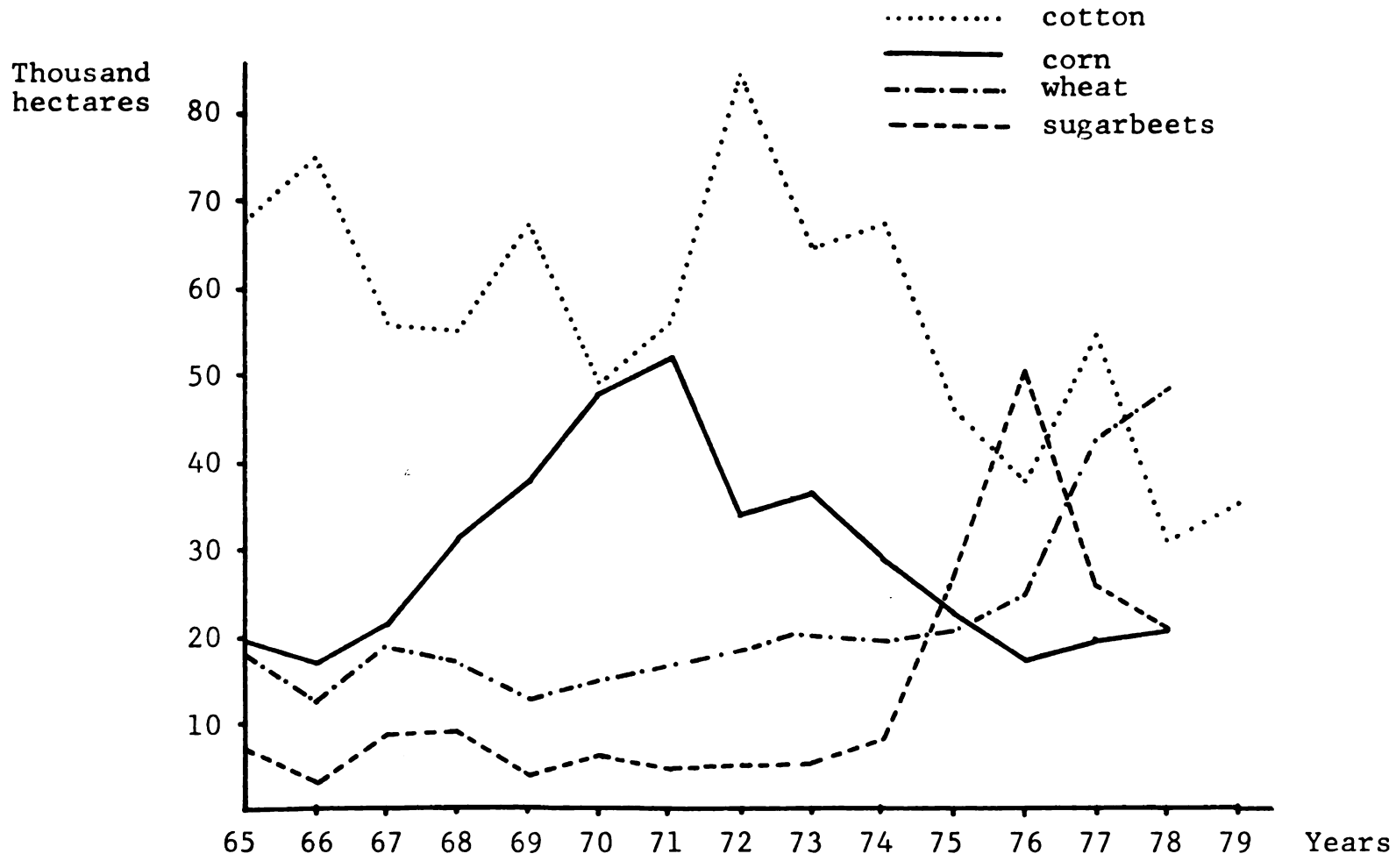


Figure 4.2. Irrigated Corn, Cotton, Sugarbeets and Wheat Area in Andalucia Occidental (1965-1979).

Source: USDA, Selected Agricultural Statistics on Spain, 1965-76. GRUPO E.R.A. Las Agriculturas Andaluzas.

slightly compared to 1978.

One should consider all of these crops in analyzing future land allocation patterns in the irrigated areas of Andalucia Occidental. Each crop has its own peculiarities.[1]

The following is a short summary of considerations to be made for each commodity as they face EEC membership.

In the past, government policies have influenced farmers' decisions via prices and input subsidies, especially in the sugarbeet subsector. Currently, the government is not promoting sugarbeet production and the outlook for this commodity is not very promising. Spanish prices are approximately 15 percent higher than in the EEC and yields are almost 30 lower than in the EEC (average 1973-78). In 1979 a five-year plan for the promotion of cotton production was negotiated between the government, farmers and agricultural workers. It calls for the expansion of total Spanish cotton area to 100,000 hectares, compared to 50,000 hectares in 1979, of which 76 percent were in Andalucia Occidental. In 1978, Spanish cotton prices were 55 percent higher than international (Liverpool) prices. Although Greece and Spain will be the only cotton producers in the EEC (and Europe), it is difficult to see how the other member countries will allow the Commission to maintain production at very high

---

[1] The interested reader will find an excellent, more in-depth, treatment of the subject in Grupo E.R.A., Las Agriculturas Andaluzas, Part Two, chapter on irrigated land by J. Calatrava, F. Gomez and C. Lovera.

support prices.

In 1976 total irrigated wheat area in Andalucia Occidental started to increase significantly from its previous fairly constant level, while sugarbeets and cotton declined. Calatrava et al., suggest three main reasons for the shift towards wheat: increase in agricultural wages, rising labor unrest and a high ratio of returns for management to capital investment.[1] There was a clear shift away from labor intensive activities toward more capital intensive activities. Moreover, wheat offers good possibilities for a second crop rotation. The sequence wheat-sorghum is becoming a very attractive alternative.

Since 1976, corn area in Andalucia Occidental has reversed a declining trend. Some people believe that the cotton boom and the sugarbeet boom are over and a corn boom is next. Others see limitations to dramatic corn area increases due to the competition from cotton (now being promoted) and wheat-sorghum and also due to technical limitations. An issue which becomes critical in this discussion is yields. Those who foresee a great potential in corn production base their judgement on the fact that in the last three years (1977-80) corn yields have increased much faster than during the historical trend of the last 20 years (illustrated in Table 4.4). Levels of 10,000 and 12,000 kg/ha

---

[1] J. Calatrava, F. Gomez y L. Lovera in Grupo E.R.A., Las Agriculturas Andaluzas, p. 221.

have been reached in the best lands of the "campiña."

Table 4.4. Yields of the Main Crops on Irrigation in Andalucía Occidental (kg/ha).

Years	Sugarbeets	Cotton	Wheat	Corn
1958-62	28,828	1,674	1,952	2,645
1963-67	29,822	1,965	2,145	3,679
1968-72	32,086	1,886	3,288	4,910
1973-79	37,006	2,152	3,804	5,421
Percent change 1958-62 to 1973-79	+28.5	+28.5	+95	+105

Source:

Grupo E.R.A., Las Agriculturas Andaluzas, p. 196.

Table 4.5 shows similar returns per hectare of corn compared to wheat. There has been no accounting for government credit given to corn producers. The farm size representative of the figures in Table 4.5 is that of between 5 and 25 hectares. This is assuming that the farm is mechanized, except for a combine hired for harvesting. As mentioned, yields can make a substantial difference in the relative profitability of each activity. Also note that rising energy costs may also be an important factor affecting the decisions made by farmers. These would adversely affect corn production, which uses substantially more traction, energy and nitrogen fertilizern than wheat.

In Andalucía Occidental, corn is also grown as a second crop in a rotation scheme, and it competes with sorghum,

Table 4.5. Wheat and Corn On Irrigation - Andalucia Occidental.

Estimated Costs and Returns from Wheat and Corn Activities on Irrigated Land in the Guadalquivir Valley (Pts. 1979)

	WHEAT soft-type II Yield: 4,500 kg/ha			CORN hybrid Yield: 8,000 kg/ha		
	Quantity	Pts/unit	Pts/Ha	Quantity	Pts/unit	Pts/Ha
I GROSS REVENUE						
Grain (kg)	4,500	15.6	70,200	8,000	13.55	108,400
Total Gross Revenue			70,200			108,400
II VARIABLE COSTS						
Seed (kg)	220	21	4,620	30	74	2,220
Fertilizer						
base: units of N	50	42.5	2,125	150	42.5	6,375
units of P_2O_5	100	35.5	3,550	100	35.5	3,550
units of K_2O	50	21.4	1,070	100	21.4	2,140
top dressing nitrogen	60	42.5	2,550	150	42.5	6,375
Herbicides			375			3,000
Other Phytopathologic Treatments			345			3,500
Preparation of Soil						
labor (hrs)	12	150	1,800	17.5	150	2,626
tractor (hrs)	10.5	400	4,200	15.5	400	6,200
Seeding						
labor (hrs)	1.2	150	180	2.5	150	375
tractor (hrs)	1.2	400	480	2.5	400	1,000
Fertilizing and Spraying						
labor (hrs)	4	150	600	26	150	3,900
tractor (hrs)	3.5	400	1,400	6	400	2,400
Irrigation						
labor (hrs)	12	150	1,800	35	150	5,250
energy			2,000			8,000
Harvesting (hrs)	1.1	2,500	2,750	2.5	2,600	6,500
Loading and Transport (kg)	4,500	.5	2,250	8,000	.5	4,000
Interests on Circulating Capital			1,765			3,708
Total Variable Costs			33,860			71,118
III GROSS MARGIN			+36,340			+37,282
Revenue per kg.		15.6			13.55	
Variable Cost per kg.		7.5			8.89	
Gross Margin per kg.		+8.1			+4.66	

ASSUMPTIONS: Farm area: 5-25 has.
Mechanized except for harvester combine.

sunflower and soybeans. As a second crop, corn yields are about 50 percent of yields obtained in producing corn as the main crop. This is because the growing period is shorter and also the use of fertilizer and water is reduced. Consequently, the gross margin of producing corn as a second crop is much lower than that shown in the budget for corn in Table 4.5, and it should be compared to the margin of the competitive crops previously mentioned. Calatrava et al. have estimated that there are at least 20,000 hectares which are not presently double cropped and have the potential to be planted with a second crop.[1]

Poultry Enterprises

Both broiler and egg activities are highly concentrated in specialized production units. Vertical integration and other forms of coordination are effective in linking the different phases of production. The budgets presented in this section show the cost structure for individual farmers. In the cases where feed manufacturers have contracts with broiler and egg producers, it is difficult to interpret the significance of the gross margins.

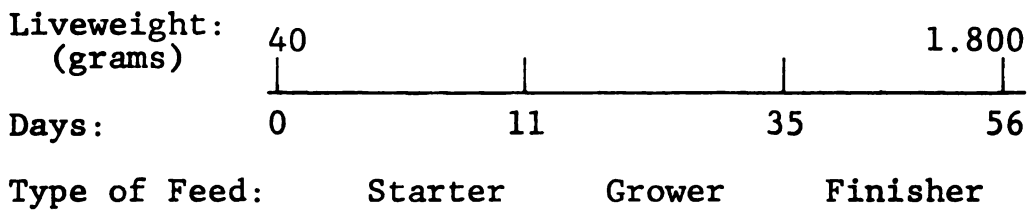
The profitability of each activity is determined for the integrating firm according to a different set of costs (e.g. cost of the different feeds and other inputs, processing costs, storage, distribution of feed, price paid to

---

[1] Ibid., p. 228.

farmers for fattened birds or per dozen eggs). In some cases, depending on the type of contract, "integrated farmers" do not have any direct interaction with the market. The usefulness of the budgets in these cases is that they will allow us to obtain estimates of changes in profitability under the C.A.P.

Broiler production. The following diagram describes the production process of raising a broiler chick to a liveweight of 1.8 kilograms. This process normally takes 56 days.



Feed conversion rates (i.e. ratio of kilograms of feed intake per one kilogram of liveweight gained) depend primarily on the climatic conditions of the poultry house.[1] Feed conversion rates are around 2.2 under current practices. This coefficient also accounts for feed eaten by broilers which die before reaching slaughter weight. (For the composition of feed rations, see Chapter V.) Broilers have an average meat conversion rate of 83 percent, i.e. 1.8 kilograms of liveweight converts into 1.5 kilograms of carcass (including head and feet).

---

[1] The sex of the birds is also an important factor, and most farmers only grow male chicks.

The budget presented in Table 4.6 was developed for an operation of 20,000 birds per cycle, 5 cycles a year. This size is representative of a good number of industrialized farms, which form the bulk of broiler production in Spain. The farm is assumed to have no cropland. Note also that the price structure presented in Table 4.6 is at the farm level; loading and transportation costs of the birds are not included. Usually the farmer has to bear these costs. The gross margin of almost 20 pesetas per bird, represents a 16.24 percent return above variable expenditures. Estimating fixed costs at 3.5 pts/bird, we have a net farm income per bird of 12.74 pesetas. The cost of feed represents 74.5 percent of total variable costs of production, and the cost of the baby chick represent 14.2 percent. These results are consistent with the general knowledge of costs of production in broiler activities and with the observations of the RCAN (81.2 percent cost of feed and 14.2 percent cost of chick).

Egg production. The diagram below describes the egg production cycle which generally starts when the layer is ready to be productive. The process of growing pullets takes approximately 20 weeks. The lifecycle of a laying hen is divided into two periods, grow-out and the productive cycle whose duration and phases depend on the farmer's decisions.

Table 4.6. Broilers.

Estimated Costs and Returns from Broilers (Pts. 1979)

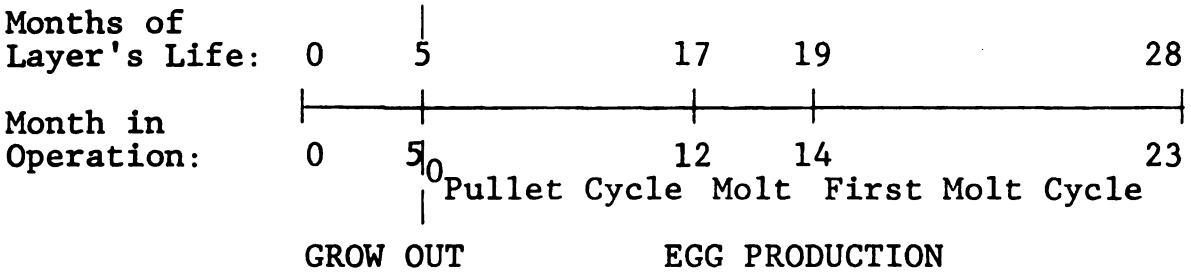
		Feed Conversion	Quantity	Pts/unit	Pts/bird
I	GROSS REVENUE				
	Broiler (live)		1.8 kg.	77.36	139.25
II	VARIABLE COSTS				
	Feed	2.2	1.8 kg.	22.5	89.10
	Baby chicks		1.045 birds[a]	16.28	17.01
	Labor		.58 FTE	756,000	4.38[b]
	Medicants & Vet.				2.50
	Utilities				2.80
	Insurance and Taxes				.30
	Interest on Circulating Capital				3.71
	Total Variable Cost				119.80
III	GROSS MARGIN				+19.45

Total gross return of operation per year: 19.45 pts. x 100,000 chickens = 1,945,000 pts.

ASSUMPTIONS: Certified breed
20,000 birds per cycle
5 cycles per year
Liveweight at slaughter: 1.8 kg.
Feed conversion: 2.2 kg. feed/kg. liveweight
Mortality: 4.5%
Labor requirements: .58 full time equivalence (FTE) a year (1 man = 35,000 birds/cycle)

[a] Accounts for mortality.

[b] .58 x 756,000 pts/year ÷ 100,000 birds/year = 4.38 pts/bird.



In egg production operations the set of choices to be made regarding husbandry practices are divided into five possible phases. In sequential order they are: (1) pullet cycle of a maximum of 15 months, (2) first molt which requires 8 weeks, (3) first molt cycle of a maximum of 10 months, (4) second molt -- 8 weeks -- and (5) second molt cycle -- maximum 10 months.[1] In Spain the most common practices are to keep the layers for a period of 12 to 14 months and then either replace the flock, culling the hens, or force molting and keep the layers for a second productive cycle for a maximum of 10 months. Technically, however, there are a very large number of possibilities regarding the length of productive cycles and the time to replace the flock. Observed production levels in the large specialized units of Northeastern Spain are 20 dozen eggs per layer a year (pullet cycle) and 13 dozen eggs per layer for a second productive cycle of 10 months (first molt cycle).

The budget presented in Table 4.7 has been developed for an operation which keeps the layers for 12 months (no

---

[1] Adopted from Allan P. Rahn, "A Strategic Planning Model for Commercial Laying Flocks." Poultry Science, vol. 56, no. 5 (September 1977), p. 1580.

Table 4.7. Eggs.

Estimated Costs and Returns from an Egg Operation (Pts. 1979)

		Feed Conversion	Quantity	Pts/unit	Pts/dozen eggs
I	GROSS REVENUE				
	Eggs		1 doz.	58.12	58.12
	Cull hens		1.650 kg.	40	3.30[a]
	Total Gross Revenue				61.42
II	VARIABLE COSTS				
	Feed	1.95	1 doz.	18.1	35.30
	Hen 20 weeks		1.18 hens[b]	230	13.57
	Labor		.6 FTE	756,000	1.51[c]
	Medicants & Vet.				.40
	Utilities				.60
	Taxes and Insurance				.07
	Interest on Cost of Feed				1.45
	Total Variable Costs				52.90[d]
III	GROSS MARGIN				+8.52

Total gross return of operation per year: 8.52 pts. x 300,000 doz. eggs = 2,556,000 pts.

ASSUMPTIONS: Certified breed
15,000 birds per cycle, starting at 20 weeks old
1 cycle a year
Yield: 20 dozen brown eggs/layer
Feed conversion: 1.950 kg. feed/dozen eggs
Mortality: 1.5% a month = 18% a year
Labor: .6 full time equivalence (FTE) a year
Mechanized recollection of eggs

[a] 1.650 kg. x 40 pts/kg ÷ 20 doz. eggs = 3.30 pts/doz. eggs.

[b] Accounts for mortality.

Table 4.7. (Continued)

[c] .6 x 756,000 pts/year ÷ 300,000 doz. eggs/year = 1.51 pts/doz. eggs.

[d] If collection of eggs is non-mechanized, then labor requirements are estimated at 1.25 man and total variable costs increase to 54.54 pts/dozen eggs.

molting) and an average production of 20 dozen brown eggs per layer.[1] The price received by farmers per dozen eggs represents the average obtained given the production of eggs of different qualities.[2] Feed conversion is of 1.950 kilogram of feed per dozen eggs (the normal weight of an egg is 57.5 grams or 690 grams per dozen). Feed conversion rates are better (lower) for the first productive cycle than for the productive cycle following a molt.

A "typical" farm, housing 15,000 birds and having mechanized egg collection facilities, has been assumed. Labor requirements are .6 FTE a year (one man could optimally carry 25,000 layers). Had the farm not been mechanized for egg collection, labor requirements would be expected to increase to 1.25 FTE, or one man for every 12,000 birds. Total estimated variable costs for eggs at the farm level are of 52.9 pesetas per dozen. As in the case of the broiler farm, we have not accounted for

---

[1] Brown eggs in Spain sell, at the farm level, at a price 4 to 10 percent higher than the price of white eggs.

[2] As observed in a group of 20 non-integrated egg farms, the results of egg production in 1979 were:

Commercial Standard	Percentage of Total Production
Super-extra	5.11
Extra	37.00
First Category	30.79
Second "	15.34
Third "	4.34
Fourth "	1.20
Fifth "	0.23
Dirty/Broken	5.73

transportation costs of the eggs from the farm to the assembling and packing plant. In most cases, the farmer has to bear these costs. Eggs are usually shipped in boxes of 360.

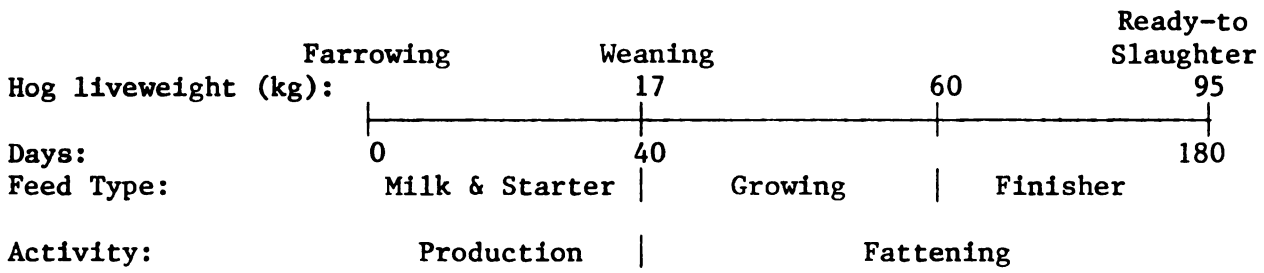
Egg production farms generally require substantial capital investment in buildings, installations and machinery. Fixed costs have been estimated at 4 pts. per dozen eggs. If this estimate is accurate, the gross margin of 8.52 pesetas yields a farm income of 4.52 pesetas per dozen eggs. Bear in mind that the price conditions of the egg market in 1978 and in 1979 were very different (refer to Table 4.1). At the average 1979 price of a dozen eggs, the budget in Table 4.7 would have yielded a 1.9 pesetas gross margin, insufficient to cover fixed costs. In 1979, however, the market was saturated due to excess supply. The average 1978-79 price is considered to be a better indicator of normal market conditions.

Swine Enterprises

There are typically three types of swine enterprises: (1) Production farms which produce weaners and breeding herd replacements; (2) hog fattening farms which produce 90-100 kilogram fattened ready-to-slaughter hogs; and (3) closed cycle farms which perform both activities, i.e. production, growing and fattening of hogs. This latter type of farm is the most interesting to study since it is being actively promoted, although the largest number of swine farms in the Northeast of Spain are those specializing in hog fattening

or in the production of weaners and replacements.

In this section budgets will be presented for each one of these types of swine farms. The complete hog cycle is described below:



Closed Cycle

It takes six months to raise a hog to 95 kilograms liveweight. This is done in two phases. The lactation period is the first and lasts for approximately five to six weeks (semi-early weaning). When the piglet is weaned, it normally has a weight of 17-18 kilograms. At this point the pig is transferred to intensive feeding, either to another farm (fattening farm) or within the same farm.

In the so-called production farms, the productive cycle starts with the service of the sow. The usual number of sows per boar varies between 20 and 33. The gestation period lasts for 114 days during which the sows are fed either an all-concentrate ration or a mixture of forage (alfalfa, vetch hay, etc.) or a root (potatoes, sugarbeet, etc.) and concentrate feed. During the lactation period, sows need to meet maintenance plus milk production nutritive requirements. This is achieved by feeding an all-concentrate ration.

In intensive hog growing and fattening operations one

can identify three main practices. First, there are those farmers who use two types of commercial feeds as shown previously. It is usual to feed "ad libitum", although there is an increasing trend towards rationing the feed quantity during the second period (after 60 kg), or even throughout. Second, there are those who use a single commercial feed throughout the fattening period. They also may combine an ad libitum and rationed feeding pattern. Finally, there are a number of farmers who buy commercial feed additives (protein, vitamins and minerals) and mix them with their own cereal ration. (For a more detailed treatment of the composition of feed rations, see Chapter V.) The budgets presented in Tables 4.8, 4.9 and 4.10 illustrate the economics of producing hogs in closed cycle (Table 4.8), producing weaners (Table 4.9) and producing feeder pigs starting at weaning (Table 4.10).

The case study farm represented by Table 4.8 is growing in importance. This reflects the objective of creating production units free of the African Swine Fever and eventually generating a potential pork meat export base. Government support for this type of enterprise only provides subsidized credit for the initial investment, or transformation of "open" operations into closed cycle operations. However, such a policy does not affect our case study farm since we assume it is not its first year of operation. Fixed costs for this type of farm have been estimated at 650 pesetas per hog. When deducted from a gross margin of

Table 4.8. Swine.

Estimated Costs and Returns from a Breeding and Feeding Swine Operation - Closed cycle - (Pts. 1979)

		Feed Conversion	Quantity	Pts/unit	Pts/hog Produced
I	GROSS REVENUE				
	Fattened live hogs		95 kg.	95.45	9,067.75
	Cull sows and boar		32 anim.	11,500	241.31
	Total Gross Revenue				9,309.06
II	VARIABLE COSTS				
	Feed: 15 open sows		730 kg[a]	16	114.89
	100 sows		1,040 kg[b]	16	1,091.15
	5 boars		985.5 kg[c]	16	51.70
	1,600 weaners		22 kg	23.5	542.43
	1,525 hogs	3.2	78 kg	17.5	4,368
	35 replace.		346 kg	16	127.06
	Mortality: 40 hogs	3.0	35 kg	17.5	48.20
	Labor		1.5 FTE	756,000	743.61
	Other				383.30[d]
	Interest on Circulating Capital				597.63
	Total Variable Costs				8,067.97
III	GROSS MARGIN				+1,241.09

Total gross return of operation per year: 1,241.09 pts. x 1,525 hogs = 1,892,662 pts.

ASSUMPTIONS: Crossing breed
115 sows of which 100 productive and 5 boars
2 litters a year. Litter size: 8 piglets (weaned)
Weaners transferred to feeding at 17 kg.
Liveweight at slaughter: 95 kg. (@ .7 = 66.5 kg. carcass weight)
Feed Conversion for hogs: 3.2 kg. feed/kg liveweight
Mortality: 2.5% in hogs and sows/boars
Replacements: 35 sows/boars per year (raised on the farm)
Total number of hogs sold: 1,525
Labor: 1.5 full time equivalence (FTE) a year.
(1 man = 75 sows and progenity).

Table 4.8. (Continued)

---

[a] 2 kg. feed/day x 365 days = 730 kg.

[b] Lactation: 6 kg. feed/day x 40 days x 2 litters/year = 480 kg. Gestation: 2.18 kg. feed/day x 128 days x 2 litters/yr = 560 kg.

[c] 2.7 kg. feed/day x 365 days = 985.5 kg.

[d] (370 pts. x 1,560 hogs + 185 pts. x 40 hogs) ÷ 1,525 hogs = 383.30 pts/hog.

1,241.09 pesetas, it yields a net farm income of 591.1 pts./hog. The gross margin obtained in the budget of Table 4.8 represents a 15.38 percent revenue above variable costs. The most important single cost is the purchase of feed which represents 78 percent of the total variable cost.

The weaner operation shown by Table 4.9 yields revenues which are 17.54 percent above total variable expenditures which, as a measure of profitability, is higher than the level of the closed cycle operation. However, the absolute level of returns of the operation per year is much lower given the shorter cycle of production.

In preparing the budgets, it was observed that weaner prices are subject to very sharp fluctuations. As an example, weaner prices in March 1980 (in Bellpuig) were 40% higher than in October 1979, and by May 1980 (two months later) they were back again to the October 1979 price. There may be some strong seasonal patterns in the supply of weaners, but since there are no official historical statistics on weaner prices this could not be tested. Fixed costs per weaner have been estimated at 375 pesetas which, once deducted from the gross margin, would yield a net farm income of 107 pesetas per weaner.

The budget in Table 4.10 shows that of the three types of swine enterprises, the pig fattening activities were the least profitable. The estimated gross margin represented a 2.78 percent return above total variable cost. This gross margin of 324.2 pts./hog is just enough to generate a

Table 4.9. Swine - Weaners.

Estimated Costs and Returns from a Weaner Operation (Pts. 1979)

		Quantity	Pts/unit	Pts/weaner
I	GROSS REVENUE			
	Weaners	1,600 anim.	3,000	3,000
	Cull sows and boar	32 anim.	11,500	230
	Total Gross Revenue			3,230
II	VARIABLE COSTS			
	Feed: 15 dry sows	730 kg.	16	109.5
	100 sows	1,040 kg.	16	1,040
	5 boars	985.5 kg.	16	49.27
	1,600 weaners	18 kg.	23.5	423
				1,621.77
	Replacements	35 sows	15,000	328.12
		1 boar	35,000	21.87
	Labor	1 FTE	756,000	472.50
	Medicants & Vet & Other			115
	Interests on Circulating Capital			188.7
	Total Variable Costs			2,747.96
III	GROSS MARGIN			482.04

Total gross return of operation per year: 482.04 pts. x 1,600 hogs = 771,264 pts.

ASSUMPTIONS: Crossing breed
115 sows, of which 100 productive and 5 boars
2 litters a year. Litter size: 8 piglets (weaned)
1,600 weaners sold at 18 kg. (liveweight)
Mortality: 2.5% (sows/boars)
Replacements are bought
Labor: 1 full time equivalence (FTE) a year

Table 4.10. Swine - Growing and Fattening Pigs.

Estimated Costs and Returns from a Feeding Swine Operation (Pts. 1979)

		Feed Conversion	Quantity	Pts/unit	Pts/hog
I	GROSS REVENUE				
	Hog (live)		95 kg.	95.45	9,067.75
	Total Gross Revenue				9,067.75
II	VARIABLE COST				
	Feed	3.25	78 kg.	17.5	4,436.25
	Weaner		1.035 anim.[a]	3,000	3,105.
	Mortality		105 kg.	17.5	64.3[b]
	Labor		1 FTE	756,000	432.[c]
	Medicants & Vet				110.
	Water & Electricity				70
	Interest on Circulating Capital				526.
	Total Variable Costs				8,743.55
III	GROSS MARGIN				+324.2

Total gross return of operation per year: 324.2 pts. x 1,750 hogs = 567,350 pts.

ASSUMPTIONS: Crossing breed
700 pigs per cycle (120 days). 2.5 cycles a year
Initial liveweight: 17 kg.
Final liveweight: 95 kg.
Feed conversion: 3.25 kg. feed/kg. liveweight
Mortality: 3.5%
Labor: 1 full time equivalence FTE a year.

[a] Accounts for mortality.

[b] 105 kg feed x 17.5 pts/kg feed x 0.035 (proportion of death pigs) = 64.3 pts.

[c] 1 FTE x 756,000 pts/year ÷ 1,750 hogs/year = 432.- pts/hog.

positive net farm income when fixed costs are estimated at 300 pts./hog. Fattening farms are the least specialized of the three swine enterprises. They require less husbandry and managerial skills due to the relative simplicity of the production process. In addition, this type of farm often has some agricultural land base which is used as a complementary source of income, by producing a cash crop or feedgrains which are consumed on the farm.

Note that the feed conversion and mortality rates assumed in this instance are higher than for the closed-cycle operations. This is primarily due to two factors: (1) the farmer has no control over the genetic and biological conditions of the hogs when he purchases them as feeder pigs or as weaners, and (2) the animals are subjected to stress during transportation. If moved a long distance, their feed conversion rate during the first weeks in the fattening farm is poor compared to hogs raised and fattened on the same farm.

There has been a definite improvement of feed conversion rates over time. The observation of a large number of fattening farms integrated with a feed manufacturing firm (accounting for over 170,000 hogs produced in 1979) showed an improvement in feed conversion from 3.531 kg. of feed per kg. of liveweight as the average in 1975 to 3.245 in 1979.

The three swine budgets were developed using feed prices paid by producers as reported by the Ministry of

Agriculture. In comparing prices reported by some of the largest feed manufacturers in the Northeastern region of Spain differences can be observed. Of course part of these differences are due to product differentiation (not all feed compounds -- say for 60-95 kg. hogs -- have exactly the same characteristics). Another portion of the differences may be explained by price discrimination, whereby integrated producers pay at cost price and non-integrated producers pay the regular commercial price.

Finally, a word about African Swine Fever. It is very serious. If a farm is hit by the disease, all hogs have to be killed and they cannot be replaced for a few weeks. However, considerable progress has been made in controlling the disease at early stages and, more importantly, in limiting its expansion. A recent survey of 260 swine farms in the province of Huesca (Ebro) showed only 3 farms being affected by African Swine Fever.[1]

Cattle Enterprises

As we have seen, the beef and dairy sectors are linked. Most beef-cattle come from dairy cows, but milk and beef production are increasingly specialized activities. There is a clear movement of calves from the Northwestern dairy farms to farms in cereal producing areas and to intensive

---

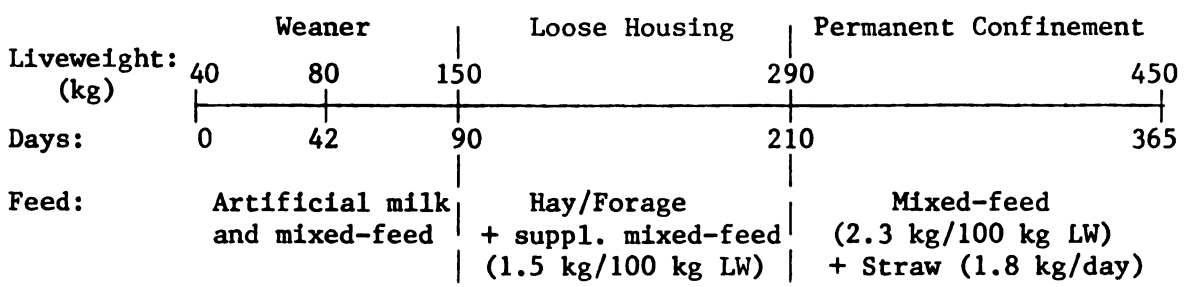
[1] INIA-CRIDA 03, "Cuestionario de Explotaciones de Ganado Porcino." (Department of Agricultural Economics, unpublished). Survey carried out in Summer, 1979.

farm units close to major consumption centers.

Due to the biological characteristics of ruminants, the farmer can choose from relatively wide variety of diets for his cattle. The first consideration regarding how to feed cattle is likely to be based on the resources on the farm, i.e. cropping land, cropping possibilities and pasture land available. The larger the farm, the greater the feeding alternatives. Only farms with a small land base are forced to feed an all-concentrate ration.

The budget presented in Table 4.11 considers the production of beef on a semi-intensive system. This illustrates the practices in some cereal regions, especially Ebro. The budgets in Tables 4.12 and 4.13 refer to the production of beef and veal, respectively, on an intensive system in which the only non-feed concentrate fed is straw. Table 4.14 illustrates the costs and revenues of a larger-than-average dairy farm in Northern Spain.

Beef production. (a) Semi-intensive system. These systems feed cattle forage and a supplementary feed-mix and are kept in loose housing first and in permanent confinement for the finishing phase. The diagram below illustrates a typical semi-intensive cattle fattening production system.



Calves are usually raised from a few days old to a live-weight of 450 kg which translates into 250 kg carcass (55.5 percent yield). The process lasts one year. Another common practice is to purchase weaned calves at around 100 kg of liveweight and raise them to a slaughter weight of 500 kg. Furthermore, some farms have their own cows and produce their own calves. In this case the farmer wants calving to take place in February so that cows and calves can graze during spring (7 cows plus calf per hectare). In June the calves are weaned and remain on pasture while their mothers are confined. During the summer months, until October, a hectare of irrigated pasture may well carry 7 or 8 calves. In October the calves will be confined for five months of finishing with a mixed-feed ration.

The budget in Table 4.11 is derived for a farm following a production system as depicted in the previous diagram. The land base has at least 10 has. of irrigated land. In this system calves gain 1.15 kilograms of liveweight per day, and they put on 410 kilograms. The cycle lasts 356 days.

This case study farm produces all its forage and/or hay requirements on the farm and it also mixes the feed ration on the farm, purchasing the different inputs. These are

Table 4.11. Beef - Type I (Semi-intensive feeding).

Estimated Costs and Returns from a Beef Operation (Pts. 1979)

		Quantity	Pts/unit	Pts/animal
I	GROSS REVENUE			
	Yearlings (live)	450 kg	136.44	61,447.5
	Total Gross Revenue			61,447.5
II	VARIABLE COSTS			
	Feed: up to 90 days:			
	powder milk	22 kg	43	946
	feed mix	2 kg/d.	17.75	1,704[a]
	from 90 to 210 days:			
	feed mix	3.3 kg/d.	12	4,752[b]
	forage	14 kg/d.	3	5,040[c]
	from 210 to 365 days:			
	feed mix	8.5 kg/d.	12	15,810[d]
	straw	1.8 kg/d.	3	837[e]
				29,089
	Weaners	1.03 anim.[f]	16,500	16,995
	Mortality	0.03 anim.	6,800	204
	Labor	.5 FTE	756,000	3,780[g]
	Medicants & Vet.			250
	Transport & Other Variable Expenses			675
	Interest on Circ. Capital			8,159
	Total Variable Costs			59,152
III	GROSS MARGIN			2,295.5

Total gross return of operation per year: 2,295.5 pts. x 100 calves = 229,550 pts.

ASSUMPTIONS: 100 calves on a 10 ha. irrigated farm (one year cycle)
Breed: Friesian or Brown Swiss x Charolais
Initial liveweight: 40 kg
Final liveweight: 450 kg (@ 55.5 % = 250 kg carcass weight)
All forage produced on the farm, other feeds purchased and mixed on the farm.
Mortality: 3%
Labor: .5 full time equivalence (FTE) a year.

Table 4.11. (Continued)

---

[a] 2 kg feed/day x 17.75 pts/kg feed x 48 days = 1,704 pts.

[b] 3.3 kg feed/day x 12 pts/kg feed x 120 days = 4,752 pts.

[c] 14 kg for./day x 3 pts/kg for. x 120 days = 5,040 pts.

[d] 8.5 kg feed/day x 12 pts/kg feed x 155 days = 15,810 pts.

[e] 1.8 kg str./day x 3 pts/kg str. x 155 days = 837 pts.

[f] Accounts for mortality.

[g] .5 FTE x 756,000 pts/year ÷ 100 animals/year = 3,780 pts/anim.

purchased separately (i.e. not mixed)[1] or as a SENPA cereal mix to which the farmer adds purchased protein, vitamins and minerals.[2]

The running of the farm requires 1,200 hours of labor (or half a FTE). Labor efficiency of the farm could be improved since it has been estimated that one may would optimally carry 300 calves. The 450 kg calf produced is an "añojo." The budget presented in Table 4.11 yields a gross margin of 2,295.5 pesetas per calf, or a 3.9 percent return above variable expenses. Fixed costs per animal are relatively low in most beef cattle operations. They are estimated at 6 pesetas per calf for the farm represented in Table 4.11.

(b) Intensive systems. The intensive system being considered here is that of a calf fattening operation which keeps the animals in permanent confinement. The case study farm represented in Table 4.12 is assumed to purchase calves during the lactation period and feed them with only concentrates after weaning, to a liveweight of 540 kilograms (or

---

[1] A possible feed-mix of 85% content of dry matter and 16% of digestible protein is the following:

Barley	.70	@ 11	pts. = 7.7
Alfalfa dehydrated	.20	@ 10.2	pts. = 2.04
Bran	.055	@ 10	pts. = 0.55
Urea	.025	@ 15	pts. = 0.375
Minerals - Vitamins	.02	@ 59	pts. = 1.18
	1 kg		11.845 pts.

[2] Researchers in the Ebro region have identified a great potential for corn silage feeding, but this is still a rare practice.

Table 4.12. Beef - Type II (Intensive feeding).

Estimated Costs and Returns from a Beef Operation (Pts. 1979)

		Feed Conversion	Quantity	Pts/unit	Pts/animal
I	GROSS REVENUE				
	Yearlings (live)		540 kg.	136.55	73,737
	Total Gross Revenue				73,737
II	VARIABLE COSTS				
	Feed: artificial milk		20 kg.	55.02	1,100.40
	starter		80 kg.	17.75	1,420.
	feed compound	4.9	400 kg.	16.30	31,948
	straw		1 kg/d.	3	975[a]
					35,443.40
	Weaner		1.03 anim.[b]	22,500	23,175.
	Mortality		0.03 anim.	5,700	171
	Labor		1 FTE	756,000	2,520[c]
	Other Variable Costs				1,500
	Interest on Circulating Capital				10,049.5
	Total Variable Costs				72,858.9
III	GROSS MARGIN				+878.1

Total gross return of operations per year: 878.1 pts. x 300 animals = 263,430 pts.

ASSUMPTIONS: 300 calves in permanent confinement (one year cycle)
Breed: Friesian or Brown Swiss x Charolais
Initial liveweight: 100 kg.
Final liveweight: 540 kg. (@ 55.5 % = 300 kg. carcass weight)
All feed purchased
Feed conversion: 4.9 kg. feed/kg. liveweight
Mortality: 3 percent
Labor: 1 full time equivalence (FTE) a year

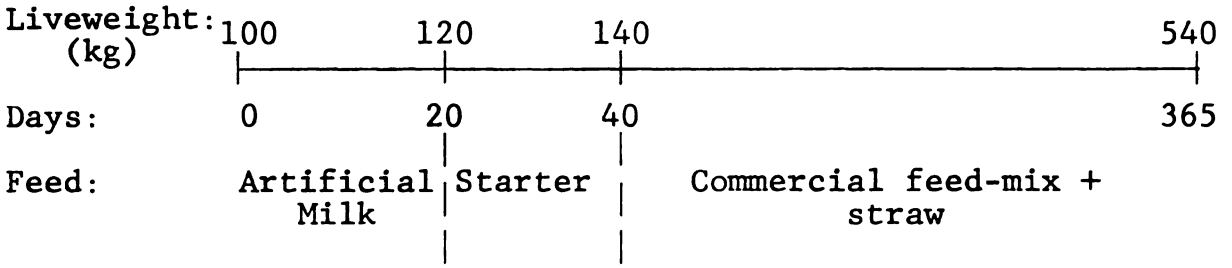
[a] 1 kg. str./day x 3 pts/kg. str. x 325 days = 975 pts.

Table 4.12. (Continued)

[b] Accounts for mortality.

[c] 1 FTE x 756,000 pts/year ÷ 300 animals/year = 2,520.0 pts/anim.

300 kg. carcass). The process is depicted in the diagram below:



This intensive production system is representative of some farms in the Northeast. However, they can also be found in typical cattle fattening regions (e.g. Duero, Ebro) and close to consumption centers where land for agricultural use is scarce.

The budget in Table 4.12 is developed for a beef cattle farm of these characteristics. This farm is assumed to be labor efficient. A feed conversion rate of 4.9 kilograms of feed per kilogram of liveweight has been used for the fattening period following the initial six weeks. This figure is representative of intensive feeding farms. The daily liveweight gain on this farm is 1.2 kilograms, higher than in the case of semi-intensive feeding. Table 4.12 shows that the feed bill per kg. of liveweight gained on the intensive type of farm is 14 percent higher than on the semi-intensive farm. The gross margin is not comparable to the farm represented by Table 4.11 due to the difference in final liveweight, labor requirements and size of enterprise. The gross margin shown in Table 4.12 represents a 1.2 percent return above variable costs. Total fixed costs per animal

for the intensive beef farm were estimated at 5 pesetas, lower than in the previous case due to economies of scale.

Veal production. Veal meat is suffering a recession in demand and is becoming a luxury good. More than 50 percent of the total veal production is concentrated in Galicia and Catalunya. In Catalunya, however, one finds production on intensive systems. Veal production in Galicia tends to be a residual activity from dairy farms, hence, representing a loss of potential beef production.

The intensive production system of our case study farm is very simple. The calf is bought as a weaner and raised to a liveweight of 300 kilograms. It is fed artificial milk and some concentrate for the first two months (to approximately 100 kg) and only concentrate and straw for the following five months of fattening (up to 300 kg). The complete cycle, therefore, lasts for seven months. For the fattening period (between 100 and 300 kg) the feed conversion rate is 4.6 kg of feed/kg of liveweight. As expected, it is lower than for beef cattle, since the animal has better conversion rates the younger it is. The budget in Table 4.13 shows a gross margin of 764.4 pesetas per calf or a 1.56 percent return above variable costs. Fixed costs per animal for such a farm were estimated at 5.45 pesetas. It is generally agreed that expansion limitations of veal production are going to come from the demand side. Some even predict a downward shift of the price-quantity demand relationship.

Table 4.13. Veal.

Estimated Costs and Returns from a Veal Operation (Pts. 1979)

	Feed Conversion	Quantity	Pts/unit	Pts/calf
I GROSS REVENUE				
Calf (live)		300 kg.	165.35	49,605
Total Gross Revenue				49,605
II VARIABLE COSTS				
Feed: Artificial milk		35 kg.	55.02	1,925.7
Starter		40 kg.	17.75	710
Compound	4.6	190 kg.	16.30	14,246.2
Straw		1 kg/d.	3	450[a]
Weaners		1.03 anim.[b]	24,000	24,720
Mortality		0.03 anim.	3,500	105
Labor		1 FTE	756,000	1,482.4[c]
Other Variable Costs				1,000
Interest on Circulating Capital				4,201
Total Variable Costs				48,840.6
III GROSS MARGIN				+764.4

Total gross return of operation per year: 764.4 pts. x 510 calves = 389,844 pts.

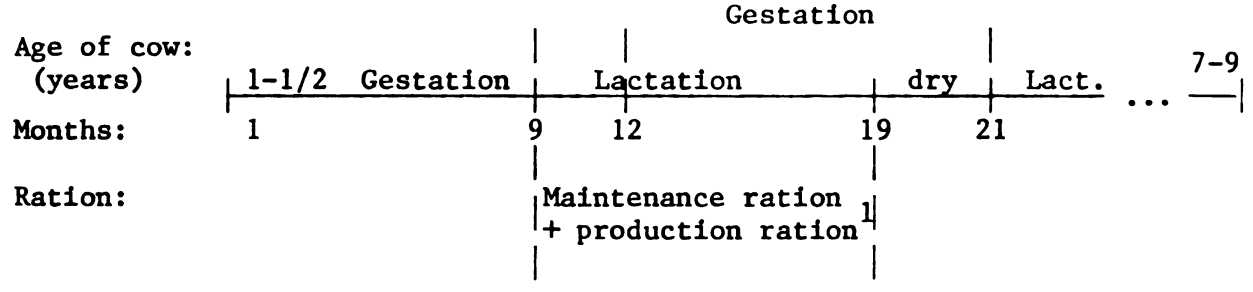
ASSUMPTIONS: 300 calves in permanent confinement
Production cycle: 7 months. 1.7 cycles per year
Initial liveweight: 60 kg.
Final liveweight: 300 kg (@ 56% = 168 kg. carcass weight)
All feed purchased
Feed conversion: 4.6 kg feed/kg. liveweight
Mortality: 3 percent
Labor: 1 full time equivalence (FTE) a year

[a] 1 kg str./day x 3 pts/kg. str. x 150 days = 450 pts.

[b] Accounts for mortality.

[c] 1 FTE x 756,000 pts/year ÷ 510 animals/year = 1,482.4 pts/anim.

Milk production. Close to 50 percent of all milk produced in Spain is concentrated in Galicia, Oviedo and Santander. This is a hilly area with high levels of rainfall and good pastures. Therefore, it is well suited for extensive or semi-intensive livestock production systems. Often, however, the farm structure represents an impediment for such practices due to the large number of small and fragmented dairy farms. As a result, a relatively large number of cows are kept in permanent confinement and they are fed concentrate feeds. The predominant system, however, in Galician dairy farms is to keep the cows in a mixed regime, loose or confined depending on the period of the year. The diagram below shows the cycle of an adult cow and the feeding practices for the milk production phase.



The production period for a cow per year is 10 months, assuming that it gets pregnant regularly at the third month of the lacation period. The productive life of a dairy cow is decided by the farmer since there are trade-offs between

---

[1] The maintenance ration based on grass, forage or silage provides 5 liters of milk per day (1,500 liters a year per cow), and production above this level is provided by an additional ration.

age of the cow (i.e. number of calvings) and milk yields. To maintain the cow for six calvings is one of the most usual practices.

The budget presented in Table 4.14 has been developed for a rather large type of dairy farm compared to the average Northern farm. It is not unreal, however. The Agency for Livestock Development found that the average number of cows in its associated farms of Galicia and Norte in 1978 was 26.7 cows per farm. Moreover the RCAN reports several groups of farms with more than 20 dairy cows in those two regions. Although there are reasons to believe that the farms associated with those two institutions are above average in terms of size, a mechanized dairy farm with 30 cows is not unusual and it represents a type of farm which will probably be economically viable in the future. Furthermore, we assume a minimum land base of 12 ha, sufficient to provide the maintenance ration of the dairy herd. This can be achieved by having pasture or forage on this land.

Calving rates approach .8 and they are expected to continue improving in the future. Another very important technical coefficient affecting the profitability of the farm is the yields of milk per cow. A milk production per cow per year of 4,000 liters is very realistic for the type of farm assumed in Table 4.14 but, again, it is a higher yield than the average of the region. Milk yields per cow are primarily dependent on feeding practices.

The gross margin shown in Table 4.14 suggests a

Table 4.14. Dairy Cows.

Estimated Costs and Returns from a Dairy Operation in Northern Spain (Pts. 1979)

		Quantity	Pts/unit	Pts/cow	Pts/liter of milk
I	GROSS REVENUE				
	Milk	4,000 l	19.3	77,200	19.3
	Calves	19 calves	16,500	10,450	2.61
	Cull cows	5 cows	45,000	7,500	1.87
	Total Gross Revenue			95,150	23.78
II	VARIABLE COSTS				
	Feed: maintenance ration (pasture on farm)	40 kg/d.	1.25	18,250[a]	4.56
	Production ration: feed-mix	.4 kg/l.	16.80	16,800[b]	4.20
	Dry period: feed comp.	1 kg/d.	18.	1,080[c]	.27
	Replacements: 3 cows	555 kg	16.80	932.4	.23
	Milk powder: 23 calves	9.3 kg	43	306.6	.08
	Straw for Beds			1,600	.40
	Replacements	3 cows	60,000	6,000	1.50
	Labor	1 FTE	756,000	25,200	6.30
	Medicants & Vet.			1,800	.45
	Electricity	365 d	125.	1,521	.38
	Interest on Circulating Capital			1,960	.49
	Total Variable Costs			75,450	18.86
III	GROSS MARGIN				+4.92

Total gross return of operation per year: 4.92 pts/l. x 4,000 l./cow x 30 cows = 590,400 pts.

Table 4.14. (Continued)

ASSUMPTIONS: 30 cows on a farm in Northern Spain
Breed: Friesian
Milk production: 4,000 liters/cow/year (containing more than 3% of fat).
Maintenance ration: provides 1,500 liters of milk
Production ration: provides 2,500 liters of milk
Calving rate: .76 Total number of calves: 23
Feed: all forage produced on the farm, feed-mix purchased.
Replacements: 20 percent a year = 6 cows of which 3 grown on the farm and 3 purchased
Mechanization: mechanized milking, semi-mechanized feeding
Labor: 1 full time equivalence (FTE) a year.

---

[a] 40 kg pasture/day x 1.25 pts/kg past. x 365 days = 18,250 pts.

[b] .4 kg feed/liter x 16.80 pts/kg. feed x 2,500 liters = 16,800 pts.

[c] 1 kg feed/day x 18. pts/kg. feed x 60 days = 1,080 pts.

relatively high profitability for the case study farm. Gross revenues are 26.1 percent above variable costs. Fixed costs per liter of milk were estimated at 2.14 pesetas, almost half of the gross margin.

Lamb Enterprises

There is an increasing specialization in sheep farming with some farms specializing in sheep-milk production and other farms in lamb production. Wool production remains a joint product of milk and meat. Sheep farming still tends to be one more of the activities of the farm, either complementary or the main activity, which represents between 50 and 85 percent of the sources of farm revenue.

Typically, lambs are kept with their mothers during the suckling period. They are weaned when they are 45 to 60 days old. Then, they are fed a barley-soymeal ration often supplemented with hay. Weaning can occur earlier or later, depending on management practices and whether the farm milks the sheep. Typically, lambs produced from sheep breeds with meat attributes do not graze, but remain in permanent confinement. During the suckling period, they consume only milk and shortly before weaning they start taking some concentrates.

The budget in Table 4.15 represents an intensive lamb fattening operation which can be found primarily in the Ebro and Centro regions. It is assumed that lambs are purchased just after weaning. Likewise, it could have been assumed that the lambs were raised on the farm and transferred to

Table 4.15. Lamb

Estimated Costs and Returns from a Lamb Fattening Operation (Pts. 1979)

		Feed Conversion	Quantity	Pts/unit	pts/lamb
I	GROSS REVENUE				
	Lamb (pascual)		26 kg.	166.1	4,318.6
	Total Gross Revenue				4,318.6
II	VARIABLE COSTS				
	Feed: Barley	1.1	14 kg.	12	184.8
	Supplemental feed	1.6	14 kg.	18.	403.2
	Alfalfa hay	1.2	14 kg.	7.1	119.3
					707.3
	Weaner		1.02 anim.[a]	3,050	3,111.
	Mortality		.02 anim.	350	7.
	Labor		1 FTE	756,000	151.2[b]
	Medicants & Vet.				60.
	Other Variable Costs				25.
	Interests on Circulating Capital				130.
	Total Variable Costs				4,191.5
III	GROSS MARGIN				+127.1

Total gross returns of operation per year: 127.1 pts x 5,000 lambs = 635,500 pts.

ASSUMPTIONS: 1,000 lambs per cycle. 5 cycles per year
Breed: "Manchega"
Initial liveweight: 12 kg (at weaning)
Final liveweight: 26 kg (@ .48 = 12.5 kg. carcass weight)
All feeds purchased
Mortality: 2 percent
Labor: 1 full time equivalence (FTE) a year.

[a] Accounts for mortality.

[b] 1 FTE x 756,000 pts/year ÷ 5,000 lambs/year = 151.2 pts/lamb.

the intensive feeding at a cost of producing weaners similar to their market price. Both practices (lamb fattening and closed cycle) are usual.

The operation represented in Table 4.15 produces "pascuales" or a lamb of between 25 and 30 kilograms. In the Ebro region, the "ternasco" is also a usual type of lamb to produce, its liveweight varies between 18 and 26 kilograms. The production cycle lasts for 60 days, starting when the lamb is approximately 45 days old. The feed ration is composed of barley mixed with a protein plus mineral and vitamin supplements. The mixing is done on the farm. Alfalfa hay is also fed as a complement to the feed ration. The intensive lamb operation shown in Table 4.15 yields a gross margin of 127.1 pesetas per lamb, or a three percent revenue above variable costs. Fixed costs were estimated at 25 pesetas per lamb.

CHAPTER V

IMPACTS OF EEC MEMBERSHIP

Scenario for Spain in the EEC

In order to compare the current profitability of Spanish farms with the situation in which they would have operated under the CAP, a scenario of prices and policies for Spain in-the-EEC in 1979 had to be identified. The questions addressed are: what are the Common Agricultural Policies and EEC prices that would affect Spanish farmers in the feed-grain-livestock subsector? and, how would these alter current Spanish agricultural policies and farm level prices?

A major effort has been made to compare and identify a hypothetical set of prices received and paid by farmers should Spain have been an EEC member in 1979. These prices are not necessarily the institutional prices since in most cases farmers buy and sell at farm level market prices. Institutional prices, however, were useful in providing guidance on the direction and extent of change of prices according to policy objectives.

In deriving a set of Spanish prices under the CAP, farm level market prices paid and received by farmers in France and Italy were used as the main points of reference. Supply and demand conditions of these two countries are considered

similar to the Spanish conditions. Prices paid and received by Spanish farmers may be affected in a similar way. There will be however, differences between Spanish, French and Italian prices due to differences in production costs, production systems, consumers' preferences, etc. Tables 5.1 and 5.2 at the end of this section summarize the prices actually used in the ration and budgeting analysis.[1] The results of these analyses are presented in the next two sections.

Cereals

The basic principles of the cereal market organization of the EEC are: (1) prohibition of any kind of governmental control measures; (2) exercise market control via prices only; (3) establish higher prices for deficit areas than for surplus areas, to cover transportation costs and (4) inclusion of grain derived products and competitive products in the cereal market regulation.[2]

The implications of these principles for the adjustment of current Spanish policies are: (1) only price support measures would be allowed, thus, all other support mechanisms would be discontinued. These include such measures as

---

[1] Tables A1.1 and A1.2 in Appendix 1 provide the information for price comparisons between Spain, France and Italy as well as between EEC and Spanish institutional prices (all figures are in US dollars).

[2] As outlined in Briz, ed., España y la Europa Verde, p. 298.

current provisions of subsidized credit and the crop insurance program. (2) The government would no longer exercise complete control on wheat commercialization, thus the SENPA would have to disappear as the only buyer and seller of wheat. A government agency to operate the intervention mechanisms in cases of surpluses would still be needed. In most cases, however, grain will be marketed in a "free-market" system. (3) Durum wheat would receive a production aid per hectare planted. (4) Institutional absolute and relative grain prices would be different. (5) Imports of grain will be subjected to the variable levy system, hence, producing no change on current Spanish practices.

Pricing mechanisms are, therefore, the main instruments of the CAP on cereals.

The EEC Commission establishes a single intervention price, a target price and a threshold price for the different cereals, plus a reference price for bread-wheat. The intervention price for common wheat, barley and corn is generally set at the same level. In 1976-77 the EEC countries agreed to a new hierarchy of prices and set the target of fully implementing the new system -- "the silo model" -- by 1982-83.[1] This system establishes a hierarchy of cereal prices based on the single intervention price for

---

[1] See, Ries, L'ABC du Marché Commun Agricole, p. 76 and Toepfer International, The EEC Grain Market Regulation, 1980-81 (Hamburg 1980), p. 63.

wheat, barley and corn. In 1979-80, the reference price for bread-wheat was 12.7 percent higher than the intervention price for wheat, and the intervention price for durum wheat was 67 percent higher than the intervention price for wheat. Actual prices received by French and Italian farmers in 1979 were higher than the intervention level, especially in Italy.

Comparing soft wheat prices received by farmers is difficult due to grain quality differences as well as the higher price for bread-wheat in the EEC. In accordance with a preliminary work in this area carried out by Hasha[1] it was assumed that most of the Spanish wheat will qualify as bread-wheat under the CAP, especially type II and III varieties which are the ones used in the budgeting analysis. Therefore, the Spanish intervention prices for soft wheat types II and III were compared with the EEC bread-wheat reference price. As a result it was estimated that the price of soft wheat type II in Spain in-the-EEC would decline by 2.6 percent, and the price of soft wheat type III would increase slightly by .3 percent.

Durum wheat is not included in the budgeting analysis, but needs to be taken into consideration given the potential for expanded production under EEC prices. Comparing the

---

[1] Gene R. Hasha, "A Preliminary Examination of the Adoption of the Common Agricultural Policy for the Spanish Feed-Livestock Sector." Paper presented to the Conference on Agricultural Trade Implications of the EC Enlargement (Minneapolis, June 1980). Mimeograph, p. 4.

intervention prices in Spain and in the EEC, it was estimated that had Spain been an EEC country in 1979, durum wheat prices paid to farmers would have increased by 22 percent. Assuming that Spanish farmers would qualify for the CAP's aid the increase would have been 42 percent.

Barley is the cheapest feedgrain in Spain. In the EEC it also tends to be the cheapest feedgrain, but its value is much closer to that of the other feedgrains. Considering the difference between the intervention price in Spain and the EEC, and the relative level of the prices of barley and corn as observed in France and Italy, the price received by farmers for barley was estimated to increase by 18.3 percent to an absolute level of 13.36 pts./kg. Prices paid by farmers and feed manufacturers per kilogram of barley is also estimated to increase by 18.5 percent. This translates into an absolute price level of 13.75 pts./kg and represents a slightly lower level than the price paid by French farmers and feed manufacturers.

As shown in Table 5.3 (next section) barley is estimated to be 10 percent cheaper than corn for Spain in-the-EEC. In 1979 the relative difference between barley and corn prices for French livestock farmers and feed manufacturers was only 6.7 percent. The fact that the margin between the prices of these two feedgrains is larger in Spain is consistent with the production characteristics of the two countries. France has a relative large corn crop and Spain a large barley crop. As shown in the next section, the

relative prices between corn and barley are critical in the use of each feedgrain by the feed-compounding industry.

Both Spain and the EEC are net importers of corn. Corn is a subsidized commodity in Spain because the intervention price is higher than the entry price for imported corn. In the EEC the threshold (or entry) price is higher than the price guaranteed to producers, and farmers receive a price per kilogram of corn which is considerably higher than the intervention price. Drawing from the comparison of these prices and actual prices received by French and Italian corn producers, it was estimated that prices received by Spanish farmers had they been in the EEC would have been less than one percent higher.

On the other hand, the price paid by farmers and feed manufacturers for corn would have increased by 12 percent indicating the higher threshold price in the EEC.

Oilseeds

The primary concern here is with soybean and sunflower meals as inputs to the feed manufacturing industry. On the production side, soybean (target prices), sunflower and rapeseed (intervention prices) prices, had Spain been in the EEC in 1979, would have increased by some 30 percent.[1]

In comparing 1979 soybean meal prices paid by farmers in Spain and in Italy (prices were not available for France)

---

[1] Ibid., p. 11.

there was little difference between the two countries. But the price of soybean meal in The Netherlands was 15.5 percent lower than in Spain.

Currently Spain levies compensatory duties on imported soybeans and soybean meal. In joining the CAP these levies will be suppressed. Solbes estimates a reduction of the entry price of soy in Spain of approximately 3 percent.[1] Hasha, however, notes that "the [current] levies do not explain why Spanish soymeal prices seem to be somewhat high."[2] One reason why Spanish soybean meal prices are substantially higher than Dutch prices may be that port facilities in The Netherlands are more adequate to handle large amounts of soybeans than Spanish port facilities. Differences in meal processing costs may be another reason.

Thus, in spite of the suppression of the import levy, 1979 soybean meal prices in Spain in-the-EEC were estimated to remain higher than Dutch prices and essentially unchanged from observed actual levels. Thus, in the enlarged EEC, soybean meal prices in Italy and in Spain are estimated to be very similar. The same "no price change" estimation was made for sunflower meal since in the EEC, processors receive an aid which brings the net price paid very close to the Spanish level.

---

[1] P. Solbes Mira, La Adhesión de España a la CEE (Monografías de Moneda y Credito, no. 2, Madrid 1979), pp. 68 and 89.

[2] Hasha, "Adoption of the CAP by the Spanish Feed-Livestock Sector," p. 11.

Poultry

The EEC policy on poultry is primarily geared towards protection against imports by the establishment of "sluice-gate" prices[1] and import levies. It also enables the FEOGA (French acronym for "European Guidance and Guaranteed Agricultural Fund") to provide export refunds. Other policy measures on the poultry sector concern aspects of commercialization, improvement of information flows and improvement of quality standards. Had the Spanish poultry sector operated under the CAP in 1979, it would have had to change the import system from state trading to a sluice-gate price and import levy mechanism. It would also have had to suppress any type of intervention measures, i.e. government purchasing of eggs or chicken carcasses.

Import prices and levies in the EEC are derived from grain requirements in the production process and feedgrain prices in the Community as compared to feedgrain prices on the world market. Prices received by farmers for chickens and eggs are difficult to compare, even within the EEC. This is due to marketing conditions specific to various member states and because of differences in quality, weight and grading. In comparing chicken farm level selling prices in Spain, Italy and France, it was observed that in 1978 French and Italian prices were about 7.5 percent higher than

---

[1] A sluice-gate price is exactly the same thing as an entry or threshold price, i.e. that price at which an imported commodity enters the Community.

Spanish prices. In 1979, however, prices in these two EEC countries were approximately 12 percent lower than in Spain. In order to be competitive in the Spanish and Community markets, it was estimated that had Spain been an EEC country in 1979, broiler chicken prices received by farmers would have been four percent lower than the level actually received.

The Spanish farm level selling price for eggs was actually in between the French and the Italian prices. It was assumed that it would not have changed under EEC membership.

Pigmeat

The EEC establishes a basic price for pig carcasses, and contemplates intervention mechanisms at a "buying-in price" fixed at no more than 92 percent nor less than 85 percent of the basic price. Trade protection measures are very similar to those for poultry, i.e. sluice-gate price, import levy and export restitutions. In joining the CAP, Spain will have to suppress state trading and adapt its institutional prices to the EEC level.

The pork indicative price in the EEC is 8 percent higher than the Spanish indicative price. In comparing market prices of live pigs there were large differences within the EEC, e.g. French prices were found to be considerably lower than Italian prices. From a comparison of these prices (as shown in Table A1.1 in Appendix 1), the magnitude and direction of the price change in Spain under the CAP was not

clear. An increase of 1.5 percent in the price of pigs was estimated under the assumption that policy prices are indicative of the direction market prices will change. The new price for Spain in-the-EEC is still lower than the Italian price and higher than the French price.

Beef and Veal

The EEC Commission fixes a guide price and an intervention price for adult, live, bovine animals. Terms of trade are regulated by customs duties, import levies and export refunds. In joining the EEC, Spain will have to modify its beef policies and adopt the EEC prices and trade measures. For the 1979-80 campaign, the EEC basic price for beef cattle was about 5 percent lower than the Spanish indicative price. Intervention prices, however, are 2 percent higher in the EEC than in Spain. Actual market prices of live beef cattle in 1979 were lower in the EEC than in Spain. Thus, beef prices for Spain in the EEC were estimated to decline by 2 percent.

The current 1979 Spanish veal price received by farmers was very close to the average of the French and the Italian price. As a result, veal prices were assumed to remain unchanged in Spain in the EEC scenario.

Milk

The milk products sector is a problematic one for the EEC, due to structural supply surpluses. In addition to the price policy, the EEC provides aid for the consumption of

skimmed milk and skim milk powder as animal feed, and regulates trade through import levies and export refunds. For each campaign, the EEC fixes a target price for milk (also an intervention price for butter, skimmed milk powder and for three types of cheeses) and establishes threshold prices for certain products. In joining the EEC, Spain will have to adopt the EEC regulations, and remove the minimum buying price at which processors have to purchase the milk from farmers. Fresh milk state trading will also have to be suppressed.

Comparing EEC milk prices and Spanish prices, it was observed that Spanish prices, both institutional and market prices, were higher. After converting EEC prices per kilogram into liters (1 kg milk = .971 liters milk) a Spain in-the-EEC price was derived from French and Italian prices with extra weight given to the French price. The result was a price 8 percent lower than the Spain out-of-the-EEC level, which is consistent with an 8.6 percent price differential in comparing target prices.

Sheepmeat

Since October 1980 the EEC has a sheepmeat regime. A reference price for different regions within the Community is adjusted annually, and producers receive a compensation premium if the average market price they receive falls short of the reference price. EEC member states are also entitled to operate either intervention or variable premiums

measures.[1] In Spain, sheepmeat prices are not regulated but the government influences production by granting premiums to producers. The current Spanish policy measures can easily be incorporated into the EEC regime.

Comparing French and Italian lamb prices with Spanish prices, it was found that Spanish prices were between a higher French price and a lower Italian price. It was assumed that had Spain been an EEC member in 1979, lamb prices would have remained unchanged.

Means of Production

Fertilizers. The Spanish government is heavily subsidizing the processing of nitrogenous fertilizers by making available naptha at a subsidized price. Naptha is obtained from petroleum, or coal, and its price bears a very close relationship to the price of a barrel of petroleum. It has been a priority to increase the use of fertilizers in Spanish agriculture. Fertilizer use per ha of agricultural land in Spain is well below the EEC level. In making fertilizer application comparisons bear in mind the rainfall levels and soil quality which restrict the potential use of fertilizer in Spain. In spite of the subsidies to the fertilizer industry, fertilizer use by Spanish farmers in 1978 declined compared to 1977.

The EEC fertilizer industry does not depend heavily on

---

[1] Agra-Europe, no. 897 (October 3, 1980), p/2 - p/5.

petroleum derived products since it uses cheaper raw materials, mainly natural gas. The Dutch fertilizer industry, for example, benefits greatly from the Dutch resources of natural gas. In comparing prices, in spite of the subsidy, Spanish farmers paid approximately 10 percent more for their nitrogen than the average French or Italian farmer. However, nitrogenous fertilizer prices in other EEC countries were higher than Spanish prices.

For the production of phosphate fertilizers the industry uses sulfur which is also an expensive element to obtain. Up to 1979 the Spanish government subsidized this industry, but the subsidies were relatively small compared to those for nitrogen production. The Spanish price level for P_2O_5 fertilizer compares with a higher French price and a lower Italian price paid by farmers. Spain is a rich country in phosphates and it is a net exporter of this material. Potash fertilizer prices in Spain are below the EEC level and there are no subsidies in this sector. Overall, fertilizer prices for Spain in the EEC scenario were not changed, because the differences between Spanish, French and Italian prices are minimal compared to the actual differences within the EEC.

Seed. Price statistics are so fragmented that they do not allow a comparison between Spain and the EEC. The only assumption made for the Spanish in the EEC scenario was to increase barley seed price by 15 percent due to the increase in barley price of 18 percent. Wheat and corn prices

changed little, so their seed prices were not changed.

Feedstuffs. Reference has been made to barley, corn and oilseed meal prices paid by farmers. Those are the most important feed components used in concentrate rations. Prices of other feedstuffs assumed under Spain in the EEC scenario were derived from straight comparisons between the Spanish, French and Italian price series. Those prices were only used for the analysis of rations presented in the next section. The results of this analysis allow us to estimate the prices of feed compounds by adding a marketing margin to the cost of production of the ration.

To complete the budgeting analysis, a set of prices was assumed for live animals purchased by farmers. Only piglet and calf prices were changed from current levels in Spain. Both prices were estimated to decrease by 4 percent. The fact that piglet prices are estimated to decrease and pig prices to increase slightly is an indication of efficient piglet producing systems in the EEC as a response to higher feed costs in hog production. Tables 5.1 and 5.2 summarize the estimated prices that would have prevailed had Spain been in the EEC in 1979.

Feed Rations

This section is concerned with feed, especially feedgrain use in the composition of compound rations. The composition of feed rations varies with changes in the relative price of the different feeds. Feed compounders

Table 5.1. Prices Received by Farmers.

Comparison of Spain as of 1979 (out EEC) and Spain in EEC Scenario

Product	Units	SPAIN Out EEC	SPAIN In EEC	Percent Charge
Wheat soft II	Pts/kg.	15.60	15.20	- 2.6
soft III	Pts/kg.	15.15	15.20	+ 0.3
Barley	Pts/kg.	11.30	13.36	+18.3
Corn	Pts/kg.	13.55	13.65	+ .74
Broiler chicken	Pts/kg. lw	77.36	74.27	- 4.0
Eggs	Pts/dozen	58.12	58.12	0
Pigs	Pts/kg. lw	95.45	96.84	+ 1.5
Piglets	Pts/animal	3,000	2,880	- 4.0
Beef - "añojo"	Pts/kg. lw	136.55	133.8	- 2.0
Veal	Pts/kg. lw	165.35	165.35	0
Milk	Pts/liter	19.30	17.75	- 8.0
Lamb	Pts/kg. lw	166.1	166.1	0
Cull hen	Pts/kg. lw	40.	40.	0
Cull sow/boar	Pts/animal	11,500	11,500	0
Cull dairy cow	Pts/animal	45,000	45,000	0

Source: See Appendix 1.

Table 5.2. Prices Paid by Farmers.

Comparison of Spain as of 1979 (out EEC) and Spain in ECC Scenario

(Pts/kg. unless otherwise indicated)

Product	SPAIN Out EEC	SPAIN In EEC	% Change
Feedstuffs			
Wheat	--	14.30	
Barley	11.6	13.75	+ 18.5
Corn	13.5	15.11	+ 12.
Sorghum	12.5	14.80	+ 18.4
Bran	10.15	11.56	+ 13.9
Soybean meal (44%)	20.5	20.5	0
Sunflower meal (36%)	13.6	13.6	0
Fish meal (63%)	45.	40.	- 11.1
Meat meal	21.	21.	0
Alfalfa - deh (17%)	10.3	11.4	+ 10.7
Urea	15.	15.	0
Skim milk	43.	43.	0
Milk replacer	55.02	65.	+ 18
Alfalfa hay	7.1	7.8	+ 10
Forage	3	3	0
Straw	3	3.25	+ 8
Feed compounds			
Broiler feed	22.5	25.	+ 11.
Layer feed	18.1	20.4	+ 12.5
Weaner hog	23.5	24.5	+ 4.3
Fattening hogs	17.5	19.8	+ 13.
Breder swine feed	16.	18.2	+ 13.7
Cattle fattening	16.3	18.1	+ 11.
Compl. dairy	16.8	18.5	+ 11.
Beef feed-mix	12.	14.5	+ 20.8
Compl. lamb	18.	18.1	+ 0.6
Live animals (Pts/animal)			
Baby chicks	15.80	15.80	0
Laying hen	230.	230.	0
Piglet	3,000.	2,880.	- 4.0
Sow	15,000.	15,000.	0
Boar	35,000.	35,000.	0
Calf (40 kg lw)	16,500.	15,800.	- 4.2
Dairy cow	60,000.	60,000.	0

Table 5.2. (Continued)

Product	SPAIN Out EEC	SPAIN In EEC	% Change
Fertilizer			
Nitrogen (N)	42.5	42.5	0
Phosphate (P_2O_5)	35.5	35.5	0
Potash (K_2)	21.4	21.4	0
Seeds			
Wheat	21.	21.	0
Barley	15.	17.25	+ 15.0

Source: See Appendix 1.

formulate their rations using mathematical optimization algorithms to obtain the least cost combination of feeds that will provide desired nutritional requirements. However, there is some stability in the composition of rations, and, for this reason, typical Spanish rations for 1979 will be presented. They will be compared to typical French or Italian rations to suggest how the composition of rations may change when Spain joins the EEC.

Given the importance of the poultry and swine subsectors as feed-compound consumers, feed rations for broilers, layers and hogs were estimated using a linear programming package,[1] technical information from the Spanish agricultural extension service[2] and Michigan State University's Telplan programs.[3] The matrixes of technical coefficients and nutrient requirements for poultry and hogs are presented in Tables A2.1 and A2.2 in Appendix 2. This analysis compares the composition of rations under the actual 1979 Spanish prices and Spain

---

[1] Stephen B. Harsh and J. Roy Black. Agricultural Economics Linear Program Package. Version 2. A. E. Staff Paper No. 75.10 (Department of Agricultural Economics, Michigan State University, April 1975).

[2] Tables on nutrient requirements and composition of feeds in annexes of J. M. Hernández Benedí. Manual de Nutrición y Alimentación del Ganado (Publicaciones de Extensión Agraria. Ministerio de Agricultura, Madrid 1980).

[3] Information on requirements of essential amino acids and characteristics of feeds in contents of amino acids was taken from the "User's Manual" of Michigan State University's Telplan programmes, nos. 12 (least-cost growing and finishing rations for swine) and 15 (poultry and game bird ration formulation).

in-the-EEC prices for feedstuffs. The ultimate interest in analyzing the composition of feed rations is to identify probable changes in the use of feedgrains and oilseed meals by the feed-livestock subsector when Spain becomes an EEC member.

Before turning attention to the composition of feed compounds used in the various livestock activities, it will be helpful to focus on the estimated changes in the relative prices of feedgrains. Table 5.3 shows the feedgrain prices for Spain in and out-of-the-EEC relative to the price of barley and corn.

Table 5.3. Feedgrain and Bran Prices Relative to Barley and Corn.

	Spain out		Spain in	
	Barley = 1.0	Corn = 1.0	Barley = 1.0	Corn = 1.0
Barley	1.00	0.86	1.00	0.91
Corn	1.164	1.0	1.099	1.0
Sorghum	1.078	0.93	1.076	0.98
Wheat			1.04	0.95
Bran	.875	0.75	.801	0.76

Clearly, in joining the EEC corn is becoming a cheaper feed relative to barley. In the middle of 1979, farmers and feed-compounders paid 16.4 percent more for a kilogram of corn than for a kilogram of barley. It has been estimated that under EEC conditions, corn would have cost them only 10 percent more than barley. The relationship between the prices of barley and corn is particularly important since

these two commodities are the main energy providers in feed rations. Corn contains more energy and less fiber than barley, which makes it a more valuable product for feed compounders. This is reflected in the price differential between the two feedgrains.

It is expected that under EEC conditions feed-wheat may have a greater potential as a feed ingredient to be included in Spanish rations. Currently, it is used very little due to the almost total control of SENPA in wheat marketing. Feed wheat is estimated to have been four percent more expensive than barley and five percent cheaper than corn had Spain been an EEC member in 1979. Under the EEC scenario, the price of sorghum approaches the corn price level while maintaining its relationship with the price of barley at the actual Spanish level. Had Spain been in the EEC, it was estimated that bran would have become cheaper relative to barley.

Poultry Rations

Typically, broilers are fed two types of feed compounds after the initial 10 days on starting feed. The finishing ration has a higher energy to protein ratio than the growing feed. However, the difference in composition is small. Basically, in broiler rations corn provides the energy, and soybean meal provides additional protein. The rations are then balanced with supplemental ingredients.

Table 5.4 provides detailed information on the composition of a typical broiler ration. The results of the linear

Table 5.4. Poultry Feed Rations for Spain Out-of-the-EEC, Estimated Spain In-the-EEC and French Ration. Percentages.

Feed Ingredients	POULTRY: B R O I L E R S				POULTRY: L A Y E R S			
	Out	LP-out	LP-in	France	Out	LP-out	LP-in	France
Barley					8	14		All cereals (mainly corn):
Corn	58	64	64	65	58	64	74	
Sorghum	4							60
Wheat Bran							4	
Manioc								12
Soybean meal	28	30	30	25	15	9	10	17
Sunflower meal					4			
Alfalfa dehyd.	1				1			2
Fish & meat meal	4	4	4	4	2	7	7	
Other feeds, min. & vit.	5	2	2	6	12	6	5	9
Total	100.-	100.-	100.0	100.0	100.0	100.-	100.-	100.-
Cost in Pts/kg.	22.5		25.-		18.1		20.4	
Percent increase			11%				12.5%	
Energy		2926 Kc	2926 Kc			3050 Kc	3066 Kc	
Crude protein		22.5%	22.5%			16.3%	16.5%	

Sources: Primary data from Spanish feed manufacturers and "typical rations" from the Confederación Nacional de Fabricantes de Piensos Compuestos.
French ration from: USDA, ESCS, Feed use and feed conversion ratios for livestock in the members of the EC, IED staff report, January 1980.

Notes: kc = Kilocalorie.

programming (LP) least-cost calculations are also shown. These calculations show a trade-off between corn and sorghum indicating that they are almost perfect substitutes. The relationship between the two feedgrains was favorable to sorghum when its price was at least 8 percent lower than the price of corn. The cost of forcing barley into the optimal solution was relatively high. Soybean meal was well established as the main protein source.

The ration was balanced at 2,926 kilocalories and 22.5 percent of crude protein, indicating an energy/protein ratio of 130, adequate for warm poultry house climatic conditions. Using Spain in-the-EEC prices in the LP analysis did not change the optimal ration formulation, but due to higher prices of corn, the ration became more expensive. The increase in the commercial price of the feed compound was derived by adding a margin to the costs of purchasing the feeds in the ration. This margin was based on the observation of actual practices of feed manufacturers, and it accounts for processing and marketing costs. Comparing Spanish and French rations shows that they are similar in composition.

Feed compounds for the egg production phase of the layers' life cycle tend to have a lower energy to protein ratio than feed compounds for the pullets' growing phase. This is indicative of a higher protein content in egg production feed rations. In Spain, layers in production are fed a ration which contains at least 50 percent corn. The

remaining 50 percent includes 16-24 percent of other cereals or even more corn, 16-22 percent of mainly protein feeds, mostly soybean meal, and 5-12 percent of the ration includes feed supplements.

The results of the LP least-cost ration indicate potential for a greater use of cereals in the ration under current Spanish conditions. This, however, produces a high energy feed which is not needed,[1] at least during the first 20 weeks of the laying period. For Spain out-of-the-EEC case, sorghum was found to be a very attractive feed to include in the ration together with corn.

In order for barley to enter the ration, sorghum had to be priced at 12.8 pts/kg instead of 12.5. In addition, as the price of barley was being reduced, it entered the ration as a substitute for corn. However, there are technical limits on the use of barley in rations for layers. The Spain in-the-EEC case showed an almost complete switch to corn as the energy source in the ration. It was complemented with wheat bran. This is the result of the narrowing margin between barley and sorghum prices and the price of corn. The main difference between the Spanish rations and a typical French ration[2] is the use of manioc. A 10-15 percent

---

[1] The energy-protein ratios of the derived ration are 187 for Spain out-of-the-EEC and 185 for Spain in-the-EEC. They compare with actual Spanish rations averaging 167-178 energy-protein ratios, depending on climatic conditions.

[2] As reported in USDA, Feed Use and Feed Conversion Ratios in the Member Countries of the European Community (IED Staff Report, Washington, January 1980), p. 133.

use of manioc in the French layers' rations is high compared to other EEC countries. In the Netherlands manioc makes up only about five percent of the layer rations. (See a brief discussion on the potential use of manioc in Spain at the end of this section.)

Swine Rations

In 1978 hog rations accounted for 71 percent of all swine feed compounds produced. Other swine compounds are for weaners, sows and boars. Table 5.5 shows the composition of a standard hog feed-compound (combination of growing and finishing rations) and typical rations for swine breeders and weaners.

Typically, in hog rations, a mainly barley ration will produce a low energy feed, and a corn-sorghum ration will produce a high energy feed. The high energy feed is more expensive but it allows better feed conversion rates than low energy feeds. Most feed compounders produce a fairly standardized type of feed adjusted for high or low energy depending on price fluctuation and farmers' demands.

The estimated least-cost rations showed very clearly a great potential for the use of sunflower meal as the main protein source. The main limitation on the use of sunflower meal is the fiber content of the ration, especially when combined with barley (also a high fiber feed). The trade-offs in the formulation of the rations were either a mainly corn and sunflower ration, or a barley and soybean meal ration. Thus, not only is the relative price of barley and

Table 5.5. Swine Feed Rations for Spain Out-of-the-EEC, Estimated Spain In-the-EEC and French Ration. Percentages.

Feed Ingredients	SWINE: H O G S				Other SWINE Sows & Boars		Other SWINE Weaners	
	Out	LP-out	LP-in	France	Out	In	Out	In
Barley	36	58	17	All cereals (mainly wheat):	64	25	32	32
Corn	24	28	65			36.5	23	23
Sorghum	10			70				
Wheat bran					10	12		5
Manioc				some				
Soybean meal	20	9		16	11	7.5	23	20
Sunflower meal	2		13		2	4	6	7
Alfalfa dehyd.					5	4		
Fish & meat meal	3	4	4			2	3	3
Skim milk							10	8
Other feeds, min. & vit.	5	1	1	7	4	6	9	9
Total	100.-	100.-	100.-	100.-	100.-	100.-	100.-	100.-
Cost in Pts/kg.	17.5		19.8		16.-	18.2	23.5	24.5
Percent increase			13%			13.7		4.3
Energy		1.02 FU	1.03 FU					
Crude protein		15.0%	15.5%					
Crude fiber		4.5%	4.5%					

Sources: Primary data from Spanish feed manufacturers and "typical rations" from the Confederación Nacional de Fabricantes de Piensos Compuestos.
French ration from: USDA, ESCS, Feed use and feed conversion ratios for livestock in the members of the EC, IED staff report, January 1980.

Notes: FU = Feed unit.

corn important, but also the relative price of sunflower and soybean meal.

The estimated ration for Spain out-of-the-EEC is mainly a barley and soybean meal ration as observed in current practices. This was obtained by pricing sunflower meal at 14 pts./kg instead of its normal price of 13.6 pesetas. As an illustration of the above-mentioned trade-offs, when sunflower meal was priced at 13.6 pesetas the composition of the ration was: barley 20 percent, corn 63 percent, sunflower meal 12 percent and other ingredients five percent. The solution of the least-cost ration for Spain in-the-EEC shows a very clear shift towards a corn and sunflower meal ration. In pricing sunflower meal out, the cereal contents of the ration increased, especially wheat bran, and soybean meal entered the optimal solution representing six percent of the ration.

In increasing the corn content of the ration, the energy level of the feed mix also increases by .01 feed unit. This suggests that the hogs would not need to eat as much as before to gain the same weight, i.e. the feed conversion rate is likely to be lower.

In order to observe the substitutability of corn and barley, sensitivity analysis on the composition of the least-cost ration was done by changing the relative price level between these two feedgrains. Under current Spanish conditions barley started substituting for corn as the price of corn became 15 percent higher than the price of barley.

Under Spain in-the-EEC conditions, barley started substituting for corn when corn was 7 percent more expensive than barley. In this case, however, the rate of substitution of barley for corn is very small. Under Spain in-the-EEC conditions when the price of corn was raised 16 percent higher than the price of barley, the same price relationship as in Spain out-of-the-EEC, the corn content of the solution was reduced from 65 to 63 percent and the barley content was increased from 17 to 20 percent. Given this new barley to corn price relationship, when feed wheat was taken into consideration it fully substituted for both corn and barley. This shows a great potential for wheat to be used in swine rations. (Recall that wheat did not enter the optimum solution, as presented in Table 5.5, only the increase in the price of corn allowed wheat into the optimal solution.)

The maximum fiber allowance in the ration is also important in limiting the barley and sunflower content. When the limit on crude fiber was increased from 4.5 to 6 percent, the proportion of barley in the ration increased at the expense of corn.[1] Interpret the results on sunflower meal utilization with caution. The author found little evidence of the potential use of sunflower meal in hog

---

[1] For a discussion of this subject see, W. E. Dinusson, et al. Fiber-Protein-Energy Relationships in Rations for Growing-Finishing Swine. Research Report no. 21 (North Dakota Experiment Station, January 1969).

rations.[1]

In comparing the Spanish rations to a standard French ration, the use of manioc and wheat are the main differences. The potential for feed wheat has already been identified. In order to enter the Spain in-the-EEC least-cost ration, feed wheat had to be at least six percent cheaper than corn. The lack of technical data on manioc prevented its consideration as a potential feed ingredient.

Typical Spanish swine rations for breeders and weaners are compared to an estimated ration of Spain in-the-EEC based on French and Italian rations in Table 5.5. It is logical to assume a reduction of barley usage in favor of corn usage, given a new set of prices which narrows the absolute difference between the prices of these two feedgrains. Even if the relative price of corn and barley remains at the actual 1979 Spanish level, the LP analysis of least-cost rations suggests that at the EEC absolute price level, use of corn and wheat will be encouraged at the expense of barley. Feed compound prices were obtained by increasing the cost of the ration by a fix percentage marketing margin based on actual margins in Spain.

---

[1] J. Perez Lanzac, et al., "El Marco General de la Demanda de Alimentos Concentrados por la Ganadería Española y su Projección para 1980," ITEA, no. 33, 1978, p. 23 say that the ceiling in consumption of sunflower meal is fairly high. J. F. Carter, ed., Sunflower Science and Technology, no. 19 in the Series Agronomy (Madison, 1978), p. 429, say: "It is availability of the meal, not necessarily the higher fiber, lower lysine or lower metabolizable energy that has limited its (sunflower meal) use in the past."

Cattle and Sheep Rations

A typical set of Spanish rations for beef and dairy cattle and lambs is shown in Table 5.6 and is compared -- when possible -- to an estimated ration for Spain in-the-EEC based on French and Italian rations. The feed mix used in semi-intensive beef enterprises is estimated to become 20.8 percent more expensive due to the large proportion of cereals and hay in the ration which prices are assumed to increase considerably under the CAP.

The other beef rations in Spain and in Italy are very similar. A comparable dairy ration was not found in the EEC. The lamb ration shown in Table 5.6 is that of a complement feed compound, providing protein, vitamins and minerals almost exclusively. The prices of all these feed compounds for Spain in the EEC were estimated in the same fashion as for poultry and swine compounds. They were also contrasted to French and Italian prices. (See Table A1.2 in Appendix 1).

Manioc

This is a feed used in the EEC and imported from Southeast Asia and also from African countries. It is a cheap source of energy in feed rations.

What is the potential for Spanish feed manufacturers to use manioc in their rations? At this time there are only speculative comments from experts since there is very little technical and economic data available. The question seems to be, at what price can manioc be delivered to the feed

Table 5.6. Cattle and Lamb Feed Rations for Spain Out-of-the-EEC and Estimated Spain In-the-EEC (Derived From Typical French or Italian Rations). Percentages.

Feed Ingredients	Percentages									
	BEEF Semi-in. Feed-mix		BEEF Inten. Starter		BEEF Inten.		DAIRY		LAMB Supplement	
	Out	In	Out	In	Out	In	Out	In	Out	In
Barley	73		17		66		20			
Corn			40	} 58	10	} 68	55			
Wheat bran	7		10	7	7	5			6	
Soybean meal			23	22	4	5	10		42	
Sunflower meal					9	10	10		40	
Alfalfa dehyd.	16									
Urea	2						0.5			
Skim milk			5							
Other feeds, min. & vit.	2		5	13	4	12	4.5		12	
Total	100.-		100.-	100.-	100.-	100.-	100.-		100.-	
Cost in Pts/kg.	12.-	14.5	17.75	19.7	16.3	18.1	16.8	18.5	18.-	18.1
Percent increase		20.8		11.-		11.-		11.-		0.6

- - no change - -

Sources: Primary data from Spanish feed manufacturers and "typical rations" from the Confederacion Nacional de Fabricantes de Piensos Compuestos.
French ration from: USDA, ESCS, Feed use and feed conversion ratios for livestock in the members of the EC, IED staff report, January 1980.

mixer's plant?

Manioc is a difficult product to handle and transport, even in pelletized form. Thus, the cost of manioc for feeding mixers will be primarily determined by: (1) the proximity of feed manufacturing plants to ports and (2) the capacity of the ports to accept large vessels and handle manioc. If manioc has to be transported inland for long distances, the delivered price rises considerably. This is why most experts do not consider it feasible for Spain to import manioc from Rotterdam. If the Spanish feed mixing industry is to use manioc it should arrive at Spanish ports, and the larger the vessel (e.g. 80,000 MT instead of 30,000 MT) the more competitive its price compared to cereals. Thus, the importance of port capacity and special handling facilities.

Results of the Partial Budgeting Analysis

This section presents the results of the partial budgeting analysis. The difference between prices out of the EEC and prices in the EEC provide the basic information on how much revenue and variable costs are going to change for each of the case study farms. The gross margin realized by each farm under the EEC scenario will be compared to the gross margin obtained under actual 1979 Spanish conditions. The analysis is partial in that the basic structure of the case study farms is maintained. No changes in yields, labor efficiency and wages are assumed. An increase in the gross

margin in-the-EEC compared to the gross margin out-of-the-EEC will be indicative of an expected increase of profitability of the case study farm, and the group of farms it represents, as Spain joins the EEC. A decrease of the gross margin under the EEC scenario will be indicative of a decrease of profitability relative to the current Spanish situation.

Crop Enterprises

The results of the budgeting analysis for barley, soft wheat and corn enterprises are shown in Table 5.7. Costs of cereal production are not going to be affected much by Spanish entry in the EEC. Dry land wheat and barley farmers will not receive subsidized credit, which is expected to increase the cost of financing cropping expenditures. Moreover, barley growers will probably have to pay more for seeds.

The estimated rise in the price of barley under the CAP indicates a sharp increase in its profitability. The profitability of wheat on dry land is likely to decrease slightly, suggesting that adoption of the CAP will provide a great incentive for the production of barley. Barley will certainly become a more attractive alternative than soft wheat.

On irrigated land, margins per hectare of corn and wheat do not vary greatly under the CAP. The change depends on the extent of change in prices received. Corn margins are likely to increase and soft wheat margins are likely to

Table 5.7. Results of Partial Budgeting for Crop Enterprises (Pts./ha).

	Dry-Land (Ebro)		Irrigated Land (Ebro)		Irrigated Land (Guadalquivir)	
	Barley	Wheat	Wheat	Corn	Wheat	Corn
Additional costs:						
seeds	337.5	-	-	-	-	-
interest	370.7	716.5	-	-	-	-
Change in revenue	+ 5,026.4	+ 95.	- 1,720.-	+ 680.-	- 1,800.-	+ 800.-
Change in return	+ 4,318.2	- 621.5	- 1,720.-	+ 680.-	- 1,800.-	+ 800.-
Previous gross margin	+ 7,684.5	+1,061.5	+27,764.5	+25,563.-	+36,340.-	+37,282.-
New gross margin	+12,002.7	+ 440.-	+26,044.5	+26,243.-	+34,540.-	+38,082.-

decrease slightly. In the hypothetical case that some Spanish wheat would not qualify as bread wheat in the EEC, greater price reductions should be expected, leading to a much larger decline in wheat margins per hectare. In the Ebro region corn becomes as profitable as wheat. In Andalucía the absolute difference between corn and wheat margins widens in favor of corn. These differences, however, are not large enough to suggest drastic changes in land allocation responses. Other factors such as yields, energy costs and competition from other crops are likely to influence farmers more than the small corn and wheat price changes as Spain adopts the CAP.[1]

Livestock Enterprises

Note that the estimated increase in cereal prices, had Spain been an EEC member in 1979, caused a similar increase in feed prices paid by livestock farmers. As a rule, it will be observed that costs of producing livestock are increasing. This increase in cost will not likely be coupled with an increase in prices received. As a result, gross margins for all livestock enterprises considered in this budgeting analysis decrease.

The results for the poultry subsector are presented in

---

[1] Solbes, La Adhesión de España a la CEE, p. 115 stresses the importance of the price relationship between corn and sugarbeets which are close substitutes. Since the price of sugarbeets is expected to decrease as Spain joins the EEC, Solbes predicts that corn production will likely increase when Spain becomes an EEC member.

Table 5.8. The gross margin per broiler is sharply reduced. This is mainly due to the increased cost of feed. The estimated chicken price decline as Spain joins the EEC is also responsible for part of this decline in profitability. The gross margin per dozen eggs is also reduced, although proportionally less than the reduction of the broiler margin. In this case, the price level of eggs was estimated to remain unchanged and the increase in feed costs is responsible for the decrease in profitability.

Table 5.8. Results of Partial Budgeting for Poultry Enterprises.

	Broilers (Pts./bird)	Eggs (Pts./dozen eggs)
Additional costs:		
feed	+ 9.90	+4.48
interest	+ 0.32	+0.17
Change in revenue	- 5.56	-
Change in gross margin	-15.78	-4.65
Previous gross margin	+19.45	+8.52
New gross margin	+ 3.67	+3.87

In both poultry enterprises feed costs represent a very high proportion of the total variable costs of production, 60-80 percent. The increase in the price of corn, the main feed ingredient in poultry rations, should have a greater impact on the profitability of the subsector than the relative smaller changes in the market price of poultry products.

The results of the partial budgeting analysis suggest that poultry enterprises will still be realizing a positive gross margin under the EEC conditions. In order to assess the profitability of the subsector, however, other costs that have not been considered should be accounted for (e.g. transportation of poultry products from the farm to the first handler and fixed costs).

Feed costs are also an important component in swine enterprises. The sharp increases in the prices of barley and corn will raise considerably the total costs of production for swine farmers. This increase in cost is likely to be partly offset by increasing hog prices under the CAP. The net effect, however, is likely to be a reduction of actual gross margins, thus, a decline in the profitability of the subsector.

Table 5.9 shows the results of the partial budgeting analysis for the swine case study farms. The feeder pig activity was operating with a small margin, therefore, higher feed costs result in a negative margin. The new margins for closed cycle and weaner enterprises are also considerably lower than the previous margins, suggesting that these farms will still operate with positive gross margins although net returns on total capital invested may become negative. Regardless of the magnitude of the new gross margin, the impact of EEC membership on the swine subsector is going to be a reduction in profitability and pressures to increase productive efficiency.

Table 5.9. Results of Partial Budgeting for Swine Enterprises.

	Hogs Closed Cycle (Pts./hog)	Weaners (Pts./weaner)	Hogs Fattening only (Pts./hog)
Change in costs:			
weaner	-	-	-124.2
feed	+ 787.57	+182.83	+583.03
interest	+ 63.00	+ 30.66	+ 29.30
Change in revenue:			
hog/weaner	+ 132.05	-120.	+132.05
Change in gross margin	- 718.52	-333.49	-356.10
Previous margin	+1,241.09	+482.04	+324.2
New gross margin	+ 522.57	+148.55	- 31.9

As suggested by the analysis on rations, such productivity gains may well be in lower feed conversion rates due to the use of higher energy feeds.[1] Another strength of the swine subsector in facing higher costs of production is that demand for pork is strong relative to other meats. In adjusting production practices, a favorable environment which provides growth opportunities is certainly preferable to a situation of stagnation as other meat sectors appear to be experiencing.

Under the CAP, that part of the beef subsector which makes substantial use of concentrate feeds suffers from higher feed prices and lower beef prices. The combination of the two produce negative gross margins for each of the case study farms. The increase in feed costs has a greater effect on the decline in profitability than the decrease in live beef-cattle prices.

In the case of veal production the prices received by farmers for ready-to-slaughter calves was estimated to remain unchanged. Thus, the negative gross margin is solely a consequence of higher feed costs.

In comparing the two beef enterprises, it is interesting to observe that higher feed costs affect the semi-intensive more than the intensive operation. This is because the composition of the feed ration used in

---

[1] Note that an improvement of the feed conversion rate of .05, for example from 3.2 to 3.15, would represent more than a 10 percent reduction on the additional feed costs.

Table 5.10. Results of Partial Budgeting for Beef and Veal Enterprises (Pts./animal).

	Beef (Semi-intensive)	Beef (Intensive)	Veal (Intensive)
Change in costs:			
calf	- 721.	-	-
feed	+4,540.7	+3,964.85	+2,038.
interest	+ 611.15	+ 634.38	+ 191.81
Change in revenue	-1,237.5	-1,485.	-
Change in gross margin	-5,668.35	-6,084.23	-2,229.81
Previous gross margin	+2,295.5	+ 878.1	+ 764.4
New gross margin	-3,372.85	-5,206.13	-1,465.41

semi-intensive enterprises has a greater proportion of feedgrains than concentrate rations used in intensive enterprises. The increase in feedgrain prices is the main cause of the feed mix price increase.

In considering adjustments to this new situation in the EEC, it must be recognized that feeding practices for cattle farmers are open to a larger number of alternatives than for poultry and swine farmers. Not all prices of feedstuffs are likely to increase as much as the prices of feedgrains when Spain joins the EEC. This will encourage cattle farmers to make a greater use of other feedstuffs, such as forage crops. In fact, a large number of farmers already feed their cattle hay (alfalfa, vetch, oats, etc.), silage, pasture and some grain supplement.

The case study dairy farm considered here showed a relatively large gross margin under current Spanish conditions. In spite of an 8 percent decrease in the price of milk and feed cost increases under EEC conditions, the dairy enterprise shown in Table 4.14 will still generate a positive gross margin.

Table 5.11 shows that the gross margin of the dairy enterprise will be reduced by almost 50 percent when the farm operates under EEC prices. This result supports the view of many experts who think that the problem of the dairy sector in facing EEC membership is going to be that the large number of very small dairy farms in northwestern Spain will find it very hard, if not impossible, to adjust

to lower milk prices and higher costs. On the other hand, it is generally recognized that there are a number of larger (above 15-20 cows) relatively efficient dairy farms which will be able to adjust to the EEC conditions. Those farms are currently benefiting from policy measures aimed at helping small farmers. These views regarding the above-average dairy farms are supported by the findings of this study. The figures in Table 5.11 also show that the milk price decrease is going to have a greater impact than feed price increases on the declining profitability of dairy farms.

Table 5.11. Results of Partial Budgeting for Dairy and Lamb Enterprises.

	Dairy (Pts./liter milk)	Lamb (Pts./lamb)
Additional costs:		
feed	+0.51	40.95
interest	+0.01	1.31
Change in revenue:		
milk/lamb	-1.55	-
calves	-0.11	-
Change in gross margin	-2.18	- 42.26
Previous gross margin	+4.92	+127.1
New gross margin	+2.74	+ 84.84

The dairy subsector will certain suffer a loss of profitability under EEC conditions. The capacity to adjust for individual farmers will depend a great deal on whether or not they can achieve economies of scale by increasing the

herd size. Over time, the improvement of technical variables, such as milk yields and calving rates, may also be very important in improving the profitability of the farm.

This study has not considered large and intensive dairy farms such as those close to large cities. The capacity of this type of farm to adjust to the CAP will depend on their current situation and whether they currently have a favorable net margin. These farms will probably be the ones most affected by higher feed costs since they depend heavily on concentrate feeds.

Lamb growing activities do not appear to be significantly affected by EEC membership. Feed costs per lamb will increase by less than 6 percent and lamb market prices at the farm level are not likely to be affected. Table 5.11 shows that the gross margin of the case study farm considered in Table 4.15 is going to decline by approximately one-third of its current level.

Many have great expectations for the sheep subsector when Spain joins the EEC. They foresee a potential for exporting lamb carcasses to the other EEC member countries. For this to be possible, however, Spain sheep farmers should produce a different type of lamb for export. Several researchers in Spain have commented that EEC consumers, particularly in France, have a preference for heavier lambs. For them it is a question of size, not age. To produce such lambs will require important technical changes, especially in improvement of breeds, and it is likely to be a difficult

and time-consuming task.

Summary

In summary, the partial budgeting analysis clearly suggests that EEC prices will encourage barley production in Spain but will not have much effect on soft wheat and corn production.[1] Table 5.12 summarizes the results for the different cereal enterprises analyzed. It allows making comparisons between current Spanish conditions and the estimated in-the-EEC conditions. It also illustrates very clearly the great impact that the CAP may have on dry-land farming in Spain.

Table 5.12. Gross Margins of Cropping Enterprises (Pts./ha).

Enterprise		Out EEC	In EEC
Dry-land:	Barley	7,684.5	12,002.7
	Wheat	1,061.5	440.0
Irrigated:	Wheat (Ebro)	27,764.5	26,044.5
	Wheat (Guadalquivir)	36,340.0	34,540.0
	Corn (Ebro)	25,563.0	26,243.0
	Corn (Guadalquivir)	37,282.0	38,082.0

The partial budgeting analysis also suggests a reduction in the profitability of all livestock activities considered in this study. Table 5.13 provides the figures to

[1] The main impact on wheat and corn production will likely result from the effect of the CAP on other crops which are competitive for land use.

compare the profitability of each enterprise between the out-of-the-EEC and the in-the-EEC situation by comparing gross margins as a percentage of variable costs. This measure of profitability does not allow comparisons across different enterprises since fixed costs are not included and vary widely among different activities.

Table 5.13. Gross Margins of Livestock Enterprises as Percentage of Variable Costs.

Enterprise	Out EEC	In EEC
Broilers	16.24	2.8
Eggs	16.11	6.72
Swine (complete)	15.38	5.86
Swine (weaners)	17.54	5.02
Swine (feeder pigs)	3.71	- 0.35
Beef - añojo - 1	3.88	- 5.30
Beef - añojo - 2	1.21	- 6.72
Veal	1.56	- 2.87
Dairy	26.09	14.14
Lamb	3.03	2.0

Table 5.13 shows that the profitability of each case study enterprise is declining. This decline is, in most cases, primarily produced by an increase in feed costs, although in broiler, beef and milk production, EEC membership is also expected to decrease product prices. The effect of the increase in feed costs is shown in Table 5.14 which

Table 5.14. Variable Costs of Production Per Unit of Output (Pts./Unit)[a], Percent Change in Cost and Percent Change in Prices Received.

Product	Variable Costs of Production Per Unit of Output		Percent Change in Costs	Percent Change in Price Received
	Out EEC	In EEC		
Broiler (1 kg/lw)	66.56	72.23	+ 8.5	- 4.0
Eggs (1 dozen)	49.60	54.25	+ 9.4	0
Swine (1 kg/lw)[b]	92.04	98.48	+ 7.0	+ 1.5
Beef-cattle (1 kg/lw)[c]	131.45	141.30	+ 7.5	- 2.0
Milk (1 liter)	14.38	15.01	+ 4.4	- 8.0
Lamb (1 kg/lw)	161.21	162.84	+ 1.0	0

[a] Net of revenues from joint products, i.e. total variable costs, minus revenues from culling and sale of calves.

[b] "Feeder-pig" production.

[c] Semi-intensive beef production.

presents the estimated costs of production per unit of output for Spain out-of-the-EEC and for Spain in-the-EEC. The percent change in cost of production is then compared to the estimated percent change in price received per unit of output.

The largest increase in variable costs of production per unit of output occurs in the poultry subsector. The increase in costs reflects the effect of the increase in the prices of feed compounds. Producing one kilogram of live beef-cattle or pig costs substantially more in Spain in the EEC than under current conditions. Milk and lamb production are less dependent on feedgrains and, thus, the increase in variable costs of production is not as large as in the other activities. The figures in Table 5.14 represent the minimum price that farmers should receive to remain in production in the short run. If such prices prevail, the gross margins would be zero.

Table 5.15 shows the relationship between output and feed prices, and clearly suggests that under EEC conditions Spanish livestock producers will operate under less favorable price relationships, i.e. the cost of feed compounds becomes higher relative to output prices, and they will have to concentrate on increasing productivity levels.

The budgeting analysis has been helpful in identifying the declining profitability in livestock enterprises as they operate under EEC conditions. The absolute level of the new gross margin is not as important as the changes shown in

Table 5.15. Price Ratios.

Ratio of prices (pts./unit) of:	Out EEC	In EEC
Broiler to broiler compound	3.44	2.97
Dozen eggs to egg compound	3.21	2.85
Pig to pig compound	5.45	4.89
Beef to beef compound	8.35	7.39
Milk to dairy compound	1.15	0.96

comparing the actual and in-the-EEC situations for each enterprise. Finally, it should be clear that the enterprises analyzed here are of a certain type and by no means exhaust the whole range of grain and livestock farms in Spain. Therefore, generalizations made need to be qualified and interpreted with restraint.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This thesis assessed the impacts that accession to the EEC would likely have on the Spanish feedgrain-livestock subsector. Moreover, interest was in the impact that adoption of the CAP would have at the farm level. The results of this study were aimed at providing supplemental information to the results obtained by Peterson who analyzed the same issue from an aggregate and historical perspective.[1]

The principal analytical procedure used to carry out this study was partial budgeting for selected enterprises in the cereal and livestock subsectors. These enterprises were derived from case study farms representing the commercially more important farms in the feedgrain-livestock economy.

The initial set of budgets reflect the actual situation in Spain in 1979. A set of conditions was then estimated to create the environment which would have prevailed in the hypothetical case of Spain having been an EEC member in 1979. In estimating this set of Spain in-the-EEC conditions, an analysis of feed rations was performed using a linear

---

[1] Peterson, "The Adjustment of the Spanish Feedgrain-Livestock Economy Following Accession to the EC."

programming algorithm. The effect that these new conditions, i.e. a new set of prices paid and received by farmers, would have on Spanish farmers was derived by performing partial budgeting analysis and, thus, comparing the Spain in-the-EEC situation with the Spain out-of-the-EEC situation. These comparisons allowed the identification of the main impacts of entry in the EEC on the types of farms in the Spanish feedgrain-livestock subsector.

This chapter summarizes the results of the study and the author's conclusions. The chapter ends with an outline of the main limitations of this study and suggestions for future research.

Summary

Cereal and livestock farming systems in Spain are very diverse. The availability of water is the most important determinant of cropping systems. Most of Spain is fairly dry and suffers summer droughts, so unless on irrigated land, the cropping alternatives are very limited. Most of the winter-fall cereals (wheat, barley, rye, oats) are grown on dry land and most of the spring-summer cereals (corn and sorghum) are grown on irrigated land. There they compete with many other crops including sugarbeets, cotton, alfalfa, forages, and fruits. The most important winter-fall cereal producing regions are Centro, Duero and Ebro.

Livestock production systems vary among different species and regions. Poultry production is fairly

homogeneous in that it takes place in highly specialized farms and is concentrated in a few provinces. The poultry subsector is closely linked to the feed manufacturing industry, not only in terms of geographic location, but also through contractual arrangements for the provision of feed and technical assistance.

The swine subsector is also increasing in specialization and various forms of coordination between producers and feed manufacturers or processing firms are also appearing. There are still extensive pig farming activities but their importance is declining in favor of "white pork" meats produced from hogs of foreign breeds raised exclusively on feed compounds.

The cattle subsector is much more diverse, and regional differences are important. There is a large concentration of the dairy herd in the Galician, Oviedo and Santander provinces where farms tend to be very small and fragmented. Under those conditions it is difficult to benefit from economies of scale and to use the pastures adequately. Beef cattle are raised primarily in the more important cereal producing regions. There, calves tend to be imported from the breeding herds of the dairy regions and exported as ready-to-slaughter cattle to areas of high consumption levels. Intensive beef-cattle feeding practices are becoming important. This is also observed in lamb production. Sheep farming is becoming technically more efficient as semi-intensive sheep farming practices are adopted.

Traditional sheep producing areas and practices are declining in favor of more intensive systems in the main cereal producing regions.

The Spanish agricultural policy is criticized for having promoted livestock production systems highly dependent on feed compounds and disconnected from the cropping and natural resources of the country. This dichotomy between the livestock and cropping subsectors makes livestock production dependent on imported feedstuffs and foreign technology. Barley, corn and soybean meal are the three main feed ingredients used by the feed mixing industry. Two-thirds of the corn requirements and the totality of the soybean meal required by feed compounders and livestock producers are imported. This had made it possible for farmers to increase productivity and to provide meat to a population that was eating over three times more meat per capita in 1978 as compared to 1960.

The budgets developed for selected enterprises of case study farms in the cereals and livestock subsectors for 1979, provided insights into the current organization of the subsectors at the farm level. Barley tended to be more profitable than wheat on dry land in the Ebro region. However, dry land production is highly affected by climatic conditions which may produce large variations in yields. Wheat and corn are highly competitive crops on the irrigated lands of the Ebro and Gaudalquivir river valleys.

As corn yields keep improving faster than wheat yields,

corn production is becoming more profitable relative to wheat. Although corn and wheat gross margins are similar, the absolute level of costs and revenues on corn production are much higher; in this respect increasing energy costs for traction and irrigation, and increasing labor costs may have a negative effect on the relative profitability of corn.

All livestock enterprises analyzed were operating with positive gross margins. It was estimated that all of them realized a positive net margin over variable costs. However, comparisons across different enterprises cannot be made since fixed costs were not taken into consideration, and capital investments vary widely between different enterprises. The dairy enterprise analyzed is larger and technically more efficient than the average dairy farm in Northwestern Spain. However, it is not atypical and the estimated gross margin suggests that it is a fairly profitable activity. Poultry farms also generate relatively large gross margins.

Three types of swine enterprises were considered: weaner production, pig fattening and closed cycle. The last type of farm is now being promoted by the government as a way to control the African Swine Fever. Of the three operations, closed cycle and weaner production activities are the more profitable. The gross margin in pig fattening enterprises is considerably lower.

The beef and veal subsector appears to operate under

narrower margins than the dairy, poultry or swine activities. The gross margin per animal of the beef enterprises analyzed was higher in the farm using a semi-intensive production system (feeding pasture and concentrates) than in the farm raising calves only on concentrates. The lamb enterprise studied also generated a positive gross margin although prices received by farmers per kilogram of lamb are subjected to sharp fluctuations due to seasonality of supply.

For the rest of the study a hypothetical situation assumed Spain as an EEC member country in 1979. Basically, a set of prices was estimated which describe the new situation. These were contrasted to the actual conditions in Spain in 1979. The objective of identifying probable adjustments in the utilization of feedstuffs when Spain joins the EEC was achieved by analyzing the composition of current feed rations and estimating feed rations under the EEC scenario.

Results from the analysis are as follows. Broiler rations are not likely to change very much from current formulations. There will be an incentive for feed mixers and farmers to substitute corn for barley in rations for layers and hogs, since corn becomes relatively cheaper compared to barley under the CAP prices. Any shift towards corn as the main energy providing feed increases the potential for sunflower meal to be used instead of soybean meal as the protein supplement in hog rations. The extent of this shift is likely to be limited by the Spanish production of

sunflower seed and, equally important, by the sunflower crushing capacity and meal commercialization. Feed wheat is also a feedstuff with great potential for use in hog rations under EEC prices. Judging from French rations, there is also some potential for the use of manioc in rations for layers and hogs. The extent to which Spanish feed mixers will actually use manioc depends on its price, which is significantly affected by transportation and handling costs.

Partial budgeting analysis was used to assess the impact on the profitability of cereal and livestock enterprises as Spain adopts the CAP. The large increases in the price of barley received by farmers relative to changes in the prices of other cereals is likely to encourage barley production. Under the EEC scenario, barley is a much more profitable crop than wheat on dry land, suggesting a probable increase in barley production at the expense of other dry land crops.

On irrigated land, land allocation patterns are more complex because farmers have the option to grow a wider variety of crops. The set of relative prices among these is going to influence planting decisions. In this case, comparison was made between wheat and corn. Due to the small price variation estimated under the CAP, these two crops maintained their mutual competitiveness, both having similar levels of profitability. However, in both the Ebro and Andalucia Occidental regions, corn production has a

slightly higher margin.

There are three other crops in the cereal and oilseeds subsectors for which some analysts identify as having great potential under the CAP price structure. These are: durum wheat (which price in Spain under the CAP is assumed to increase by 21 percent and 41 percent assuming that Spanish farmers are entitled to the CAP production aid), sunflower and rapeseed which producer's guaranteed prices in the EEC are over 30 percent higher than in Spain.

The impacts for livestock producers operating under the set of EEC prices is adverse compared to the present situation. The profitability of all livestock enterprises considered in this study declines as a result of EEC membership. This is because the increase in feedgrain prices, especially barley, corn and sorghum, will be translated into higher cost of feeds, whether straight feedgrains or compound feeds. At the same time prices received by farmers for their outputs are not expected to increase but rather to decrease or remain unchanged in most cases. In reducing current levels of profitability, the effects of higher feed costs is more important than the effect of different output prices. An exception is the dairy enterprise, in which case the decrease of the price of milk reduces the actual gross margin more than the increased feed costs.

In the new situation the broiler, egg, swine (closed cycle and weaner production), dairy and lamb enterprises produce positive gross margins. Those, however, may not be

sufficiently large to provide a positive net farm income. The pig fattening operation generates a negative margin close to zero (gross revenue = variable costs). The beef and veal subsector, while currently operating with narrower margins, generates relatively large negative margins under the EEC scenario. This suggests that beef-cattle operations are likely to suffer more than other livestock enterprises from higher feed costs and lower prices when Spain becomes an EEC member.

All livestock enterprises, however, will have to adjust to lower margins. In linking together the analyses on rations and budgets it is suggested that the increased use of corn, especially in hog rations, may help some livestock subsectors increase technical efficiency. This will be achieved by improving feed conversion rates, i.e. lower feed requirements per unit of output, due to the use of higher energy feeds.

Conclusions and Policy Implications

The last objective of this study was to draw tentative conclusions regarding the adjustments that EEC membership will impose on the Spanish feedgrain-livestock subsector. These conclusions are now presented.

1. Under the set of relative prices expected to have prevailed under the CAP in 1979, Spanish farmers would have a strong price incentive to produce more barley, and

durum wheat. Although still not competitive with other crops on irrigated land, barley would, in most cases, out-compete soft wheat as an alternative dry-land crop. The same price increase which encourages farmers to produce more barley, will discourage feed compounders and livestock farmers from using it as the main source for animal feeding. Instead, they will be encouraged to use corn for this purpose which, in spite of a higher price under the CAP, will become less expensive relative to barley and other feedgrains than in the current Spanish situation.

The policy implications of this situation which encourages barley production and corn utilization is clear: a system of prices or trade alternatives needs to be found which avoids having large barley surpluses and costly corn imports. The Common Agricultural Policy on feedgrains allows for market price differentials between surplus and deficit areas. However, even these differentials do not seem to guarantee the use of all the Spanish barley crop, especially if it expands beyond current production levels of 8 million MT. The question seems obvious and one would expect the market pricing mechanisms to operate and reflect a situation of supply and demand equilibrium. Such cases though are more the exception than the rule under the CAP.

2. Under the CAP, the major concern of Spanish cereal producers should be meeting the EEC quality standards.

This is primarily important in the case of bread-wheat which has a higher price than feed-wheat. Quality standards also become important in the commercialization process, especially when surpluses arise and government agencies do the purchasing.

The CAP's structure of absolute and relative prices are not likely to pose great problems to feedgrain and oilseed producers. Rather they will provide an incentive to produce more barley, and possibly durum wheat and oilseeds that are well adapted to Spanish conditions.

3. The main problem in adopting the CAP for the Spanish feedgrain-livestock subsector is going to be the rising feed costs for livestock producers. Those increases in the costs of production are not likely to be met by similar increases in the prices of outputs. Furthermore, product prices are expected to decline in some cases.

This situation is difficult to visualize, especially in the poultry and swine subsectors which are very efficient. Although our analysis may somehow exaggerate the contrast of high feed costs and low livestock product prices, it points out a problem which most analysts already recognize. The capacity of each subsector to adjust will depend on their current organizational structure so that areas for potential improvement in efficiency can be identified.

For the sheep and cattle subsectors there are possibilities for improved efficiency, both in farming

activities and structures as well as in the commercialization stages. In the poultry and swine subsector the continued joint effort between farmers and feed manufacturers should provide the basis for productivity gains. In the past, it has been the partnership between feed compounders and poultry and swine producers which has allowed these subsectors to grow and gain an increasing share of the meat market. One should expect this partnership to continue the dynamic process in which they are engaged and also have the ability to adjust to EEC membership.

While egg and broiler production are very efficient at the farm level, several experts pointed at inefficiencies in the chicken processing industry. These concern the commercialization of a final product, usually a whole chicken (with or without entrails) as opposed to most EEC countries where chicken is commercialized without head and feet.

4. The implications of the in-EEC situation for livestock producers are important for policy purposes. Technical and economic efficiency improvements may require structural changes and livestock production practices which are closely linked to cropping resources. Some of these changes, especially in the dairy subsector, are already being claimed as necessary even before Spain joins the EEC. However, the important point to be made is that, in the author's view, a logical line of

adjustment to higher feedgrain costs consists of a closer link between feedstuffs production and livestock production. Beef, dairy and sheep enterprises can use more pasture and forages, whether grazed or fed as silage or hay. They can also try to increase feedgrain production on the farm.

Due to the increasing prices of feedgrains, however, feeding feedgrains produced on the farm may not be attractive since the opportunity cost as a cash crop may be too high. This is the reason why an integrated hog-barley operation may lose attractiveness under EEC conditions. Increasing the relationship between livestock and cropping activities is one of the policy priorities of the Spanish government, and one of the main difficulties being faced is one of farm structure, i.e. farm size and land tenure systems.

5. Pressures are also going to emerge as the government relinquishes its absolute control in the marketing of wheat and foreign trade in most livestock products. This trade liberalization process does not appear to be particularly difficult. However, if done late it will be under the stress of a presumably well organized EEC sector which may be very aggressive in trying to gain access to the Spanish market.
6. Finally, we come back to the basic question of Spain's integration in the EEC. It is a political decision which cannot be disputed on economic grounds, but which

has important economic implications that cannot be overlooked. It has been recognized from the beginning, especially by the EEC Commission, that the process of enlargement may cause market distortions. These need to be anticipated and their effects mitigated to allow a transition that will minimize social costs. We would hope the issues raised in this study will help anticipate problems and encourage an early response to them.

Limitations and Needed Research

This study has three main limitations. First, the data base was deficient. The data from which enterprise budgets have been developed is fairly reliable. However, there is no complete set of farm level data regarding technical and economic information to allow us to be more exhaustive in deriving modal situations from which to extrapolate at the regional or national level. This has limited the analyses to a set of case study farms which are more or less representative, depending on the activity. In any case the degree of representativeness could not be determined. This is why they have been referred to as "case study farms." Therefore, this study does not permit a generalization of the results to the national level.

The second limitation concerns the assumption made in developing a hypothetical Spain in-the-EEC scenario for 1979. The procedures used are spelled out in Chapter V. The main assumption is that the CAP prices and other policy measures

that existed in 1979 are a good indicator of the prices and policies which will prevail when Spain joins the Community. This is an area of uncertainty and our best guess is, of course, debatable.

Another critical area where uncertainties prevail is on monetary aspects. The current exchange rates between pesetas and the European Currency Unit or U.S. dollars may well be different from the exchange rates at the time of accession.[1] This may not be critical for the analyses performed in this study if the relative price level remains unchanged. However, it becomes critical when considering trade implications when assumptions about monetary compensatory amounts also need to be made.

The third main limitation of this study is its comparative static character. Such a comparison is justified for research purposes, but it is clearly unreal. The real situation if Spain joins the EEC, as is expected, is certainly going to be one of a change in relative prices and a change in policies. These changes, though, will be gradual and directed, and other components will not remain fixed. Energy and labor costs, improvement in yields, climatic conditions, consumers' tastes and preference, all are going to influence the production trends of Spanish agriculture.

---

[1] Some experts believe that the Spanish peseta will be devalued as Spain joins the EEC. The pesetas' parity with the U.S. dollar has not changed much in recent years, while the inflation rate in Spain has been considerably higher than in the U.S.

Particularly, as Spain joins the EEC, the general price level is expected to increase and with it labor costs will rise. In this analysis labor costs have remained unchanged.

To predict all these adjustments requires the use of sophisticated forecasting techniques. Still the predictions will have a certain error associated with them. Therefore, the comparative static method was used for simplicity, also because the assumptions made seem as good as any other guesses on the future evolution of the CAP. Most of all, it was used because the objective was to identify pressures and not absolute magnitudes of changes in enterprise profitability over time.

In carrying out this study it became obvious that there is a great deficiency of farm level data. There are benefits of policy formulation from good information about the structure of agricultural subsectors and about observed behavioral responses by agricultural producers. This is especially true in light of a negotiation process with the EEC. The concern about the effects of political decisions on specific groups should encourage the search for adequate supportive information. An immediate advantage of having detailed and up to date farm level data would be to support studies such as the one presented here which would permit aggregating results from the micro level to the national level.

Another area which needs further research is that of extensive versus intensive agriculture. If Spain is to meet

its domestic demand of livestock products from domestic supply, it is clear that pastures and forage crops cannot feed the beef and dairy herds and the sheep flocks. There may be possibilities, however, for complementarity between extensive and intensive production systems, particularly associated with the different stages of production (e.g. breeding, rearing, growing, fattening). This matter is worthy of being studied in more detail.

Finally, vertical coordination in agriculture, and especially vertical integration arrangements, is an area which has been only superficially studied. There are economic and social costs and benefits resulting from different mechanisms of coordinating vertical stages in the Spanish production-marketing processes and little empirical analysis is currently available to guide policy makers.

APPENDICES

APPENDIX 1

DATA SOURCES USED IN THE DERIVATION OF ENTERPRISE BUDGETS

The budgets presented in Chapter V were derived from secondary data and primary data provided by feed manufacturers. These budgets contain three types of information: farm typology, technical and prices.

Farm Typology and Technical Information

Farm typology refers to farm size and the level of mechanization. Technical information consists of input-output relationships. The following sources were used (please refer to list in the last part of this appendix).

- CROPS in the Ebro region: (1), (2), (3), (4), (25) and opinions of experts from Aula Dei (INIA, CSIC and Mediterranean Agronomic Institute) in Zaragoza.
- CROPS in the Guadalquivir valley: (5), (6), (7) and opinions of experts from INIA-CRIDA 10 and ETEA in Cordoba. INIA researchers also made available preliminary results of a survey on corn production systems.
- POULTRY and SWINE: (8), (9), (10) (19-only for swine), (24), (25) and, most importantly, data provided by

feed manufacturers. A farmers' union also provided its cost of production estimates. The department of Agricultural Economics in INIA-CRIDA 03 in Zaragoza made available information from farm surveys on swine production. Feed manufacturers provided summary data of their associated farms for each subsector. In addition they provided technical and accounting records of 112 specialized broiler farms, 21 specialized egg producing farms and aggregated records accounting for the production of 160,000 hogs.

- CATTLE: (8), (11), (12), (13), (14), (15), (16), (17), (18), (24), (25) and also some data provided by feed manufacturers.
- SHEEP: (20), (21), (22), (23), (24), (25) and also some data provided by feed manufacturers.

Prices

The specific Spanish prices used in the farm budgets are mentioned in Chapter IV and summarized in Tables 5.1 and 5.2 in Chapter V. Basically the sources are from the Ministry of Agriculture. Feed manufacturers also provided information on feed prices, but this was not used in order to maintain consistency of sources.

EEC prices were taken from (28), (29), and (30) and then converted into pesetas and dollars for allowing a direct comparison with Spanish prices. Institutional prices were converted from ECUs into pesetas and dollars.

The exchange rates used are shown in the notes of Table A1.1.

Tables A1.1. and A1.2. below show a comparison of prices received and paid by farmers in Spain, France and Italy in 1979 as well as the estimated prices for Spain in the EEC. Institutional Spanish and EEC prices for the agricultural year 1979-80 are also compared. The period is different than the natural year 1979, so that they are not directly comparable to the market prices.

TABLE A1.1. Comparison of Prices Received by Farmers in Spain (out and in the EEC), France, and Italy (1979) and Institutional Prices

(In US$ per 100 Kg. and 100 Kg. liveweight unless otherwise indicated)[a]

Products	SPAIN out (A)	SPAIN in (B)	$\frac{B-A}{B}100$ (C)	FRANCE (D)	ITALY (E)	INSTITUTIONAL 79-80 SPAIN (F)	INSTITUTIONAL 79-80 EEC (G)	$\frac{G-F}{G}100$ (H)
Wheat Durum	27.42	33.36	+21.7	25.97	31.56	27.56[b]	34.15[b]	+23.9
Wheat soft II	23.24	22.65	- 2.5	19.37	24.05	23.24[b]	23.04[c]	- .9
Barley	16.84	19.91	+18.2	17.50	22.78	16.39[b]	20.45[b]	+24.8
Corn	20.19	20.34	+ .7	18.27	23.07	22.35[b]	20.45[b]	- 8.5
						20.11[d]	24.52[e]	+21.9
Sunflowerseed	41.08	-	-	-	-	40.97[b]	52.78[b]	+28.8
Chicken	115.27	110.66	- 4.0	106.71[g]	104.15[h]	124.91[l]	-	-
Eggs ($/doz.)	.87	.87	0	.92	.81	.91[l]	-	-
Pigs	142.22	144.30	+ 1.5	127.02[i,k]	147.29[j]	133.5[l,k]	144.3[l,k]	+ 8.1
Piglets ($/ 18 Kg. animal)	44.70	42.91	- 4.0	37.23	37.76	-	-	-
Beef	203.46	199.36	- 2.0	200.47[l]	174.44[m]	223.50[l]	211.87[l]	- 5.2
Veal	246.37	246.37	0	280.41[n]	241.88[o]	-	-	-
Milk ($/100 l.)	28.76	26.45	- 8.0	24.36[p]	30.63[p]	28.91[l]	28.48[l,k]	- 1.5
Lamb	247.5[q]	247.5[q]	0	258.32[r]	230.28[s]	-	-	-

Source: See price data sources on page 212.

TABLE A1.1. (continued)

---

[a]Exchange rates 1979:
100 FF = 23.505 US$
100 Lit = .12035 US$
100 ECU = 137.065 US$
100 Pts = 1.490 US$

from the International Financial Statistics - IMF.

[b]Intervention price

[c]Reference price for bread-wheat

[d]Entry price

[e]Threshold price

[f]Indicative, target, basic or guide price

[g]"Poulets d'elevage"

[h]"Polli di allevamento in batteria"

[i]"Porcs - class II"

[j]"Suini grassi"

[k]Price derived from carcass weight price, conversion = 70%

[l]"Genisses R" (heifer)

[m]"Manze I" (heifer)

[n]"Veaux"

[o]"Vitelli I"

[p]Converted from Kg. at 1 Kg. = .971 liters

[q]"Pascual"

[r]"Agneaux gris"

[s]"Agnelloni"

TABLE A1.2. Comparison of Prices Paid by Farmers for Feeds in Spain (out and in the EEC), France and Italy. 1979

(US $/100 Kg.)

Feed	SPAIN out	SPAIN in	Percent Change	FRANCE	ITALY
Feed wheat	-	21.31	-	-	-
Barley	17.28	20.49	+ 18.6	20.92	23.68
Corn	20.11	22.51	+ 11.9	22.32	22.88
Sorghum	18.62	22.06	+ 18.5	-	-
Bran	15.12	17.22	+ 13.9	16.40	18.86
Soybean meal 44%	30.54	30.54	0	-	30.09
Sunfl. meal 36%	20.26	20.26	0	20.46	-
Fish meal 63%	67.05	59.60	- 11.1	48.84	56.00
Meat & bone meal	31.29	31.29	0	29.89	31.52
Skim milk	64.07	64.07	0	-	-
Milk replacer	81.98	96.85	+ 18.1	107.49	95.77
Urea	22.35	22.35	0	-	-
Alfalfa Deh. 17%	15.35	16.99	+ 10.7	15.34	20.34
Alfalfa Hay	10.58	11.62	+ 9.8	-	-
Forage	4.47	4.47	0	-	-
Straw	4.47	4.84	+ 8.3	3.56	5.91
Broiler compound	33.52	37.25	+ 11.1	36.10	30.67
Layer compound	26.97	30.40	+ 12.7	29.52	30.22
Piglet compound	35.01	36.50	+ 4.3	33.53	30.24
Hog compound	26.07	29.50	+ 13.2	28.68	28.35
Bulk Swine comp.	23.84	27.12	+ 13.8	27.58	-
Beef complement	24.29	26.97	+ 11.0	27.05	26.92
Dairy complem.	25.03	27.56	+ 10.1	26.25	27.50

Source: See price data sources on page 212.

Exchange rates same as in Table A1.1.

DATA SOURCES ON COSTS OF PRODUCTION, PRODUCTION SYSTEMS AND PRICES

Crops in the Ebro Region

(1) J. Gros Zubiaga y F. Arieta y Gonzalez Tablas. El Maiz en Zaragoza. Departamento de Economía Agraria. INIA-CRIDA 03. Zaragoza, 1978.

(2) J. Gros y J.L. Alejandre. "Costes de Producción de Trigo y Cebada en Secano." Departamento de Economía Agraria. INIA-CRIDA 03. Zaragoza, 1980.

(3) F.J. Cavero y V. Gomez. Análisis de la Situación de los Regadíos de la Ribera Navarra. Departamento de Economía Agraria. INIA-CRIDA 03. Zaragoza, 1977.

(4) _____. Evolución del Optimo Económico de las Explotaciones de una Zona de Nuevos Regadíos. Departamento de Economía Agraria. INIA-CRIDA 03. Zaragoza, 1978.

Crops in the Guadalquivir Valley

(5) Cámara Oficial Sindical Agraria. Costes Agrarios de Producción de Sevilla en 1974. Editorial Católica Española. Sevilla, 1976. Also a new edition for 1978.

(6) J.J. Romero Rodríguez. Análisis de las Potencialidades Agrícolas de la Zona de Fuente Palmera en la Provincia de Córdoba. ETEA, Córdoba, 1975.

(7) A. Guerrero. Cultivos Herbáceos Extensivos. Ediciones Mundi Prensa. Madrid, 1977.

Livestock Activities

(8) A. Ribelles. Estudio de Costes de Determinadas Producciones Animales. Estudios Económicos Copaga. 1980.

(9) A. Checchi y J. Peix. L'explotació Pagesa a Catalunya. Editorial Vicens-Vives. Barcelona, 1979.

(10) M. Sanz. "Situació i Avenir de la Ramadería de les Comarques Meridionals." Paper presented in the "Jornades Agraries." Reus, 1980.

(11) V. Gomez. Algunos Aspectos sobre el Cebo de Terneros en las Explotaciones Aragonesas. Departamento de Economía Agraria. INIA-CRIDA 03. Zaragoza, 1976.

(12) J. Gros y F. de Arieta. Sistemas de Engorde de Terneros en los Regadíos de Zaragoza. Comunicaciones INIA. Serie: Economía Agraria, no. 1, 1976.

(13) INIA-CRIDA 01. "Comunicaciones Presentadas al III Seminario INIA/SEA sobre Pastos, Forrajes y Producción Animal." Mabegondo (Coruña) Noviembre 1977.

(14) R. Jiménez, N. Badía, J. Zea y G. Guerrero. Producción de Carne de Vacuno Joven. Análisis Económico de la Sustitución de Concentrados por Forrajes. Anales INIA. Serie: Producción Animal, no. 5, 1974. Also a previous article on the same topic in Anales INIA, Serie: Producción Animal, no. 3, 1972.

(15) V. Canete, F. Lázaro, J.F. Gálvez. Empleo de Urea y Cereales en el Engorde de Terneros Frisones. Anales INIA. Serie: Produccion Animal, no. 8, 1977.

(16) Agencia de Desarrollo Ganadero. Comentarios sobre el Censo de Ganado Realizado en Explotaciones de la A.D.G. en Septiembre de 1978. Madrid, 1979.

(17) _____. Controles de Producción Lechera, Análisis de los Resultados. Boletín 11. Madrid, 1979. Also other unpublished A.D.G. papers.

(18) V. Calcedo Ordoñez. "La Producción de Leche en la CEE y en España," Agricultura y Sociedad, no. 14 (Enero 1980), pp. 215-239.

(19) J. Thos. Economía de la Producción Porcina en el Valle Medio del Ebro. Facultad de Veterinaria. Trabajos IEPGE no. 13. Zaragoza, 1973.

(20) R. Revilla y E. Saez. Repercusión Económica de la Alimentación en la Producción Ovina. Facultad de Veterinaria. Trabajos IEPGE no. 39. Zaragoza, 1979.

(21) _____. Las Explotaciones Lecheras de Ganado Ovino en España. Anales de la Facultad de Veterinaria, no. 11-12. Zaragoza, 1977-78.

(22) E. Manrique y R. Revilla. "La Explotación Familiar Ovina en Zonas de Regadío." Análisis técnico-económico de tres explotaciones representativas. Paper presented in the "Jornadas Luso-Espanolas de Ovinotecnia." Santarem, Junio 1980.

(23) A. Carmona. "El Cebo de Corderos: Razas y Aptitudes Cárnicas," Ganado Lanar, edited by the "Cámara Oficial Sindical Agraria de Sevilla." Sevilla, 1978.

General

(24) J.J. Hernández Benedí. Manual de Nutrición y Alimentación del Ganado. Publicaciones de Extensión Agraria, Ministerio de Agricultura. Madrid, 1980.

(25) Ministerio de Agricultura. Red Contable Agraria Nacional. Resultados Empresariales de 1979.

Prices

(26) Ministerio de Agricultura. Boletín Mensual de Estadística Agraria. Junio 1980.

(27) _____. "Adhesión España. Trabajos Preparatorios. Agricultura." Answers to the EEC questionnaire. Various Documents. Undated.

(28) EUROSTAT. Selling Prices of Vegetable Products (1 and 3/1980); Selling Prices of Animal Products (1 and 3/1980); Purchase Prices of the Means of Production (1 and 3/1980); Agricultural Price Statistics, 1969-1979 (1980).

(29) Commission of the European Communities. Agricultural Markets: Livestock Products. (Price Series). Also other Commission and Eurostat sources for institutional prices.

(30) Commission of the European Communities. Projet Negotiations d'Adhesion de l'Espagne, Proposition Concernant le Secteur Agricole. February 1980, rev. 2. It contains useful tables comparing Spanish and EEC prices. These tables are also reproduced in El Campo, Boletín de información agraria del Banco de Bilbao. No. 77, Mayo-Junio 1980.

APPENDIX 2

MATRIXES OF TECHNICAL COEFFICIENTS AND NUTRIENT REQUIREMENTS FOR ESTIMATING LEAST-COST FEED RATIONS

TABLE A2.1. Matrix of Technical Coefficients and Nutrient Requirements for Estimating Least-Cost Poultry Rations

Feed Ingredients	FEED													REQUIREMENTS per kg fed	
	Barley	Corn	Sorgh.	Wheat Bran	Alfalfa meal	Fish meal	Meat meal	Soyb. meal	Animal fat	Lime-stone	Phosph. (dical)	Salt	Methi-onine	Broiler	Layer
Kilogrammes	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	= 1.0	1.0
Met.Energy Kcal	2800	3370	3250	1600	1040	2800	1920	2200	7800					=3190[1]	2860[1]
Crude Protein %	10.0	9.5	9.5	15.5	17.5	65.0	50.0	45.0					98.0	≥22.0	16.0
Lysine %	.35	.25	.20	.4	.72	4.8	2.6	2.8						≥ 1.15	.7
Meth. & Cys. %	.4	.35	.25	.41	.4	2.2	.9	1.3					98.0	≥ .86	.52
Tryptophane %	.15	.07	.09	.3	.4	.6	.25	.63						≥ .22	.15
Calcium %	.05	.02	.04	.15	1.35	3.8	10.0	.3		38.0	21.0			≥ .86 ≤ .94	2.8 3.15
Phosphorus %	.35	.2	.3	1.15	.25	2.5	5.0	.6			18.5			≥ .55	.65
Sodium %	.05	.02	.05	.2	.9	.5	.73	.04			.1	38.0		≥ .13 ≤ .19	.13 .19

Source: Refer to the text, Chapter V.

[1]The program used allowed for balancing the ration by adjusting the energy content (low energy vs. high energy).

TABLE A2.2. Matrix of Technical Coefficients and Nutrient Requirements for Estimating Least-Cost Swine Rations

Feed Ingredients	FEED														REQUIREMENTS		
	Barley	Corn	Sorgh.	Wheat	Wheat Bran	Alfalfa meal	Fish meal	Meat meal	Soyb. meal	Sunfl. meal	Blood meal	Lime-stone	Phos-phor.	Salt	20-60 Kg.	60-95 Kg.	Single Ration
Kilogramme	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1	= 1.0	1.0	1.0
Feed Unit	1.0	1.1	.98	1.02	.8	.7	1.0	.83	1.02	.78	1.2				= 1.0[1]	1.0[1]	1.0[1]
Crude Protein %	10.0	9.5	9.5	10.5	15.5	17.5	65.0	50.0	45.0	39.0	81.0				≥16.0	14.0	15.0
Crude Fiber %	5.5	2.2	2.6	2.5	9.5	25.0	1.0	1.0	7.0	16.0	1.0				≤ 4.0	5.0	4.5
Calcium %	.05	.02	.04	.05	.15	1.35	3.8	10.0	.3	.3	.3	33.84	23.13		≥ .5 ≤ .8	.5 .8	.5 .8
Phosphorus %	.35	.2	.3	.4	1.15	.25	2.5	5.0	.6	1.2	.3	.02	18.65		≥ .6	.5	.55
Salt %														100	≥ .25	.25	.25
Lysine %	.35	.25	.2	.35	.4	.72	4.8	2.6	2.8	1.7	6.0				≥ .6	.55	.55
Meth. & Cys. %	.4	.35	.25	.53	.41	.4	2.2	.9	1.3	2.2	2.3				≥ .4	.3	.35
Tryptophane %	.15	.07	.09	.16	.3	.4	.6	.25	.63	.5	1.0				≥ .11	.09	.1

Source: Refer to the text, Chapter V.

[1]The program used allowed for balancing the ration by adjusting the energy content (low energy vs. high energy).

LIST OF REFERENCES

LIST OF REFERENCES

AGRA EUROPE. The Agricultural Implications of EEC Enlargement. Part III: Spain. Agra Europe Special Report, no. 6, 1980.

Banco de Bilbao. Informe Económico 1979. Bilbao, 1980.

Black, W.E. and J.E. Haskell. "Vertical Integration Through Ownership." Marketing Alternatives for Agriculture, E.M. Bonn, editor. Cornell University, November 1976.

Briz, J. (coordinator). España y la Europa Verde. Editorial Agrícola Española. Madrid, 1979.

Caldentey Albert, P. "El Ciclo del Cerdo en España en el Periodo 1959-1977." Agricultura y Sociedad, no. 14 (Enero 1980), pp. 127-163.

Carter, J.F., ed. Sunflower Science and Technology. No. 19 in the Series Agronomy. American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, INC. Publishers. Madison, 1978.

Commission of the European Communities. Commission's Opinion to the Council Concerning Spain's Application for Accession. Com (78) 630 Final and annex. Brussels, November 1978.

_____. "Enlargement of the Community (General Considerations)." Bulletin of the EC. Supplement 1/78. Belgium, 1978.

Cornejo Garcia, J. "Operativa de las Importaciones de Cereales-Pienso y de Soja en España." Agricultura, no. 581 (Noviembre 1980), pp. 750-761.

Crissman, Charles. Sources of Growth in Spanish Agriculture: 1960-1978. Unpublished M.Sc. Dissertation. University of Missouri-Columbia, 1981.

Diez Patier, E. Efficient Organization of the Fluid Milk Subsystem in Spain. Ph.D. Dissertation. Michigan State University, 1976.

_____. "Mercado de Carnes." Agricultura. (Mimeographed copy, undated).

Fernandez Rojas, A. "La Industria de Piensos Compuestos en España." Agricultura, no. 581 (Noviembre 1980), pp. 742-749.

FORPPA. Memoria 1978. Resumen.

Gomez Orbaneja, A. y Checchi Lang, A. La Agricultura Española, Rezagada o Descarriada ? Moneda y Crédito. Madrid, 1980.

Gros Zubiaga, J. y J.L. Alejandre Gimeno. "Costes de Producción de Trigo y de Cebada en Secano." Departamento de Economía Agraria, INIA-CRIDA 03, Zaragoza, 1980 (mimeograph).

Grupo E.R.A. Las Agriculturas Andaluzas. Servicio de Publicaciones Agrarias. Madrid, 1980.

Harsh, S.B. and J.R. Black. Agricultural Economics Linear Program Package - Version 2. Staff Paper no. 75-10. Department of Agricultural Economics, Michigan State University, April 1975.

Hasha, Gene R. "A Preliminary Examination of the Adoption of the Common Agricultural Policy for the Spanish Feed-Livestock Sector." Paper presented to the Conference on Agricultural Trade Implications of EC Enlargement. (Minneapolis, June 1980).

Henry, W.R. and R. Raunikar. "Integration in Practice - The Broiler Case." Journal of Farm Economics, vol. XLII, no. 5. December 1960, pp. 1265-1274.

Hernández Benedí, J.M. Manual de Nutrición y Alimentación del Ganado. Publicaciones de Extensión Agraria, Ministerio de Agricultura. Madrid, 1980.

Hoffman, A.C. "Vertical Integration in the Food Industries." Coordination and Exchange in Agricultural Subsectors. NC Project 117, Monograph 2, January 1976.

Instituto Nacional de Estadística. Censo Agrario de España 1972. Serie C. Resúmenes Nacionales (por provincias). Madrid, 1979.

IRESCO. Comercialización de la Carne. Colección de Estudios IRESCO. Ministerio de Comercio y Turismo. No. 16. Madrid, 1977.

Josling, Timothy E. and Scott R. Pearson. "Future Development in the Common Agricultural Policy of the European Community." Final Report submitted to USDA. November 1980. Mimeograph.

Langreo, Alicia. "La Integración Vertical en España." Agricultura y Sociedad, no. 9 (Octubre 1978), pp. 187-205.

Ministerio de Agricultura. Anuario de Estadística Agraria 1978. Servicio de Publicaciones Agrarias. Madrid, 1979.

_____. La Agricultura Española en 1978. Servicio de Publicaciones Agrarias. Madrid, 1979.

_____. Boletín Mensual de Estadística Agraria. (Censo Ganadero de España en Marzo 1978). Servicio de Publicaciones Agrarias. Madrid, 1979.

_____. Boletín Mensual de Estadística Agraria. 6/80. Servicio de Publicaciones Agrarias. Madrid, 1980.

_____. Red Contable Agraria Nacional. Resultados empresariales 1979. Servicio de Publicaciones Agrarias. Madrid, 1980.

_____. "Adhesión España, Trabajos Preparatorios, Agricultura." Answers to the EEC questionnaire. Documents nos. 1, 3, 6-II, 9, 10, 15, 16, 21, 28. (Undated.)

NC Project 117. The Egg Subsector of US Agriculture: A Review of Organization and Performance. Monograph 6. June 1978.

Pasca, Roberto. "Conflicts Arising from the Enlargement of the Community: an Italian Perspective." Prospects for Agriculture in the EEC, M. Tracy and I. Hodac, editors. College of Europe, Bruges, 1979.

Pérez Lanzac J., P. Corcuera Muguerza y A. González Carbajo. "El Marco General de la Demanda de Alimentos Concentrados por la Ganadería Española y su Proyección para 1980." ITEA, no. 33, 1978. pp. 13-28.

Peterson, E. Wesley F. "The Adjustment of the Spanish Feedgrain-Livestock Economy Following Accession to the European Economic Community." Ph.D. Dissertation. Michigan State University, 1981.

Rahn, Allan P. "A Strategic Planning Model for Commercial Laying Flocks." Poultry Science, vol. 56, no. 5, September 1977, pp. 1579-1584.

Ribelles, Antonio. Estudio de Costes de Determinadas Producciones Animales. Estudios Económicos COPAGA, 1980.

Ries, Adrien. L'ABC du Marché Commun Agricole. Editions Labor. Bruxelles, 1978.

Rodriguez Zuñiga, M., J. Ruiz Huerta y R. Soria Gutierrez. El Desarrollo Ganadero Español: el Sector Vacuno. Departamento de Economía Agraria, Consejo Superior de Investigaciones Científicas. Monografías no. 8. Madrid, 1979.

_____. "El Desarrollo Ganadero Español: un Modelo Dependiente y Desequilibrado." Agricultura y Sociedad, no. 14, pp. 165-193. Enero 1980.

Sanz Callejas, Mariano. "Situació i Avenir de la Ramadería de les Comarques Meridionals." Paper presented to the "Jornades Agraries," Reus 1980. (Mimeograph).

SENPA, Ministerio de Agricultura. Memoria de Actividades año 1977. Madrid.

Solbes Mira, P. La Adhesión de España a la CEE. Los Efectos sobre la Protección Exterior a la Agricultura. Monografías de Moneda y Crédito, no. 2. Madrid, 1979.

"Farming in the EEC." The Economist. November 1, 1980.

Thompson, James T. "Defining Typical Resource Situations." Farm Size and Output Research. Southern Cooperative Series. Bulletin no. 56, June 1958.

USDA. The Chicken Broiler Industry. ERS Agricultural Economic Report no. 381. August 1977.

_____. Feed Use and Feed Conversion Ratios in the Member Countries of the European Community. IED Staff Report. January 1980.

USDA. Selected Agricultural Statistics on Spain: 1965-76. ESCS Statistical Bulletin no. 630. March 1980.

Vidal, Jose E. "Spain's Mixed-Feed Industry Continues Dramatic Expansion." Foreign Agriculture, May 8, 1978, pp. 14-15.

Williamson, Oliver E. Markets and Hierarchies: Analysis and Antitrust Implications. The Free Press. New York, 1975.