

Agricultural development in the Netherlands

An analysis of the history of Dutch agricultural development and its importance for China

Haifa Feng

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A Chinese economist made an analysis of the development of the agricultural sector of the Netherlands in order to assess factors which could be of importance for the development of agriculture in China. The study starts with a description of the actual situation and then long term trends in Dutch agricultural development are analysed. These main features are: land ownership and tenure system, free trade system, cooperative system, financing system, marketing system, organizational system, the system for education, research and extension and the government policy system. On the basis of this analysis the concept of Dutch agricultural development is formulated as this could be important for developing economies. The author finally deals with the question: 'What can China learn from the Dutch experience?'

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Abbreviations

LEI	Agricultural Economics Research Institute in the Netherlands
DLO	Agricultural Research Department
LNV	Ministry of Agriculture, Nature Management and Fisheries in the Netherlands
EU	European Union
EC	European Community
VNO-NCW	Confederation of Dutch Employers
TFP	Total Factor Productivity
AWU	Annual Work Units
ECU	European Currency Units
CPB	Central Planning Bureau in the Netherlands
NSU	Netherlands Size Units
NLG (<i>f</i>)	Dutch guilder
NCR	National Cooperative Council for Agriculture in the Netherlands
OECD	Organization of Economic Cooperation and Development
NATO	North Atlantic Treaty Organization
ALGF	Agricultural Loan Guarantee Fund in the Netherlands
VECO	Union of the Netherlands Seed, Seed Potato and Trade Potato Marketing
STOPA	Surplus Buying Agency in the Netherlands
LTO	Dutch Federation of Agricultural and Horticultural Organizations
WTO	World Trade Organization
AUW	Agricultural University in Wageningen in the Netherlands
DLV	Agricultural Extension Service in the Netherlands
SEV	Social-economic Consultancy Service in the Netherlands
ADRF	Agricultural Development and Reorganization Fund in the Netherlands
CAP	Common Agricultural Policy of EU

Preface

In November 1995 the Chinese Minister of Agriculture, Mr. Liu Jiang, and his Dutch counterpart, Mr. J.J. van Aartsen, agreed on a Letter of Intent for Agricultural Cooperation between both ministries. In part this was an Agreement between the Chinese Academy of Agricultural Sciences (CAAS) and the Netherlands Agricultural Research Department (DLO-NL) on cooperative research in agricultural economics. On the basis of this Agreement, the Institute of Agricultural Economics (IAE-CAAS) and the Agricultural Economics Research Institute (LEI) have formulated three joint research projects, one of which focuses on 'the experience of Dutch agricultural development and its importance to agriculture in the People's Republic of China'.

The two major objectives of these projects are:

- to reveal the causes of the great difference between agricultural productivity in China and the Netherlands and to find ways to improve the efficiency of Chinese agriculture;
- to analyse developments in Chinese agriculture with special reference to market opportunities for Dutch agribusiness.

The project will start with some basic reviews on the development of agriculture in the Yangtze Delta since 1978 and in the Netherlands in the last century.

Prof. Dr. Feng Haifa, assistant director of IAE-CAAS, and visiting scholar at LEI from November 1996 to May 1997, has written a report called 'On Dutch Agricultural Development'. This review has proven to be an excellent step in the project. Even for Dutch readers, it will be interesting to learn from developments in the past. Prof. Feng referred to one of three famous Chinese expressions to illustrate this: 'Taking history as mirror, the ups and downs can be understood correctly.' It is evident and of great relevance to learn from past developments.

Looking for the effect of different economic, social and institutional factors at different stages of agricultural development enables one to learn from successes and failures. From this study as well, it is clear that there is never just one single factor involved. From the Dutch experience it is also clear that agricultural development is a never-ending story and that its adjustment is therefore a constant issue. Nevertheless, it is a challenge for agricultural economists to provide relevant information to policy-makers, farmers and agribusinesses to prepare for their decisions and actions. We expect that the results of the project will provide an important contribution to the benefit of both nations. The questions to be answered in this project challenge Chinese as well as Dutch scientists.

It has been a real honour and pleasure for LEI to have had Prof. Feng Haifa as visiting scholar. Thanks to his intensive efforts, he has made a substantial contribution to the project in only six months. In my opinion, he has touched on the right aspects in Dutch agricultural development. His work consisted of reading reports and consultations with many

Dutch experts. I would like to thank all these informants for their efforts.

As said before, this study should be regarded as an important step in the project. Many steps have to follow. Future cooperation with Prof. Feng Haifa and his colleagues will be an interesting and pleasant challenge to all of us.

The managing director,

Prof.Dr. L.C. Zachariasse

Acknowledgements

In China, my specialist research area is agricultural development and policy. Besides research work, I am also a part-time teacher in the Postgraduate School at the Chinese Academy of Agricultural Sciences (CAAS). I teach Development Economics to postgraduates majoring in agricultural economics and farm management.

During my research and teaching career, I had read about Dutch agricultural development and already knew that Dutch flowers are world famous. Not for nothing is Dutch net agricultural trade volume second only to the United States in the world. I have always asked myself why the Netherlands is able to make such great achievements in agriculture and what the underlying factors and the driving force are behind the prosperity of Dutch agriculture. My postgraduate students sometimes asked me to explain these issues, but unfortunately there is little information in print in China about Dutch agricultural development. I could not fully answer these questions, either to the satisfaction of the postgraduates or myself.

Before I set foot on Dutch soil, I only knew that the Netherlands had a very healthy agricultural industry. What I did not know was why and how Dutch agriculture had become so healthy. The reasons for the successes of Dutch agricultural development are a maze for me, as well as for almost all of the Chinese agricultural economics researchers and agricultural policy-makers. Because China is a large country with the largest developing agriculture in the world, it goes without saying that China will have to speed up agricultural development as much as possible in the near future. And China will need to take heed of all the agricultural lessons learned in other countries to transform its traditional agriculture into modern agriculture.

The experience of Dutch agricultural development will without doubt be very useful for China in its journey toward agricultural modernization. So exploring and explaining the miracle of Dutch agricultural success has become one of my most important research goals. I had been longing to visit the Netherlands to analyse the course of Dutch agricultural development and translate the Dutch model to the situation in China.

I have now achieved this goal. According to a bilateral cooperation plan between the Dutch Ministry of Agriculture, Nature Management and Fisheries and the Chinese Ministry of Agriculture, I lived in the Netherlands for six months from late November 1996 till late May 1997 as a visiting scholar. Even though six months is not long enough for one to reveal the full picture of the experiences of Dutch agricultural development, it did provide me with a good opportunity to drop in on this 'low country' and investigate its agricultural development. No matter how you count it, whether in months, days or hours, the time I had to complete my work was rather limited. Time is a precious treasure and, as the saying goes, time and tide wait for no man and procrastination is the thief of time. For me, the first important issue was to seize the opportunity and make the best use of the limited time. So, as soon as I landed in this beautiful 'low land', I threw myself into the ocean of information

and concentrated on the topic which was already at the top of my research agenda. This report is the main result of my research work, and although it is in my opinion by no means perfect, I dare say that it is the fruit of my painstaking labours during my visit in the Netherlands.

I consider it a pity that, although I study agricultural development in the Netherlands, I do not understand Dutch. Fortunately, even though the Netherlands is not an English-speaking country, almost all Dutch people can understand English and most of them can speak it fluently. What impressed me most is that Dutch farmers can understand and speak English, as this is unthinkable in China. There is abundant literature written in English in the Netherlands, and so I could always find what I wanted. I did not feel any inconvenience during everyday work and life. From this point of view, the Netherlands is an ideal country in which to work and live, not only for its own people but also for any world citizen. The Netherlands is not an English-speaking country, but the English language is so popular in Dutch society that I think it may partly explain the success of Dutch agricultural development.

It would have been absolutely impossible for me to read all the material available on Dutch agricultural development in my limited time. I had to confine myself to studying the development of Dutch agriculture and especially the underlying reasons which have made Dutch agriculture a success. I selected related materials to read and digest, in so far as possible, and then expressed the processed research result as soon as I could in accordance with my own ideas and beliefs. So my report is based only on selected materials. With regard to the structure of the report, I have given priority to the needs of the Chinese reader so as to be consistent with the main mission of my research visit. However, the report is not intended only for Chinese consumption. The analysis in my report should be helpful to people, particularly in developing countries, who are interested in Dutch agricultural development but are working far from Western Europe and may have little immediate prospect of visiting the Netherlands. And even Dutch readers may learn something from a Chinese view of their agriculture, because in China there is a famous saying: the onlooker sees the game best.

During the course of my research visit, I have been fortunate in receiving a lot of support and help, in one way or another, from various people and organizations. Financial support from the IAC (International Agricultural Centre in the Netherlands) is gratefully acknowledged. Without this support it would have been impossible for me to visit and stay in the Netherlands. Financial support from LEI for publishing my work is also gratefully acknowledged, as without it my life in the Netherlands would have been more difficult and my research report would not have been published in English. I would also like to express my thanks for a fellowship granted by LEI. As the central organization in the Netherlands for socio-economic research into agriculture, horticulture, fisheries, forestry and rural areas, LEI has first-class facilities and an excellent academic climate for research. What I have gained from LEI is not only information about Dutch agricultural development; I have also learned how to manage a modern institute, which will help me in my management activities after my return to China.

I am most indebted to Prof. Dr. L.C. Zachariasse, the Director of LEI, who not only gave me a lot of help on indoor work and field trips, but also in everyday life. It was Prof.

Dr. V. Zachariasse who arranged the comfortable apartment for me despite his very busy schedule. Discussions with him on Dutch agricultural development, institute management and other issues profited me a good deal, his erudition on agricultural economics and farm management gave me a favourable impression, and his probing comments on the draft of my report have contributed greatly to the successful completion of the final version. I shall not forget the marvellous times I enjoyed with him and his wife, viewing the beautiful Dutch landscape during the last weekend before I left the Netherlands.

I am also most indebted to Jaap Post, head of the General Economics and Statistics Department of LEI, the department where I worked. His careful arrangements allowed my research work to progress smoothly. He also took me to visit farmers and typical Dutch sights by bike in the weekends, in spite of his venerable age. We also discussed Dutch agricultural development and other issues and his careful reading and comments on my draft report benefited me a great deal. His kindness, modesty and hospitality impressed me deeply, and I shall not forget the enjoyable times on Christmas Day last year, my first Christmas Day outside China, which I enjoyed in his home.

I am sincerely grateful to Dr. J.C. Blom, Deputy Director of LEI, for his great help; and I am also grateful to C.J.A.M. de Bont, H. Verbeek and Gabe S. Venema. Mr. De Bont took me on a visit to the Agricultural Commodities Board and the NCR. Mr Verbeek acted as my host during a visit to the Flower Auction and flower growers, which gave me a good impression of the Dutch flower industry. Mr. Venema took me to visit Rabobank Nederland in Utrecht.

I also benefited a great deal from discussions with L. Douw (Head of the Social Economics Department of LEI), Ida J. Terluin, Paul J.J. Veenendaal, C. van Bruchem, S. van Berkum, W. Jos Bijman, J. Muskens, John F.M. Helming, P. Salz, M.D. Hack, J. Luijt, H.J. Silvis, B. Pronk, F. Brouwer, W. van Veen, K. Geertjes, D. Verhoog, P. Diederer, H. Tai-A-Pin, J.W. de Wilde, J. Bade, P. Hellegers, B.M. Kamphuis, B.W. Zaalink, D. Verhoog, M. van Leeuwen, H. Kelholt, F. Godeschalk, H. Tap, D. Verhoog, T. De Kleijn, C.V. Rijswick. Thanks are also due to the experts outside LEI, R.A. Bosch (Ministry of Agriculture, Nature Management and Fisheries (MLNV)), G. Meester (MLNV), P.J.M. Keet (MLNV), G.A.M. van der Grind (Agricultural Commodities Board), J.J. Helder (NCR), W. van Oosterom (Rabobank Nederland), M.L. de Heer (LTO-Nederland), A. Oskam (AUW), N. Heerink (AUW), J. Bearda (IPC), G.H.E. Beltman (Rabobank Rijnsburg). Deserving of a special mention is Ida J. Terluin for her constructive comments on my study outline about the stages of the history of Dutch agricultural development and for her comments on the draft of my report. I am also grateful for the constructive comments from W. Jos Bijman on the draft of my report, which profited me a great deal.

Last but not least, a special word of thanks to D. Engelen, the Secretary of LEI; she gave a lot of effort to arranging my work and life in The Hague, from reserving a hotel and choosing my apartment to registering with the police and local authorities.

Finally, a thank you to my family. I would like to express my grateful thanks to my wife Dr. Li Wei, who herself bore the burden of looking after our lovely son with his study and life, in addition to her busy professional life. Without her selfless support it would have been impossible for me to work for such a long time outside China.

Needless to say, I remain responsible for all the views expressed in this report and for

any errors and omissions which may remain. I would be glad to hear any comments or criticisms. I shall continue my study of some of the aspects which have perhaps not been explored in detail in this report.

1. Introduction

1.1 Statement of concern

Agriculture is the cornerstone of a national economy. This is an objective economic law of universal applicability. Mankind could not exist and non-agricultural sectors could not be developed without agriculture. It is quite clear that a modern economy and society cannot be based on backward agriculture. In today's world there is no lack of examples showing how the national economy of one country is crippled owing to the backwardness of agriculture or to not having paid sufficient attention to agricultural development in its development strategy and plan; but we see no examples of an advanced agriculture being accompanied by backward non-agricultural sectors or by a crippled national economy. If agriculture is less developed in a country, it is impossible for an advanced economy and society to be developed, even if in some cases a relatively advanced industrial subsector can be developed. However, if there is an advanced agriculture in a country, it follows there must be an advanced national economy and society. The importance of agriculture demands that more attention be placed on agriculture in the course of economic development. At any rate, agriculture cannot be neglected in a country's development strategy and plan.

There are differences in agricultural development level among countries. Of course, these differences have a lot to do with differences in natural endowment, such as climate, location, soil type, etcetera. But the experience of world agricultural development has shown that it is the socio-economic institutional resources, i.e. the manmade resources, such as land ownership and tenure, finance, marketing, education, research and extension systems, and government policy, which have determined the differences in agricultural development level among countries, especially the differences between developed countries and developing countries. Although the natural endowment is unmovable, the social resources can be transferred from one country to another and from one sector to another. This means that developing countries can overcome their agricultural differences by learning from developed countries. This so-called learning effect in Development Economics has already come into bloom in some developing countries.

China is currently the largest developing country in the world, and its agriculture is still very backward compared with developed countries. The most important issue is feeding China's vast population more than 1.2 billion people¹, nearly a quarter of the total world population. There is no doubt about the importance of agriculture and the need to develop it in China. Nowadays there is increased worldwide concern as to whether China will be

¹ According to an authoritative projection, China's population will increase steadily in the next three decades. The population will be 1.3 billion in 2000, 1.4 billion in 2010, 1.6 billion in 2030; this is projected as China's peak population. Consequently, it is clear that Chinese agriculture will be confronted with the burden of a growing population.

able to feed its people in the next century. According to the projection made by Mr. Lester R. Brown, the Director of World Watch Institute in the United States, China's grain production in 2003 will be 263 million tons, a 20% decrease compared to 1990, whereas China's grain consumption will rise to 641 million tons. There will thus be a 378 million ton deficit between grain production and grain consumption in China, which amounts to about 60% of the total grain consumption. Nevertheless, world grain exports will only be about 200 million tons, which is far less than the amount needed by China. If China cannot feed its people and the world will not feed China either, who will feed China?¹ I believe Mr. Brown's conclusion is a pessimistic one, but it is a good warning for China. It means that if proper attention is not paid to agricultural development, China will face serious problems in its food economy. China has made a magnificent plan for developing its national economy over the next fifteen years. Nevertheless, whether or not this plan can be executed depends on the level of agricultural development. Only if agriculture has improved, will China be able to reach its established goal effectively. An improved agriculture will lay a solid foundation for Chinese economic and social development in the next decades, but agricultural deterioration will result in failed economic development. Nor is this all, since the significance of developing Chinese agriculture has already extended beyond China. It is clear that if a big country like China wants to maintain its balance in food supply and demand by approaching the international market, it will definitely cause strong fluctuations in international grain markets and prices. This might not be a good thing, neither for the domestic production and financing of grain exporting countries, nor for the food-deficit nations.

However, it is no simple task to improve China's agriculture. Undoubtedly, the development of Chinese agriculture must rely on China's own efforts. However, it is essential for China to make use of the successful experience of other countries, especially developed countries. In general, what China lacks is not natural resources but institutional aspects. On the whole, China has not yet established the effective institutional systems, such as systems for land use, financing, marketing, cooperation, education-research-extension, structural aspects and government policy, which are required for developing agriculture. As mentioned before, institutional systems can be transferred from one country to another, which, of course, is not the case for natural resources. The transferability of institutional systems provides China with an opportunity to use the experience of other countries as a point of reference for agricultural improvement. It also provides an opportunity for developed countries to pass on their experiences to developing countries.

The Netherlands is a developed country and its agriculture is renowned throughout the world. When foreigners refer to the Netherlands, they are bound to mention flowers first, an agricultural sector². To some extent, the flower is the symbol of the Netherlands because agriculture is a major part of the Dutch economic miracle. The Netherlands has set up successful institutional systems enabling its agriculture to flourish. It is important and

¹ Lester R. Brown, WHO WILL FEED CHINA, World Watch, September/October 1994.

² It is said that there are three treasures in the Netherlands: tulip, windmill, and clogs. These three treasures are all associated with agriculture. Tulip, or the flower industry, is one of the sub-sectors of agriculture; windmills were used to mill grain (agricultural product processing) and to pump water out of farmland; these were important power factors in agricultural production; clogs, being waterproof, are useful for farmers and fishermen alike.

necessary to summarise the experience of Dutch agricultural development and apply this experience to China and other developing countries. It will also be very significant to derive a new theoretical concept and model for Development Economics from the Dutch experience.

The Netherlands is a very densely populated country. Agricultural development has demonstrated that the more densely populated a country is, the more successful the economic development, especially in agriculture. Though less dense than the Netherlands, China is also a densely populated country. From this viewpoint, Dutch agricultural development is relevant to China.

Even though Dutch agricultural development is based on a free market economy, it is possible to apply the experience to China because China has given up its centralized planning economy and is striving for a market economy with Chinese characteristics. China has the soil to in which the Dutch experience can grow. There will not be any institutional barriers to the introduction of the Dutch experience to China.

1.2 Objectives of the report

The main objective of this report is to summarize the history of agricultural development in the Netherlands and to apply the Dutch experience to China so as to transform Chinese agriculture. Another key objective is to derive a new concept for Development Economics from Dutch agricultural development. The objectives of the report are fivefold:

- first, to examine Dutch agriculture from a bird's eye view so as to present its major features and symbols;
- second, to analyse the process of Dutch agricultural development from a historical viewpoint;
- third, to summarize Dutch agricultural development based on its features and processes so as to bring its success factors to light;
- fourth, to try to derive a new concept for Development Economics based on Dutch agricultural development, thereby demonstrating the significance of Dutch agricultural development to Economics;
- fifth, to transform Chinese agriculture by applying Dutch expertise in agricultural development.

The report concerns Dutch agricultural development and its importance to China. The main emphasis is on exploring development. Ultimately, this report intends to use Dutch experience as a point of reference for optimally transforming Chinese agriculture.

1.3 Approach

An approach is a tool of research. If the approach used is not appropriate, it is difficult to reach the goal. The approach, however, is not omnipotent. The best approach in any research is one which is consistent with the research purpose, not just the most advanced

approach. Even though an approach might be the most advanced in terms of its own function, it would not be the right one unless it was consistent with the research objective. My philosophy in selecting a method is to choose the simpler rather than the more complicated one if they both have the same result. Simple methods have worked better than intricate methods in many research programmes which have already been carried out. In socio-economic research, we should not fall into the trap of using a method for the method's sake.

This report is mainly based on desk research. The fundamental approach I have used is to abstract scientific concepts and the essence of things from their outward appearance. Comparison is continually used as a research method in this report.

No modelling work was elaborated in the framework of my research. But my study was mainly based on many research consequences, some of which were based upon modelling work that had been done on Dutch agricultural development. Modelling work is the indirect basis of my study.

What must be mentioned concerning the methodology is that, unlike most countries, fisheries are not included in agriculture in the Netherlands according to the Dutch Standard Industrial Classification,. This required adjusting the database by including fisheries to enable comparisons. Except for cases where no data is available, all agricultural statistics in this report include data on fisheries. Fortunately, there is little deviation when Dutch agriculture is compared directly with other countries because fisheries only make up a small part of agriculture in the Netherlands.

To present agricultural policy-makers in China with a general framework of Dutch agricultural development and to help them obtain a comprehensive understanding of all major aspects so as to establish a proper institutional system for Chinese agricultural development, I have attempted to include as many aspects as possible. So, both broader and more general issues make up this report.

1.4 Structure

The report consists of six chapters. Chapter 1 contains the statement of research concern and objectives. Chapter 2 focuses on Objective 1. The general appearance of Dutch agriculture, including the natural background, the current situation, the contribution to the whole economy, and the position in a worldwide context, is discussed in this chapter.

Chapter 3 deals with the analysis of long-term agricultural development. The fundamental subject is how Dutch agriculture gradually improved. The issues covered include the distinguishing features of each developmental stage and the accompanying changes in institutional systems. Generally speaking, this chapter corresponds to Objective 2.

Chapter 4 is concerned with summarising Dutch agricultural development. The institutional systems through which Dutch agricultural development met with success, including systems of land ownership and tenure, financing, marketing, cooperation, farmers' organization, education, research and extension, and government policy are described extensively. This chapter is the most important part of the report.

Chapter 5 handles Objective 5. An attempt is made to abstract a new concept for Development Economics, i.e. the Dutch Model, from Dutch agricultural development.

Chapter 6 translates the Dutch experience to Chinese circumstances. The focus is placed on what China can learn from Dutch agricultural development. The lag in development of Chinese agriculture compared with the Netherlands and the main obstacles facing Chinese development are also discussed briefly in this Chapter.

2. General appearance of Dutch agriculture

An understanding of the general appearance of Dutch agriculture is necessary for an effective exploration of Dutch agricultural development. In this chapter, a general picture of Dutch agriculture will be drawn by looking at the natural background, the current situation, the contribution to the national economy, and the position on the world's scoreboard.

2.1 Natural background

Agriculture, unlike other industries, relies much on natural resources. In agriculture, land not only fulfils the role of location factor, as it does for manufacturing and other non-agricultural industries, but it is primarily an indispensable production factor. This is especially true for arable farming, horticultural field crops and stock farming. Only in the case of modern operations involved in intensive animal husbandry and greenhouse horticulture, which are similar to industrial operations, does land mainly fulfil the function of location factor. Other so-called Ricardian factors¹, including climate, soil fertility, supply channels (such as harbours) or distribution areas, also play an important role in agricultural production. A favourable natural background is an asset for a country's agricultural development.

In general, the Netherlands has a favourable natural background for agricultural development, but there are also some unfavourable factors.

2.1.1 Favourable points

The following is a list of favourable factors for agricultural development in the Netherlands.

Flat land

As a part of the coastal plain of Western Europe, situated around the estuaries of the rivers Meuse, Rhine and Scheldt, the Netherlands, on the whole, is a predominantly flat country. There are no mountains, not even anything remotely like a mountain. Only in the eastern part and in the extreme south near Maastricht, where the Maastricht Treaty leading to the formation of the EU was signed, can a few hills be found. The highest point, only 323 m above sea level, is near Vaals. Along the coast, sand-dunes and flood barriers protect the country against flooding. Dikes have also been built along rivers to prevent inundations.

¹ D. Ricardo, British classical economist, created the concept of Comparative Advantages in Economics. He stressed that the trade flows result from comparative advantages, i.e. the relative, rather than from absolute profitability. In this view, these advantages are linked to a favourable geographic position and the availability of natural resources. These immovable production factors are called Ricardian factors.

Many tourists complain of the lack of mountainous landscape in the Netherlands. But from the agricultural point of view, the Netherlands is an exceptional location. The flat land is well suited for farming, as it is highly accessible and convenient for mechanization. There is little soil erosion and consequently no loss of considerable amounts of minerals for crops¹.

Moderate climate

Although it is situated in latitude 54-51 North, the Netherlands, due to the proximity of the sea and the warm North Atlantic Gulf Stream which passes close to the coast, has a moderate sea climate, characterized by cool summers and mild winters. The temperature does not fluctuate greatly in the course of a day or a year. The average January temperature is 2° Centigrade and the average July temperature is 17°C. The average year temperature is 10° C, the lowest temperatures occurring in January (1 C) and the highest in July (+22 C).

Precipitation, averaging about 800 mm, is fairly evenly distributed throughout the year. Ground frost does not occur frequently. Variations in climate between regions are small. The distance of more than 300 km from north to south has some influence on temperature, and the influence of the sea decreases towards the east.

The mild, damp climate is beneficial for pastures needed for stock breeding and for horticulture in the coastal regions. Fisheries suffers very little from ice during the mild winter.

Convenient communication

The Netherlands has countless links with the European hinterland. Three large rivers flowing into the world's busiest sea have made the Netherlands one of the world's largest and most important centres of transport and distribution. All seaports, from Delfzijl in the Northeast through Amsterdam and Rotterdam to Vlissingen and Terneuzen in the Southwest, are interconnected by a complex system of inland waterways which give access to and from Germany, Belgium, France and beyond. For decades Rotterdam has been the largest seaport in the world: every year some 32,000 ocean going ships moor at this port, transporting almost 300 million tons of cargo. Present plans foresee an increase to about 400 million tons by the year 2010 (VNO-NCW, December 1995). More than a quarter of all sea cargo destined for Europe is transhipped in Rotterdam. A fleet of 6,000 inland waterway craft, the largest of its kind in the world, carries two-thirds of EU waterborne cargo. The canals which are part of the main drainage system are also of great importance for inland shipping.

The extensive rail network links up with foreign railways at a great number of points. In the near future, the railway link between Rotterdam and Germany will be upgraded and

¹ For example, in China mountain areas account for about 70% of total land area. Owing to the soil erosion in unflat land, many minerals such as N, P and K are lost every year. These N, P and K minerals lost every year are the equivalent of thousands of tons of chemical fertilizer. Soil erosion not only makes farmland infertile, but also raises the cost of agricultural products. Even more, soil erosion raises riverbeds, resulting in easier destruction of farmland through flooding.

the high speed railway from Paris and Brussels will be extended to Amsterdam; trains travelling at up to 300 km per hour will connect Amsterdam and Rotterdam with Brussels, Paris and London. The relatively dense Dutch road network is part of a network of European motorways. Dutch airports provide access to every corner of the world. The largest airport in the country, Schiphol, is regularly voted best European airport in opinion polls. All this has earned the Netherlands the name 'Gateway to Europe'.

Convenient communications give Dutch agricultural products accessibility to the world market. Fresh flowers can reach consumers outside the Netherlands in a single day. Convenient transportation also helps adjust production structures by importing cheaper feeds to develop extensive export-oriented stock breeding. Undoubtedly, the favourable transport conditions provide the solid foundation for the outward oriented Dutch agriculture.

Strategic location

Geographically, the Netherlands has an extremely favourable strategic location. As figure 2.1 shows, the Netherlands is not only a gateway to and from Europe, but also to the European economic core region. This strategic location enables the Netherlands to cater well for the needs of a large part of Europe, a market with millions of consumers.

Dutch agriculture has benefited substantially from this location in the past. From 1900 onwards, the neighbouring countries (United Kingdom, Germany, Belgium, and France) experienced increased development in manufacturing industries. They attained an ever higher level of prosperity, and their demand for high-priced agricultural produce, including not only butter, cheese, eggs, bacon and vegetables, but also other products such as bulbs, flowers, ornamental shrubs and forced early crops, increased considerably. Agricultural development in these countries, however, lagged behind other industries. There was even a tendency to revert to less-intensive farming as many people left the rural areas to seek for better-paid jobs in the towns. This provided the Netherlands with a good opportunity to export agricultural produce to these countries.

Looking to the future, Dutch agriculture will probably benefit more from this location. Political changes in Eastern Europe in 1989 have created a combined market of about 800 million consumers. The political barriers blocking Dutch agricultural produce from entering Eastern European countries no longer exist. Undoubtedly, this will give Dutch agriculture more chances to send its products into these areas. In fact, the Netherlands has already recognized this and is seizing the opportunity to promote its agricultural development.

We have listed the favourable points of Dutch agriculture in terms of natural background above. But it must be said that although the Netherlands has a more favourable natural background, this would not lead automatically to realistic economic achievement unless the country made the best use of it. The key point is that the Netherlands has seized these opportunities effectively and made the best use of them.



Figure 2.1 The location of the Netherlands in Europe

2.1.2 Unfavourable points

There are always two sides to everything. Dutch agriculture also faces some unfavourable points in terms of natural background.

Threat from the sea

The sea can be friendly, but it can also be the greatest enemy of the Netherlands. There is a love-hate relationship between the Dutch and water.

The Netherlands is a low country. The lowest point in the country is some 6.7 m below sea level. Although more than 25% of the total area of the country is below sea level, about 60% of the total population live in these low-lying areas. About 40% of the country would be covered with water at regular intervals if the dunes and dikes did not exist. The threat from the water, especially from the sea, is tremendous. The disastrous flood during the night of January 31, 1953, is a clear indication. A permanent vigilant attitude towards the sea is necessary.

The threat from the sea to agriculture is manifold. High spring tides were often the cause of dike breaks, extensive inundations, temporary and sometimes permanent loss of land. Seawater can also flood the farmland via estuaries and inlets. For example, about 150,000 ha of farmland were lost in the flood in 1953.

Thanks to the sea, there is a fair cloud cover in the Netherlands. The average number of hours of sunshine is only 1,570. In the summer there is too little sunshine for the production of certain types of crop. To a certain extent, the shortage of sunshine places some restrictions on Dutch agricultural development.

Pressure from population density

Although the Netherlands is a small country which covers only 41,526 square kilometres, it has a population of more than 15.5 million, making it one of the most densely populated countries in the world. With more than 450 people per square kilometre (about ten times the world average), the population density is second highest in the world. Moreover, population densities are considerably higher in the 'Randstad' conurbation¹ in the western Netherlands.

This high density exerts more pressure on the limited (agricultural) resources. Consequently, agricultural development is more intensive, as history has shown. However, more intensive agriculture is bound to have negative effects on the environment. This results in Dutch agriculture being faced with a new kind of challenge.

2.2 Current situation

Dutch agriculture is one of the few leading agricultural systems in the world with its own distinguishing features.

¹ 'Randstad' conurbation is made up of the cities of Amsterdam, The Hague, Rotterdam, and Utrecht, and a number of smaller cities between the former ones. It is the economic heart of the Netherlands.

2.2.1 Productive level

Normally, the indicators of partial productivities, such as labour productivity, land productivity, capital productivity and total factor productivity (TFP), are used to demonstrate the productive level of agriculture. Due to the limited data, only labour productivity and land productivity have been used here to reflect the Dutch agricultural productive level.

In general, Dutch agriculture has a higher level of labour productivity and land productivity. Calculated from Eurostat data, agricultural labour productivity, i.e. gross value added at 1990 price and exchange rates per AWU¹ per year, was 41,223 ECU² in the Netherlands in 1994. As shown below (see section 2.4), this level sets the tone in Europe. Setting 10 European member states³ at 100, the agricultural labour productivity index in the Netherlands was 215 in 1975, 199 in 1980, and 234 in 1985 (Terluin, 1990). These levels were also the leading ones in Europe. According to the FAO, calculated in 'International U.S. Dollar' (IUSD), the agricultural labour productivity in the Netherlands in 1991 was 44,339 IUSD, ranking among the highest in the world. In 1995 in the Netherlands, average cereal production per man-year in agriculture was 5,741 kg, meat production was 11,260 g, and milk production was 52,465 kg. Dutch agricultural land productivity is among the highest in the world. In 1991, production value per hectare was 2,468 IUSD, which is much higher than the United States and France. For 1995, arable production per hectare was as follows: winter wheat 8,800 kg, sugar beet 56,000 kg, potatoes for consumption 41,000 kg, spring barley 5,700 kg, fodder corn 11,500 kg⁴. All of these rank among the world's highest production levels. In the horticulture sector, especially glasshouse horticulture, land productivity is so high that it is even measured per square metre. In 1995, tomato production per square metre was about 45 kg and cucumber production per square metre was about 66 kg; per hectare, tomato production reached 450,000 kg whereas cucumber production reached 660,000⁵. The Netherlands has a highly developed glasshouse horticulture with considerable land productivity. Consequently, the Netherlands is also known as the 'Glass Country', and parts of it as 'Glass City'. In animal husbandry, milk yield per cow was 6,596 kg and the number of eggs per laying hen was 306 in 1995.

2.2.2 Production structure

From a structural point of view, Dutch agriculture is still dominated by livestock production, as shown in figures 2.2 and 2.3 and table 2.1. This is a major feature of Dutch agriculture which differs from China.

¹ AWU, i.e. annual work units, is a standard agricultural labour input measurement unit used in EU member states. 2,200 hours of work each year is one AWU. In 1995, the volume of total labour input in agriculture in the Netherlands is 221,400 AWU.

² ECU, European Currency Unit, is a virtual currency used in EU member states. One ECU is 2.15827 NLf in 1994.

³ Germany, France, Italy, the Netherlands, Belgium, United Kingdom, Ireland, Denmark, Greece, and Spain.

⁴ In dry weight.

⁵ On LEI-DLO's sample information system database.

From figure 2.2, we can clearly see that the agricultural land index in the Netherlands is near 60%, higher than in most countries. There is hardly any desert land or other land which cannot be used for agriculture. This shows from another angle that Dutch agriculture has a good natural background, as we have presented above. Figure 2.3 shows that grass-land, used for animal husbandry, accounts for more than half of total Dutch agricultural land use, arable land amounts to about two-fifths, and horticultural land less than 6%. Moreover, a considerable amount of arable land is used for feed production. Land use for livestock breeding, then, dominates Dutch agricultural land use.

Looking at the gross value of agricultural production, we see that Dutch agriculture is also dominated by livestock production. Table 2.1 tells us that more than 55% of the gross value of agricultural production comes from livestock production. Horticulture's share in agricultural production is 35%, while for arable production the share is only about 10%.

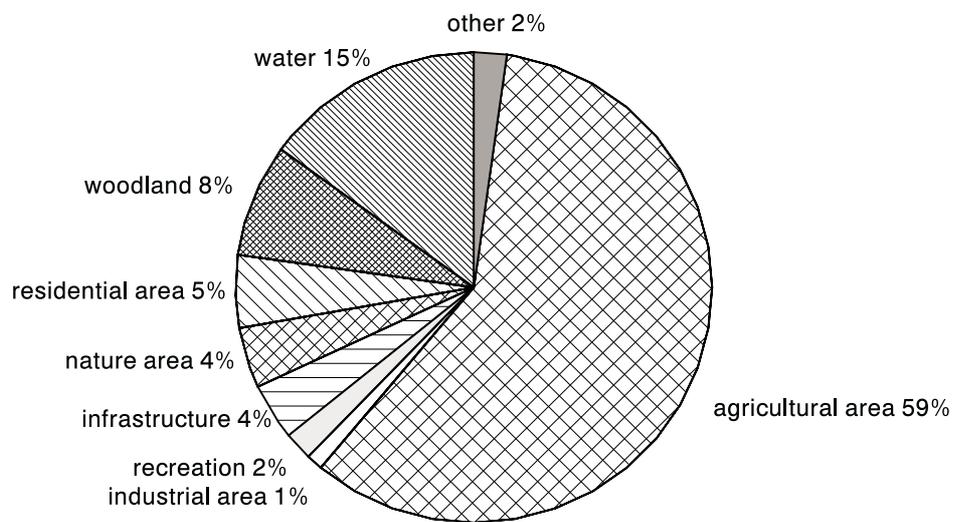


Figure 2.2 Land use structure in the Netherlands
Source: CBS.

If we compare the shares of agricultural land use and agricultural production value, however, it should be borne in mind that livestock production, which dominates Dutch agriculture, is not the sector with the highest comparative land productivity¹. On the contrary, horticulture, which despite covering only 3.5% of total agricultural land accounts for 35% of total agricultural production, has the highest comparative land productivity. The comparative land productivity of arable production is only 0.25, which is much less than 1; the comparative land productivity of livestock production is 1.03; for horticulture this figure is 6, which is 24 times the level of arable production and 6 times that of livestock production. These comparative land productivity figures show that the land productivity of arable pro-

¹ Comparative land productivity is defined as the production value share of one sector in total production value divided by its land use share in total land use.

duction is far lower than the average land productivity, and that comparative land productivity of horticulture is much higher than average land productivity. From this viewpoint, arable production is economical land utilization. It is useful to recognize this aspect for the adjustment of the Dutch agricultural structure.

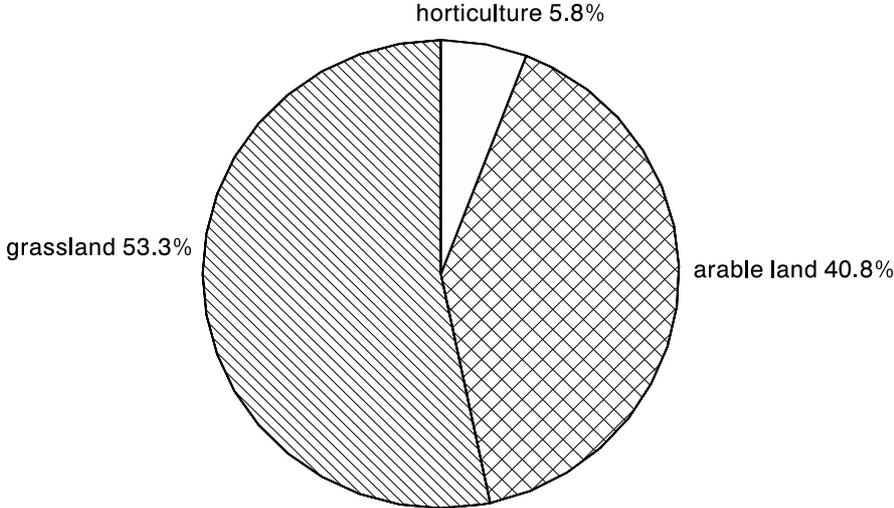


Figure 2.3 Agricultural land use structure in the Netherlands
Source: CBS.

Regarding the production structure of each sub-sector, we can see from table 2.1 that arable production is dominated by potatoes, with a share of about 56% of total arable production. Horticulture is dominated by flower production (almost 55% of total horticulture production), and livestock production is dominated by dairy cows and cattle breeding (58% of total livestock production). These three dominating production categories, i.e. potatoes, flowers, and dairy cows and cattle breeding, contribute more than 55% of the gross value of agricultural production.

2.2.3 Regional concentration

Dutch agriculture has been mainly concentrated in specific geographic locations. Each region has its own specialized production items consistent with the region's relative advantages. This geographic concentration or regional division of agriculture is beneficial not only to effective farmland utilization and land productivity but also to labour productivity. High regional specialization is one of the major distinguishing features of Dutch agriculture.

Generally speaking, as shown in figure 2.4, there are three main belts of geographic concentration:

- the west, along the coast, comprises the horticulture belt, especially flower production;

Table 2.1 The structure of agricultural production in the Netherlands in 1994

	Gross value Million	Share in gross value %
Total arable production	3,862	10.23
Of which: <i>cereals</i>	371	0.98
<i>potatoes</i>	2,163	5.73
<i>sugar beet</i>	640	1.70
<i>onions</i>	200	1.82
Total horticulture	13,115	34.74
Of which: <i>vegetables</i>	4,002	10.60
<i>fruit</i>	570	1.51
<i>flowers and plants</i>	6,022	15.95
<i>flower bulbs</i>	1,064	2.82
<i>hardy nursery stock</i>	812	3.86
Total livestock production	20,780	55.03
Of which: <i>cattle (excluding calves)</i>	4,463	11.83
<i>milk</i>	7,566	20.04
<i>pigs</i>	6,099	16.15
<i>poultry</i>	1,336	3.54
<i>eggs</i>	875	3.47

Source: CBS/LEI.

- the central area is the dairy production belt, specialized in dairy cows as well as cattle and calf breeding;
- the southeastern area is focused on intensive livestock production, primarily pig and chicken production, together with dairy farming.

Arable production is scattered in the southwestern, northeastern, and central polder areas, which is also where arable farming is a speciality.

2.2.4 Farm structure

Individual, private family farms are the basic foundation of Dutch agriculture. Farm structure is defined as the ratio of each kind of farm in relation to the total number of farms. It will be described here from the perspective of farm type and farm size.

Farm type structure

Dutch farm type structure is shown in table 2.2. It is clear that Dutch farms are dominated by livestock farms, including grazing livestock farms, pig and poultry farms¹, mixed live-

¹ Pig and poultry farms are also called intensive livestock farms or factory farms in the Netherlands.

stock farms and mixed crop-livestock farms. There were nearly 70,000 specialized livestock farms excluding mixed crop-livestock farms, in 1995. The share of specialized livestock farms in total farms is 62%, more than 48 percentage points higher than horticulture farms and almost 50 percentage points higher than arable farms. The farm type with predominantly livestock production is consistent with the agricultural land use and the gross value of agricultural production.

Table 2.2 also shows us that the share of part-time farms in the Netherlands is low, on average less than 18%, with permanent crop farms having the highest share (more than 25%), which means that more than one quarter of the permanent crop farms are not full-time farms. Horticulture operations have the lowest share of part-time farms, less than 8%.

Table 2.2 *Number and type of farms in the Netherlands in 1995*

Farm type	Farm number	Of which fulltime farms	Share of each farm type in total farms	Ratio of fulltime farms
	1	1	%	%
Arable	14,663	11,947	13.0	81.5
Horticulture	15,884	14,651	14.0	92.2
Permanent crops	5,750	4,247	5.1	73.9
Grazing livestock	54,613	44,008	48.2	80.6
Pigs and poultry	10,414	8,584	9.2	82.4
Mixed cropping	2,484	2,066	2.2	83.2
Mixed livestock	4,561	3,752	4.0	82.3
Mixed crops-livestock	4,828	3,621	4.3	75.0
Total	113,202	92,876	100.0	82.0

Source: CBS/LEI.

The low number of part-time farms in the Netherlands could change the traditional theory about part-time farming. Some economists have concluded from the situation in eastern and southeastern Asian countries that a large number of part-time farms is an inevitable trend of agricultural development in densely populated countries. For the Netherlands, however, this is clearly not the case.

Farm size structure

Dutch farm sizes are expressed in area sizes and economic sizes respectively. In animal husbandry, the number of dairy cows per farm and the number of pigs or porkers per farm are also used to reflect farm size.

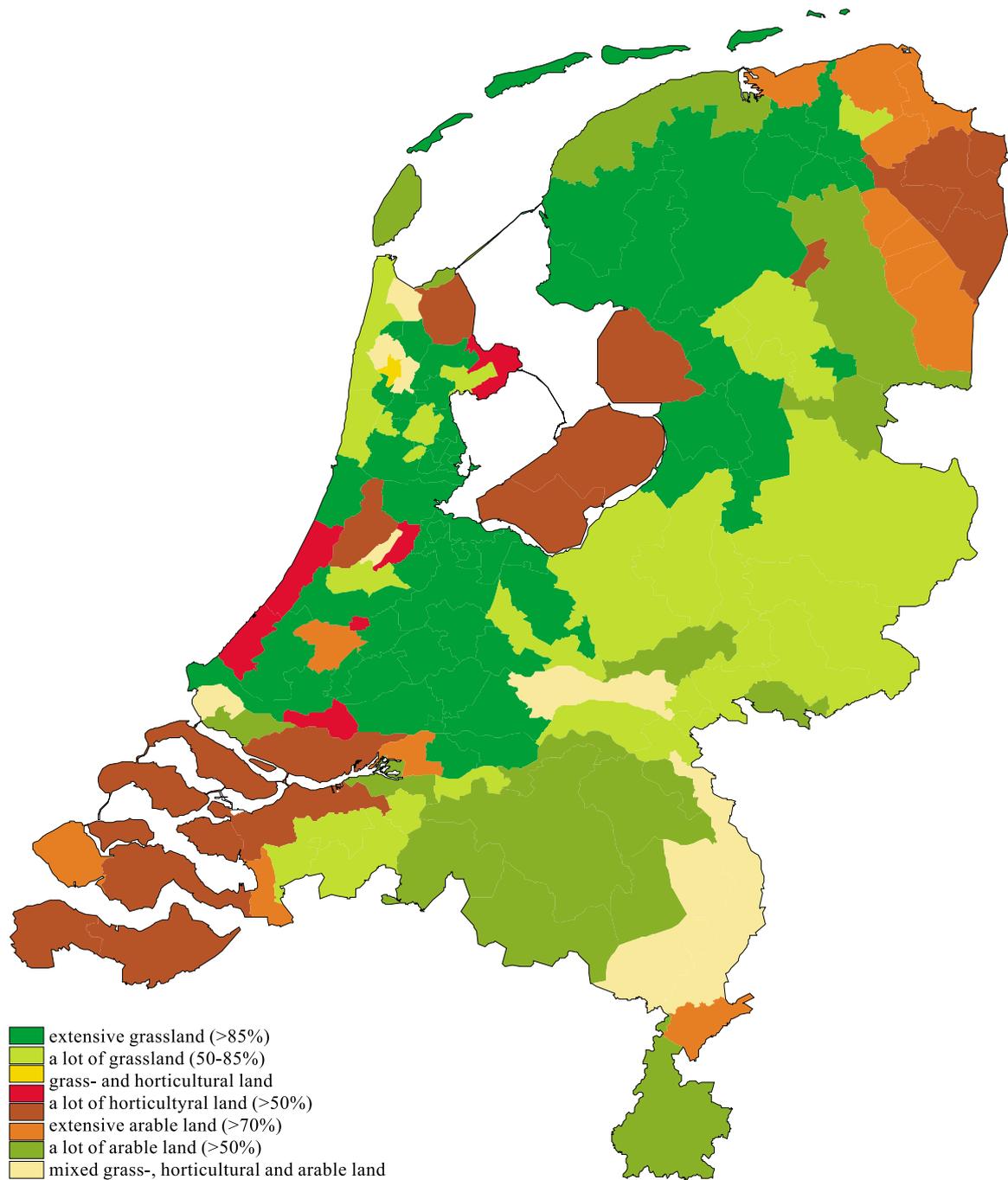


Figure 2.4 The concentration of agriculture in the Netherlands
 Source: SDU.

Table 2.3 and table 2.4 show farm sizes in the Netherlands in 1995. On average, the farm size was 17.4 ha. More than one-third of the farms had an area of less than 5 ha, almost one-third were larger than 20 ha and less than 1% had 100 hectares or more. But if we

observe each of the sub-sectors, the situation is very different. The general trend, as shown in table 2.5, is that the arable farms, grazing livestock farms, mixed crop farms and mixed crop-livestock farms are larger, but that the horticultural farms, pig and poultry farms, and permanent crop farms are smaller. In arable production, the average farm is about 34 ha, the number of farms with an area of more than 20 ha is 56.4%, and 4% of farms are larger than 100 ha. In horticultural production, the average farm size is only 3.8 ha. More than three-fifths of the farms are smaller than 5 ha. Of all horticultural farms, the share of farms with an area between 0.01 and 1 ha is 30.3%; the share of farms smaller than 0.01 ha is 2.3%. This means that about one-third of the farms in horticultural production are smaller than one hectare.

Table 2.3 *Percentile distribution of farms (including part-time farms) in relation to farm area size in the Netherlands in 1995*

Farm type	Farm size in hectare							
	< 5	5-10	10-15	15-20	20-30	30-50	50-100	100 or more
Arable	10.4	16.0	9.8	7.4	13.1	21.2	18.4	3.7
Horticulture	81.7	9.1	3.9	1.8	2.0	1.0	0.5	...
Permanent crops	61.5	17.4	10.2	5.4	3.5	1.4	0.6	...
Grazing livestock	18.6	15.8	10.9	10.9	19.9	18.5	5.1	0.3
Pigs and poultry	67.2	18.4	8.7	3.2	2.0	0.5	...	0.0
Mixed cropping	26.2	17.0	12.0	9.2	14.1	13.4	6.7	1.4
Mixed livestock	21.3	25.0	20.5	13.4	12.2	6.1	1.3	0.2
Mixed crops-livestock	18.5	23.7	14.2	9.9	12.7	12.7	6.7	1.6
<i>Total</i>	33.3	15.9	10.1	8.2	13.3	13.0	5.4	0.8

Source: CBS/LEI.

The average economic size is 70 NSU¹; the share of farms larger than 50 NSU is more than 50% and the share of farms smaller than 50 NSU is less than 50%. However, there are considerable differences in economic size among the sub-sectors. For all types of farms, horticultural farms with the smallest surface areas have the largest economic size; arable farms (including mixed crop-livestock farms) which according to area are among the five largest categories, have the smallest economic size.

In absolute terms, as can be seen in table 2.5, arable farms have the largest areas, whereas horticultural farms have the smallest. The surface area of arable farms is nine

¹ NSU, Netherlands size units, is an economic size unit based on the balance per livestock species and per hectare of crops, for which standard gross margins (sgm) are calculated by subtracting specific costs from the yield. The sgm = financial results minus direct non-factor costs. Direct non-factor costs include sowing seed, fertilizers and pesticides, energy for heating and lighting, and other direct costs. The sgm is expressed in ECU and revised regularly. The NSU in 1995 equals an sgm of 1,320 ECU. An example for the base period 1995: 1 ha. Winter wheat = 0.89 NSU, 1 dairy cow = 1.33 NSU.

times that of horticultural farms. The economic size of horticultural farms is 2.5 times that of arable farms. It is clear that horticulture produces more net output with less land and that the accompanying land use is highly efficient.

Table 2.4 Percentile distribution of farms (including part-time farms) in relation to farm economic size in the Netherlands in 1995

Farm type	Farm size in NSU %						
	3-<12	12-<20	20-<32	32-<50	50-<70	70-<100	100 or more
Arable	25.8	10.5	10.4	12.2	12.8	13.6	14.7
Horticulture	7.2	5.7	7.6	10.2	10.1	12.7	46.5
Permanent crops	15.2	10.2	11.9	15.9	12.6	14.2	20.0
Grazing livestock	24.4	9.1	7.7	9.5	12.4	18.0	18.9
Pigs and poultry	10.4	7.6	10.2	14.5	17.6	19.4	20.3
Mixed cropping	13.0	10.8	14.4	15.4	11.9	13.8	20.7
Mixed livestock	14.5	11.9	12.3	12.9	13.5	15.7	19.2
Mixed crops-livestock	33.2	14.5	11.5	9.5	8.3	9.8	13.2
<i>Total</i>	20.2	9.1	8.9	11.0	12.5	16.1	22.2

Source: CBS/LEI.

Table 2.6 presents the absolute size measured in numbers of livestock in animal husbandry. In 1995, the average number of dairy cows per farm with dairy cows was 46; 35% of farms with dairy cows had between 50 to 100 dairy cows; the average number of pigs per pig farm was 620, 40% of pig farms had more than 500 pigs. More than 20% of the farms had more than 1,000 pigs. Over 7,000 farms had more than 75 sows; about 4,000 had more than 150 sows. 8,000 farms had more than 300 porkers, with 1,300 having more than 1,000. Each year almost 20 million pigs are slaughtered in 32 slaughterhouses.

Table 2.5 Average farm size (including part-time farms) in the Netherlands in 1995

Farm type	Farm size	
	in hectare	in NSU
Arable	33.9	53.5
Horticulture	3.8	133.0
Permanent crops	6.3	68.0
Grazing livestock	20.4	58.1
Pigs and poultry	4.6	71.8
Mixed cropping	20.2	68.8
Mixed livestock	13.6	62.3
Mixed crops-livestock	20.6	46.2
<i>Total</i>	17.4	69.7

Source: CBS/LEI.

Table 2.6 *Percentile distribution of farms in relation to farm size measured in number of livestock per farm in the Netherlands in 1995*

Farms with dairy cows		Farms with pigs		Farms with porkers	
number of dairy cows per farm	share of farms	number of pigs per farm	share of farms	number of porkers per farm	share of farms
1- 10	9.0	1- 100	17.9	1-100	31.9
10- 20	9.0	100- 300	27.6	100-300	30.6
20- 30	12.3	300- 500	14.7	300-500	14.6
30- 50	30.1	500-1,000	18.9	>750	22.9
50-100	35.1	>1,000	20.9		
>100	4.5				

Source: CBS/LEI.

2.2.5 Farm income

Farm income is a basic indicator of agricultural development. Dutch farm income is shown in table 2.7. On average, entrepreneurs in horticulture under glass have a higher income per entrepreneur. Potted plant farms have the highest income per entrepreneur, which is also the highest among all farm types. There is little difference in average income per entrepreneur among farm types, though this does not mean there are no differences among farms at all. In fact, there is considerable annual variance, which motivates farmers with higher incomes to do even better and also impels farmers with lower incomes to carry out improvements in their businesses. Thus, in terms of income and financial results, farms are being adjusted towards more efficiency.

Table 2.7 *Farm income in the Netherlands in 1995 a)*

Farm type	Output per f 100 costs	Family farm income (in f 1,000 per entrepreneur)
<i>Accounting year May/April b)</i>		
Dairy farms	79	49
Intensive livestock farms	89	48
Arable farms	88	53
<i>Accounting year Jan./Dec.</i>		
Horticulture under glass	91	53
of which: -vegetables	88	37
-cutflowers	92	63
-potplants	94	72
Mushroom holdings	88	44

a) Average for last three years, not including the smallest farms; b) Output per NLG 100 costs on tenancy basis.

Source: LEI.

As far as cost productivity is concerned, the highest output per NLG 100 costs in horticulture under glass is 91 guilders; for arable farms it is 88 guilders and for dairy farms 79 guilders. The variance among farm types, and also among farmers, is obvious. There is a close interrelationship between farm income and farm return on costs. The farms with higher returns on costs have higher income levels, the farms with lower returns have lower income levels.

2.2.6 Trade capacity

Trade¹ is the most brilliant page in the book of Dutch agriculture. Its international orientation is the most important feature of the Dutch agricultural sector. Dutch agricultural development cannot be really understood without an understanding of Dutch agricultural trade.

Dutch agricultural trade features high levels of imports and considerably higher levels of exports, as the tables below show. In 1995, the proportion of agricultural imports to total agricultural production reached 1.05, and the proportion of agricultural exports to total agricultural production came to 1.80; the value of agricultural exports was 1.7 times the value of agricultural imports. Agricultural trade accounts for almost 80,000 man-years each year. The model of high import levels and considerably higher export levels means that Dutch people have given full play to their favourable communication advantages and obtained more added value by importing products, especially raw products, which have fewer comparative advantages in the Netherlands, and processing them into high-value products which are then exported. This is the essence of Dutch agricultural trade.

Import flow

The structure of agricultural imports (including coffee beans, cocoa beans and tobacco) by product and country is indicated in table 2.8 and table 2.9 respectively. In the same tables, we find the export structure. More than one-third of the imports is arable produce, about one-fifth is livestock. Horticultural imports rank third. Most of the arable imports are products which are not grown in the Netherlands. Animal feed amounts to 21% of total arable imports. More than 95% of agricultural imports are destined for the processing industry. In turn, most of the processed goods are destined for export and final consumption; only 3% goes to agriculture.

The European Union is vital to Dutch agriculture as a source of agricultural trade, as can be seen in table 2.9. More than two-thirds of Dutch agricultural imports comes from EU countries, with imports from Germany amounting to nearly one-third. Germany is the largest source of Dutch agricultural imports. Outside the EU, the United States is the biggest source of Dutch agricultural imports, with a share of nearly 9%. Among EU countries, the Netherlands imports a lot of agricultural products from outside the EU.

¹ Trade means foreign trade in most of time in my report.

Export flow

In 1995, Dutch agricultural export totalled NLG 67,400 million, making the Netherlands the third largest agricultural exporter in the world, after the United States and France. The value of agricultural exports by far exceeds the gross value of domestic agricultural production. It is a miracle, a world miracle. More than half of total agricultural output from the Netherlands is exported. Agricultural exports have become a principal pillar of the Dutch economy.

Arable produce forms the main part of Dutch agricultural export, its share being about 33%. Livestock products rank second, followed by horticultural exports. Exotic products, thus not products grown in the Netherlands, dominate arable product exports. Among horticultural exports, on the other hand, products grown in the Netherlands are most important. More than 45% of exports are processed, whereas less than 30% are virtually unprocessed. Non-Dutch products amount to about one-fourth.

Germany is by far the largest consumer of Dutch agricultural produce, receiving about one-third of exports. All EU countries together account for nearly 80% of Dutch agricultural exports. Outside the EU, North and South America are major clients for Dutch agricultural products; Eastern Europe is becoming increasingly important for Dutch agricultural exports. Nowadays, the Netherlands focuses on developing the Eastern European markets.

Table 2.8 Structure of agricultural imports and exports by products in the Netherlands in 1995 a)

Product	Import		Export	
	value in mln. f	share in %	value in mln. f	share in %
Arable products	14,359.3	36.5	21,970.1	32.6
<i>grown in the Netherlands</i>	2,732.7	6.9	1,615.3	2.4
<i>exotic products, drinks</i>	6,584.1	16.7	10,560.8	15.7
<i>animal feed</i>	3,077.3	7.8	3,830.1	5.7
<i>preparations</i>	1,965.2	5.0	5,964.0	8.8
Horticultural products	7,387.9	18.8	17,525.6	26.0
<i>grown in the Netherlands</i>	3,304.7	8.4	13,605.7	20.2
<i>other horticulture products</i>	3,056.9	7.8	2,170.9	3.2
<i>preparations</i>	1,026.3	2.6	1,749.0	2.6
Livestock	7,961.7	20.2	18,583.6	27.6
<i>livestock and meat</i>	2,117.3	5.4	8,127.7	12.1
<i>poultry and eggs</i>	908.1	2.3	2,866.1	4.3
<i>milk and diary</i>	4,936.3	12.5	7,589.7	11.3
Fishery products	1,520.7	3.9	2,363.1	3.5
Margarine, fats and oil	4,810.2	12.2	3,215.2	4.8

Product	Import		Export	
	value in mln. f	share in %	value in mln. f	share in %
Other products	3,337.4	8.5	3,740.0	5.5
Total agricultural products	39,377.1	100.0	67,397.6	100.0
<i>destined for agriculture</i>	1,299.2	3.3	...	...
<i>destined for industry and consumption</i>	38,077.9	96.7	...	...
<i>virtually unprocessed</i>	...	...	19,410.5	28.8
<i>processed</i>	...	...	30,396.3	45.1
<i>non-Dutch</i>	...	...	17,590.8	26.1

a) Registered trade only, actual trade is estimated to be 10-15% higher.

Source: CBS/LEI.

Table 2.9 Structure of agricultural exports and imports by countries in the Netherlands in 1995 a)

Country	Imports		Exports	
	value in f mln.	share in %	value in f mln.	share in %
World	39,377.1	100.0	67,397.6	100.0
EU-15	23,663.5	60.1	52,824.6	78.4
<i>France</i>	4,173.1	10.6	8,047.7	11.9
<i>Belgium and Luxembourg</i>	5,249.0	13.3	6,787.3	10.1
<i>Germany</i>	7,236.0	18.4	20,646.8	30.6
<i>Italy</i>	937.9	2.4	4,869.1	7.2
<i>United Kingdom</i>	2,174.6	5.5	5,540.8	8.2
<i>Ireland</i>	1,135.4	2.9	467.8	0.7
<i>Denmark</i>	547.1	1.4	1,002.8	1.5
<i>Greece</i>	161.7	0.4	1,385.9	2.1
<i>Portugal</i>	136.4	0.3	421.9	0.6
<i>Spain</i>	1,085.1	2.8	1,674.5	2.5
<i>Sweden</i>	443.7	1.1	865.5	1.3
<i>Finland</i>	289.3	0.7	317.6	0.5
<i>Austria</i>	94.3	0.2	796.9	1.2
Third countries	15,713.6	39.9	14,573.0	21.6
<i>USA</i>	3,312.5	8.4	1,825.3	2.7
<i>Rest of OECD</i>	1,107.5	2.8	2,443.2	3.6
<i>Arabian countries in Middle East and Iran</i>	71.8	0.2	1,465.1	2.2
<i>Eastern Europe</i>	754.4	1.9	2,971.7	4.4
<i>Other countries</i>	10,467.4	26.6	5,867.7	8.7

a) Registered trade only, actual trade is estimated to be 10-15% higher.

Source: CBS/LEI.

Trade balance

The Netherlands is a major net exporter of agricultural products: exports far exceed imports. Agricultural trade surplus was nearly 17,000 million U.S. Dollars in 1995, ranking second largest in the world, just behind the United States. Dutch total agricultural exports are smaller than France's, but its net agricultural exports are higher. For a small country such as the Netherlands, this is remarkable.

Almost all products, except arable products grown in the Netherlands, other horticultural products, margarine, fats and oil, have trade surpluses. The products with the highest trade surplus (137%) are horticultural products. Livestock products have the second highest surplus, 133%. Exports exceed imports by 53% in arable products.

Germany is the most important source of Dutch agricultural trade surplus. Nearly half of Dutch agricultural trade surplus came from Germany in 1995. In the EU, every country, except Ireland, contributes to the Dutch agricultural trade surplus. As a whole, EU countries account for all the Dutch agricultural trade surplus because the surplus from EU countries exceeds the total surplus. This means that the Dutch agricultural trade balance is in deficit outside EU countries as a whole. The United States is the biggest source of Dutch agricultural trade deficit. Exports to the United States are only 55% of imports from the United States to the Netherlands in 1995.

On average, Dutch net agricultural exports per hectare of cultivated land amounted to about USD16,000 in 1995, while agricultural exports per agricultural labour force attained around USD 67,000. These are world records. It is clear that Dutch agriculture has the highest trade capacity in today's world. Of course, the food industry, transport, and trade, among other factors, play a very important role in the export of agricultural products.

2.3 Contribution to the national economy

As a modern developed economy, the Netherlands has the same feature as other developed nations, i.e. a relatively small share of agriculture, agricultural labour and agricultural value added in the whole economy. Figure 2.5 and figure 2.6 show that nowadays in the Netherlands the share of the agricultural working population in the total working population is less than 5% and the share of agricultural value added in GDP is about 4%.

Although in the Netherlands, compared to the whole economy, agriculture is a small sector, it is an important contributor to the national economy. Agriculture provides work for more than 250,000 and an annual national income of almost 8,800 million guilders.

More important is that the net agricultural exports amount to about 90% of total net exports (excluding services exports). So even though agriculture is not the major source of national income, it is undoubtedly the major source of trade surplus and foreign exchange in the Netherlands. It is unthinkable for the Netherlands to maintain the balance of international payments without agriculture.

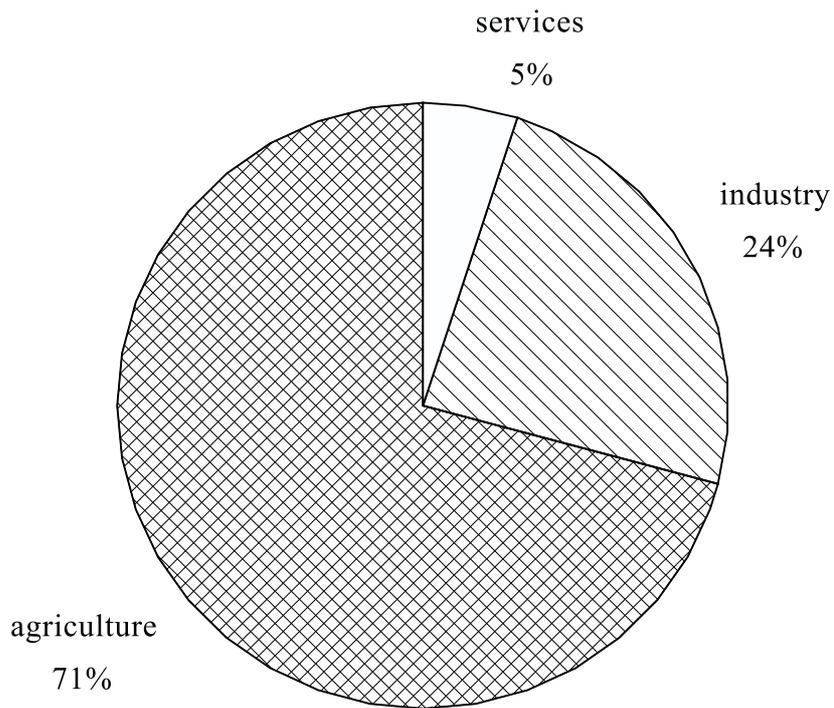


Figure 2.5 Structure of the working population in the Netherlands in 1994
Source: CBS.

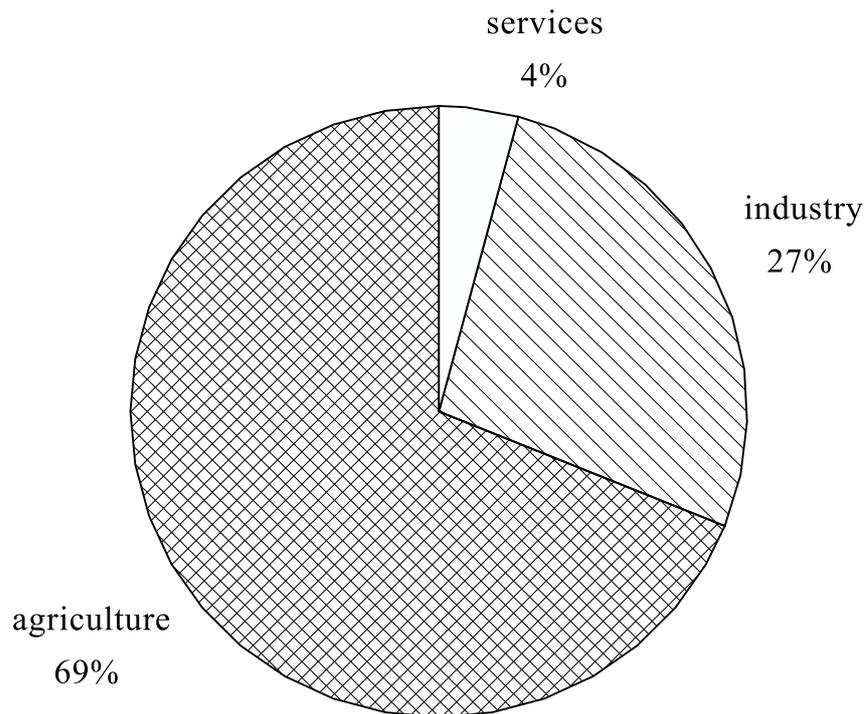


Figure 2.6 Structure of gross domestic product in the Netherlands in 1994
Source: CBS.

To obtain insight into the economic significance of agriculture for the national economy, however, it is necessary to pay attention not only to the share of the agricultural sector in the national income, but also to the income share of those sectors connected with agricultural production. In this context, we should mention the subcontracting industry, which supplies the raw materials and services, and the processing and distribution industry for agricultural products. Currently, the income of these industrial sectors considerably exceeds that of the agricultural sector. Since 1970, the income share of all these sectors together, including agriculture, is estimated to be around 10% of the Dutch national economy, as shown in table 2.10. That means that approximately one-tenth of Dutch national income has been earned in connection with the production and sale of nationally produced agricultural commodities.

Table 2.10 Contribution of sectors a) directly or indirectly related to agriculture to national income in the Netherlands

Income earned in	% of national income					
	1970	1975	1980	1985	1990	1995
Agriculture	5.8	4.6	3.2	3.8	3.7	3.2
Food industry	2.0	1.7	1.3	1.4	1.4	1.1
Supply industry	2.4	2.4	2.3	2.3	2.4	2.3
Distribution stage b)	2.4	1.8	1.3	1.3	1.2	1.2
Capital goods industry	1.0	0.9	0.7	0.8	0.8	0.8
Total	13.6	11.4	8.8	9.6	9.5	8.6

a) Excluding the processing of foreign raw materials;

b) Trade, transport etc. between food industry and the consumer.

Source: CBS/LEI.

2.4 Position on the world's scoreboard

Dutch agriculture takes a leading position in the world. As mentioned before, total Dutch agricultural exports rank third and net agricultural exports rank second in the world. However, as far as land area is concerned, the Netherlands is positioned somewhere after the first hundred or so. For a small country, this achievement is most remarkable and shows the significance of the Netherlands' contribution.

Within the EU, the Dutch agricultural sector tills about 1.6% of all land under cultivation, while comprising 1.7% of the total number of holdings and producing about 8% of the overall gross production value of the Union's agricultural sector. Dutch agriculture produces more output with less land and labour, which shows how efficient it is.

In section 2.2.1, we presented an overview of Dutch agricultural productivity. As a comparison, table 2.11 mirrors more clearly the position of Dutch agricultural efficiency in

western Europe, one of the world's leading agricultural areas. Dutch agricultural production, labour output and land productivity has been the highest of 10 European countries. Dutch agricultural labour productivity and land productivity was 115% and 181% higher respectively than the average level in 1975, 100% and 250% higher in 1980, and 134% and 266% higher in 1985. Total grain¹ (not including rice because there is no rice grown in the Netherlands) production per hectare in the Netherlands was 9,650 kg, the highest of the EU, which was nearly twice as high as the average level of the 15 EU countries in 1993.

The general picture of Dutch agriculture is characterized by agriculture based on high productivity.

Table 2.11 Comparison of Dutch agricultural productivity with other European countries

Country	1975		1980		1985	
	labour produc- tivity	land produc- tivity	labour produc- tivity	land produc- tivity	labour produc- tivity	land produc- tivity
The average of ten countries = 100						
Germany	118	126	107	119	105	109
France	122	87	114	93	126	94
Italy	76	140	98	171	93	171
<i>Netherlands</i>	215	281	199	305	234	366
Belgium	174	177	168	189	175	183
United Kingdom	108	44	130	57	128	56
Ireland	58	40	53	42	62	46
Denmark	142	91	135	102	223	130
Greece	57	151	60	180	56	172
Spain	...	...	75	59	67	55

Source: Terluin (1990).

¹ Grain only includes cereals in the Netherlands, unlike in China.

3. Long-term trend

Dutch agriculture has a brilliant present, as demonstrated in the last Chapter. But what about its past? How did Dutch agriculture arrive at its present state step by step? What is the long term trend of Dutch agricultural development? Looking back on these historical aspects is an aid to understanding the mystery of Dutch agricultural development and gauging its future. 'Taking history as the mirror, the ups and downs can be understood correctly'¹.

In analysing the long-term trend, an important (and difficult) issue is the classification of developmental stages. Because different classifications of the same research object often lead to different conclusions, classification is often contested. In this report, the course of Dutch agricultural development is classified into four stages on the basis of developmental features:

- pre-modern times, before 1880;
- first modernization phase, 1880-1950;
- second modernization phase, 1950-1980;
- sustainable growth, after 1980.

3.1 Pre-modern times: before 1880

The Netherlands derives its name from 'the Republic of the United Netherlands', established in the 16th Century. At that time, William of Orange led the United Provinces in a revolt against their Spanish rulers. After the so-called '80 Years' War', the country gained formal independence in 1648. After independence, the Netherlands immediately embarked upon its economic construction and social development. In the 17th Century the Netherlands was the leading maritime nation in the world. This period is known as the 'Golden Century' or 'Golden Age' in Dutch history.

Agriculture, being a fundamental sector of Dutch economy, began its development as the Dutch economy flourished. But in general, Dutch agriculture remained in its traditional state until around 1880, even though many achievements were gained before this time.

Geographically, agriculture developed from coastal areas and concentrated on dairy farming. This is because large parts of the Netherlands, as described in the last Chapter, lie below sea level. Much farmland, particularly in the sea districts, was marshy and usually too wet for arable farming. By draining the land with the help of windmills, it could be used as pasture and hayfields, though it was still unsuitable for arable farming. Therefore, a

¹ This is one of the three famous expressions in ancient China. Those three expressions are: taking copper (in ancient China, the mirror was made by copper) as mirror, one can be dressed suitably; taking other people as mirror, rights and wrongs can be known; taking history as mirror, highs and lows can be understood correctly.

relative specialization in dairy farming took place first in these coastal areas. Dairy produce was sold to consumers in the Netherlands and beyond.

Higher daily wages per male labourer, higher rents per hectare of farmland, and higher yields per cow are the eloquent proof that Dutch agricultural development began with dairy farming in the coastal areas. This can be seen in table 3.1. Not only were the figures higher than those in inland provinces, they were also higher than the national average level. Wages and rents, as the costs of productive factors, are determined by supply and demand. This means that the higher prices for labour and farmland were motivated by the higher demand for these factors by agricultural production in the coastal districts. Higher yields per cow are a clear indication of the higher level of agricultural development in the coastal areas than elsewhere.

Table 3.1 *Agricultural wages and rents and yield per cow in the Netherlands circa 1810*

	Coastal provinces					Inland provinces			Netherlands
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Daily wages per male <i>agricultural labourer</i> (NLG)	0.76	0.82	0.80	0.88	0.86	0.60	0.54	0.48	0.65
Rents per hectare (NLG)	25	22	31	30	31	9	14	19	23
Milk yield per cow (hl)	-	2.2	2.4	2.2	2.4	1.0	1.0	-	1.9

(1) Groningen, (2) Friesland, (3) North Holland, (4) South Holland, (5) Zeeland, (6) Drenthe, (7) Overijssel, (8) Gelderland

Source: Van Zanden (1994).

The specialization in dairy farming in the coastal areas had both internal and external consequences. It forced the farmers in the coastal areas to buy foodstuffs such as bread rather than growing their own cereals. The farmers also began to buy their tools from the emerging farm implements industry instead of making their own. This in turn stimulated the gradual commercialization of agriculture. Thus, this commercialization was the first external effect of the specialization of dairy farming in the coastal areas. This helped form and develop the domestic market and accompanying trade.

Because the coastal areas stopped growing cereals, insufficient supply from the inland areas obliged farmers in coastal areas to import them from other countries and pay for them with export revenues, butter and cheese being among the most important export products.

Another remarkable development during this period was the emergence of market gardening and its concentration near the cities. Beginning in the 17th century, all sectors started to flourish, especially trade. Related industries such as shipbuilding also developed. The population also grew rapidly, mostly in the large towns. Amsterdam, for instance, was

already a centre of trade with some 100,000 inhabitants around 1600, and this figure soon increased to 200,000. Urbanization led to an increased demand for vegetables and fruit, resulting in the emergence of horticulture, including flower and bulb cultivation, near the cities. By the end of the 17th century, Holland was already famed for its horticultural export.

However, some problems were encountered during this period. Foremost was the heavy tax burden imposed on the coastal areas by the federal government, which had to finance one war after another to maintain Dutch trade activities in the struggle with England and France. But the government did not do anything for the farmers in return and, as a result, farmers had to choose either to specialize in intensive production for the market in order to pay taxes or retreat from agriculture altogether. The first choice resulted in a more intensive form of agriculture, whereas the second option reduced agricultural investments.

The second important problem appeared in the inland areas. In these provinces, agricultural development lagged far behind. Before the 18th century, self-sufficient family farms were the main structure underlying agricultural development in these areas. Cereal production prevailed and cattle were kept only for manure and power, with hardly any exportable surplus. Unfavourable natural conditions such as poor soil quality and an underdeveloped infrastructure - few roads and canals - were important reasons for the lagging development in inland areas. The most important reason, however, was institutional: the feudal system and the common grounds system. Undoubtedly, the feudal system is harmful to agricultural development. The common grounds system, a system in which most pastures were shared by all the inhabitants of a village, proved to be a hindrance for individuals who wanted to innovate, because everybody had to agree on any change. Although

Table 3.2 Long-term development of Dutch agriculture, 1810-1880 (in constant prices)

	1810	1850	1880
Gross production (mill. guilders)	205	257	343
Labour input (1,000 man years)	308	420	482
Agricultural land (1,000 ha)	1,796	1,906	2,015
Production per			
<i>man year in guilder</i>	665	611	711
<i>hectare in guilder</i>	114	135	170
Yield per hectare (hl)			
<i>wheat</i>	13	19.3	22.7
<i>rye</i>	15	18.0	17.2
<i>barley</i>	27	32.8	39.1
<i>oats</i>	25	32.4	35.3
<i>potatoes</i>	170	120	125
Yield per cow (milk in hl)	1.9	2.3	2.5

Source: Van Zanden, 1994.

some efforts were made to abolish this system from 1800 onwards, solving this problem by legislation took three-quarters of the 19th century. A barter economy was also a restricting factor in the inland districts (Huizinga, 1986).

Generally speaking, Dutch agriculture developed with a gentle upward tendency before 1880, as shown in table 3.2. Gross production, labour input, agricultural land, productivity, all increased at different rates. For example, agricultural gross production increased 67.3% in 1880 against 1810, labour productivity grew 7%, land productivity rose near 50%, milk yield per cow increased 32%.

Compared with neighbouring countries, Dutch agriculture reached a higher stage of development in this period. As table 3.3 shows, Dutch agricultural labour productivity was between 12 to 63% higher than three of the neighbouring countries in 1800.

Table 3.3 The number of mouths fed by 100 people working in agriculture in four countries

Country	1,500/20	1,600	1,700	1,800
<i>England/Wales</i>	132	143	182	248
<i>Belgium</i>	173	160	192	233
<i>Netherlands</i>	177	219a)	...	277
<i>France</i>	138	145	158	170

a) 1670.

Source: Van Zanden, 1994.

3.2 First modernization phase: 1880-1950

Roughly speaking, the Dutch industrial revolution started in the first half of the 19th century, launching the Netherlands into the era of so-called 'modern economic growth'¹. At the beginning of the second half of the 19th Century, Dutch industrial development accelerated. Industrial development created not only a new demand for agricultural products, providing new opportunities for agriculture, but also improved the infrastructure needed for agricultural development, such as canals, railways, ports and trading routes. Between 1851 and 1860, 232 km of new canals were opened in the Netherlands, a 139 km increase in ten years; 144 km of new canals were opened between 1871 and 1880, an increase of 66 km over the previous decade. In 1864, the length of the surfaced road network was 8,542 km; nine years later, this figure had risen to 12,024 km. The length of the railway network was 335 km in 1860, and 4.5 times longer in 1880 (Griffiths, 1982).

Increasing demand and improved infrastructure provided favourable conditions for agricultural development. Against this background, Dutch agricultural development started its course of modernization after 1880.

Dutch agricultural development during this period is characterized by the introduc-

¹ The term 'modern economic growth' was introduced by the American economist Simon Kuznets to describe the combination of economic growth and structural change in the Western world in the 19th and 20th centuries. His work has made the term a household term in economic literature.

tion of modern factors to agriculture. On the production side, we see such factors as artificial fertilizer and new crop varieties. New institution systems are also introduced, related to cooperatives, finance, farmers' organizations, and education, research and extension¹. Not only were these factors the basic forces driving Dutch agriculture towards modernization, they have also become the basis for the present agricultural system in the Netherlands.

The Dutch government played a key role right from the start of this modernization phase. When faced with the agricultural crisis arising from the imports of cheap grain from North America from about 1880 to about 1900 (made possible by considerable improvements in transportation), the Dutch government did not close the border to protect their national agriculture as the German government did, but took a series of measures to improve agriculture and agricultural competitiveness, including the introduction of institutional factors and modern input factors mentioned above.

3.2.1 Introduction of modern input factors

In the modernization of Dutch agriculture, the gradual replacement of traditional input factors played an important role.

Spread of the use of artificial fertilizers

Artificial (chemical) fertilizer was the first modern productive factor introduced into Dutch agriculture. Due to the advent of artificial fertilizers, far-reaching changes took place in the fertilization of agricultural land after 1880. Because of this link, many changes occurred in agriculture as a whole. The introduction of artificial fertilizer removed the impediment of manure shortage which already existed in several areas and had a considerable impact on agricultural production. It created a new frontier, not only for agricultural growth but also for the chemical fertilizer industry.

Because artificial fertilizer represented the new production force, there was a rapid diffusion of the use of chemical fertilizers in Dutch agriculture. Within a short period, the Netherlands became the largest consumer of artificial fertilizer per hectare of arable land. The rapid increase in this usage can be seen from the artificial fertilizer imports². Within only 25 years, imports of Dutch artificial fertilizers increased to more than 105 times the level of 1885/1889, nearly doubling every five years and with an average growth rate of about 20% per year. Table 3.4 shows the percentage of land users who used artificial fertilizer around 1888. In some areas, this percentage reached 66 among large farms. It is also clear that everywhere the larger farms pioneered the use of artificial fertilizer. Though large farms generally tend to lead the way in agricultural innovation, in that time even crofters and labourers began to use artificial fertilizers.

According to the investigation of the State Commission, the first centres to use artifi-

¹ According to Karl Marx, the productive force and production relation are two basic factors to move economic and social development forward.

² Prior to 1914, there were few artificial fertilizer firms. Nearly all artificial fertilizers were imported. So the imports of artificial fertilizers provide a good indication of their increased usage.

cial fertilizers were, first of all, eastern Zeeuws-Vlaanderen and the peat colonies in Drenthe and Groningen. Both regions were important centres for diffusion of the use of artificial fertilizers. In Drenthe and Overijssel, the farmers in the peat colonies were instrumental in diffusing the use of artificial fertilizers. Their example induced the farmers on the sandy soil to start using them as well. The new polders in North Holland were the third area. The sea clay region in the southwestern Netherlands also consumed large quantities of artificial fertilizers.

Table 3.4 Number of land users who used artificial fertilizers as a percentage of the total number of land users by farm size, circa 1888, in the Netherlands

	(1)	(2)	(3)
Labourers	0.3	4.5	16.7
Small farmers	2.6	18.6	42.9
Large farmers	6.4	48.8	65.9
Total	2.0	17.9	38.4

(1) In 16 municipalities where between 0 and 10% of the land users used artificial fertilizers.

(2) In 10 municipalities where between 10 and 25% of the land users used artificial fertilizers.

(3) In 6 municipalities where more than 25% of the land users used artificial fertilizers.

Source: Van Zanden, 1994.

By 1936/38, the use of artificial fertilizers had reached a high level. The use of fertilizers per acre was as follows: N, 15 kg; P₂O₅, 17 kg.; and K₂O, 19 kg (Foreign Agricultural Service, MLNV, 1959).

Two main factors caused the rapid diffusion of the use of artificial fertilizer after 1880. First, the supply of manure for intensive agriculture, as it had developed before 1880, was a serious bottleneck in many agricultural areas. Second, the growing output and trade of artificial fertilizers made the relative price of artificial fertilizers decline rapidly after 1880. The rise of the cooperative movement and the expansion of agricultural education after 1900 also played an important role in the diffusion of the use of chemical fertilizers.

Factory processing of dairy products

The factory processing of dairy products was another innovation in Dutch agriculture after 1880. The economies of scale inherent in the production process and in product marketing were an important aspect of dairy production. But prior to 1880, factory processing of dairy products was rare. The problems related to the production of butter and cheese, especially the poorer quality, on small farms were not urgent ones.

The sharp rise of the margarine industry in the 1870s, with its concentration on exports to England, hit Dutch butter exports, which consequently declined. Farmers in Friesland, who were highly dependent on the marketing of butter, were the first to suffer

from this blow. To maintain their position in the butter market, they established the first cooperative butter factory in 1886. This was less risky for dairy farmers than producing butter in privately-owned factories. From the late 1880s onward, Friesland was the centre of factory-made dairy products. Following the example of Friesland, this innovation spread rather quickly to other provinces.

The innovation in butter production played a key role in agricultural development. The increase in production and exports of butter and cheese, both quantitatively and qualitatively, was accompanied by a dramatic decrease in production costs. Consequently, all butter-producing farmers could benefit, especially the small farmers with less working capital. It also created economies of scale in dairy processing, another step towards further agricultural specialization.

New crop varieties

In the centuries before 1880, technical development in Dutch agriculture - such as new crop varieties, new rotation systems, equipment - was the result of trial and error, of more or less accidental, uncoordinated experiments carried out by individual farmers. Innovations spread from field to field when farmers in the immediate vicinity saw the innovator's success and adopted the innovation. The diffusion of innovations was therefore generally relatively slow.

After 1880, with help from the government, a new system of innovation arose. The development of experimental agricultural fields started after 1890. In these fields, the ambulatory agricultural consultants known as 'wandelleraren' (literally, 'walking teachers') experimented with new techniques and new crops, enabling farmers to see the advantages of the innovations. After 1900, the number of experimental fields increased rapidly. This new system created many innovations, such as new crop and livestock varieties and new planting systems, from which many farmers benefited.

3.2.2 Institutional factors

Modernizing agriculture not only requires new input factors - the hardware - but also software: knowledge and information. Without software, like any computer system, modern hardware in itself is insufficient. Institutional systems introduced into Dutch agriculture provided the foundation for agricultural modernization. This is still the case.

The first factor introduced into agriculture were the farmers' and farm workers' organizations. Although Dutch agricultural organizations began in the first half of the 19th century¹, it took until 1884 before the first national umbrella organization was formed, the Netherlands Agricultural Committee. Once again, it appeared to be very difficult to come to some form of centralization. Later, in 1896, a Roman Catholic union was formed out of

¹ In 1805 the government established the Consultancy Committees for Agriculture. Later so-called free organizations were founded in the provinces, first in Groningen and Zeeland in 1837. In 1850 all provinces had their regional organizations. This was a reason for the government to disband the Consultancy Committees for Agriculture the following year.

the Netherlands Agricultural Committee, the Nederlandse Boerenbond (Dutch Farmers Union). In 1918, a Protestant farmers' union was founded. The agricultural workers organization was set up in 1900 (Netherlands Agricultural Labourers' Union). Then, the first agricultural employees' organization was formed. Now farmers and farm workers had their own national associations to present their interests to the national government.

The second institutional factor after 1880 was the introduction of the cooperative. The first agricultural cooperative was established in the Netherlands in the second half of the 1880s¹. The first dairy cooperative was founded in 1886. It was the first cooperative for agricultural products. The first cooperative vegetable auction was established in 1887. After that, numerous cooperatives were established everywhere. By 1949 there were already 3,150 cooperatives; the market shares of agricultural cooperatives were, respectively, 50% in credit, 61% in fertilizer purchase, 86% in cheese production, 85% in butter production, 84% in milk deliveries, 83% in industrial processed potatoes, 98% in sales of marketed vegetables and fruit, 75% in sale of wool, and 60% in sale of marketed flowers (NCR, 1993). Cooperatives can be seen as instruments of 'self-help'. Through the cooperatives, the farm and the market came into contact for the purchase of artificial fertilizer, feed, seeds, and agricultural machinery, for the sale and manufacture of products, and for the provision of credit. The advantages of cooperatives are clear. First of all, the cooperatives allowed farmers to profit from the economies of scale in the large-scale purchase of inputs as well as in the sale and manufacture of products; the cooperatives also allowed farmers to buy and use machinery which could not be used profitably by a single farmer. Secondly, the cooperatives were helpful in regaining and expanding the farmers' position in the markets, for example by increasing the prices they obtained for their products as well as checking buyers' and suppliers' monopolistic profits. Cooperatives improve the competitive power of farmers and strengthen their position on the markets.

The third institutional factor is the cooperative agricultural financial system. Because of the rapid improvement in sea and land transportation in the second half of the 19th century, Europe became accessible to products from far-flung agricultural areas. The massive flow of agricultural products to Europe caused an enormous drop in prices in the Netherlands. Between 1870 and 1895, grain prices fell to less than half their previous level. Because many arable farms had converted into livestock farms, dairy prices and beef prices also dropped after 1885. The agricultural crisis brought about a great scarcity of money among farmers, which led to social abuses such as instalment payments, loans at usurious rates of interest and financial dependence of individual farmers on itinerant traders and shopkeepers. In 1888, a government-appointed study committee, which of course had a broader function than simply supplying credit, emphasized the need for a sound agricultural credit system to protect farmers against extortionate rates and promote agricultural development. However, this would have to be set up by the interested farmers themselves. It recommended the establishment of credit cooperatives similar to the Raiffeisenbanks in Germany, which were established in 1896. Two years later, two central farmers' credit banks were founded, the Cooperative Central Raiffeissen Bank in Utrecht (non-Catholic,

¹ Although the first agricultural purchasing cooperative was established in 1877, the cooperatives for agricultural products were not formed till 1886.

the members of which were mainly the local banks from all over the country apart from the south), and the Cooperative Central Farmers' Credit Bank in Eindhoven (Catholic, the members of which were mainly the local banks in the south, east and west of the country). Right from the foundation of the farmers' credit bank, the cooperative agricultural financial system has played a very important role in agricultural development in the Netherlands. As mentioned earlier, up to 1949 the share of farmers' banks in agricultural credit amounted to 50%.

The fourth institutional factor is agricultural education, research and the extension system. During the agricultural crisis that arose as a result of foreign competition, the Dutch government chose not to close the borders but to strengthen its agriculture by setting up a system of education, research and advice. In this way the farmers were provided with the instruments to find economic solutions themselves. Known as the 'three pillars' of agriculture, education, research and extension have remained the basis of Dutch agriculture.

3.3 Second modernization phase: 1950 - 1980

After World War II, the economy as a whole in the Netherlands recovered quickly and agriculture experienced a boost. Agricultural development involved a strong growth in production and exports as well as productivity, as illustrated in tables 3.5-3.8.

The average annual growth rate of gross agricultural production between 1950 and 1980 was above 4%, the highest growth rate, more than 5%, occurring in horticulture. The rate for livestock farming was higher than 4.5%. The average annual growth rate of agricultural exports was more than 6%.

The most remarkable growth appeared in agricultural productivity. From table 3.8 we can see that the growth rate of agricultural productivity per year was above 3%; in the period 1960-1970 it was as high as 3.7% annually; the contributive share of TFP in agricultural growth¹, also called the relative contribution of TFP in agricultural growth, was above 60%, in 1960-70 it was as high as 98%. That means that on average more than 60% of Dutch agricultural growth during the period 1950-1980 came from increased productivity or improved agricultural efficiency. High efficiency is the major source of Dutch agricultural growth.

Structural changes, as expressed by mechanization, scale enlargement, specialization and intensiveness, are the core of Dutch agricultural development during the 1950-80 period.

¹ The contributive share of TFP in agricultural growth is defined as the ratio of TFP growth rate to total agricultural production growth rate (Feng, 1989, 1992). It is calculated by dividing the TFP growth rate by the growth rate of total agricultural production.

Table 3.5 *Agricultural growth in the Netherlands in 1950-80*

Period	Gross production	Intermediate input	Net production in agriculture	Net national income
average annual growth in %				
1950-60	4.6	6.8	3.3	4.0
1960-70	3.8	4.8	2.7	5.3
1970-80	4.6	4.7	4.2	2.8

Source: CBS/LEI.

Table 3.6 *Growth of gross production per subsector of agriculture in the Netherlands in 1950-80*

Period	Arable farming	Livestock farming	Horticulture
average annual growth in %			
1950-60	4.4	4.9	3.9
1960-70	1.5	3.8	5.3
1970-80	2.3	4.6	5.8

Source: CBS/LEI.

Table 3.7 *Growth of agricultural exports in the Netherlands in 1950-80*

Period	Exports growth per year in %
1950-60	7.1
1960-70	5.8
1970-80	5.1

Source: CBS/LEI.

Table 3.8 *Growth of agricultural productivity in the Netherlands in 1950-80*

Period	TFP growth per year in %	Contributive share of TFP in agricultural growth in %
1950-60	2.16	59.8
1960-70	3.70	97.6
1970-80	3.28	74.7

Source: Rutten, 1992.

3.3.1 Mechanization

Agricultural mechanization is one of the most remarkable changes that took place in the Netherlands between 1950 and 1980.

In Dutch practice during this period, it was required that optimization of output or added value per person in agriculture achieve the same level of purchasing power as outside agriculture. Mechanization served to increase output per person. The price relationship between labour and capital also led to mechanization.

After the war, especially since 1950, reconstruction and growing industrialization provided good job opportunities for agricultural workers who wanted to leave the sector. At the same time, the discrepancy between income per person in agriculture and in industry drew many people away from agriculture. Thus, the absolute decrease of the agricultural workforce in the Netherlands started immediately after WW II and developed very rapidly (table 3.9). The average annual decrease rate of agricultural labour was about 3% during the period 1950-1980. In the first two decades after 1950, more hired labour left than farm family labour.

Table 3.9 *Change trend of agricultural workforce in the Netherlands in 1950-80*

Period	Farm family labour	Hired labour	Total
	annual change in %		
1950-60	-2.2	-2.8	-2.3
1960-70	-3.2	-5.5	-3.6
1970-80	-2.0	-1.2	-1.9

Source: CBS/LEI.

The shortage of agricultural workers resulted in the use of more machinery. As a result, mechanization in agriculture developed very fast in the Netherlands in the 1950s and 1960s, as can be seen in table 3.10.

3.3.2 Scale enlargement

Scale enlargement, especially scale enlargement per agricultural labourer, is the most important structural change in Dutch agricultural development after 1950. There is a close relation between scale enlargement and mechanization: without mechanization, scale enlargement on the farm is impossible.

Table 3.10 Increase of agricultural machinery in the Netherlands in 1950-80

Period	Tractors	Milk machines	Combine harvesters	Potato harvesters	Sowing and planting machines
annual change in %					
1950-60	12.9	26.0	9.7	16.3	3.7
1960-70	6.7	8.3	9.5	0.6	-
1970-79	2.0	-3.4	-2.4	-1.6	0.6 a)
1950-79	7.3	10.1	5.7	5.0	1.7

a) 1960-79.

Source: CBS/LEI.

Mechanization alone is not sufficient, however. The enlargement of one farm will usually be at the expense of other farms. If other farms do not abandon their holdings and make their land available, enlargement of the independent farms is only possible to a limited extent, due to the land-bound nature of production. This means that a related institutional system is necessary for scale enlargement in agriculture.

The locus of scale enlargement of Dutch farms in the period 1950-1980 is shown in tables 3.11-13. The share of holdings larger than 30 ha was more than 16% in 1980, 11 percentage points higher than in 1950; the share of holdings smaller than 10 ha declined 32 percentage points in 1980 compared with 1950. As for cultivated land area, the share of farms with less than 30 ha was 39% in 1980, 17 percentage points more than in 1950; the share of farms with less than 10 ha was 9%, much less than in 1950. On average, the size of main holdings was nearly 19 ha in 1980, 7.6 ha higher than in 1950. If horticultural holdings are included¹, the average size of holdings was 13.9 ha in 1980, 8.2 ha or 1.5 times more than in 1950.

Increase in the size of livestock farming has also been substantial. The share of farms with more than 30 milk cows was 69% in 1980, 3.6 times higher than in 1950; the share of milk cows on farms with more than 30 milk cows in total milk cows was more than 80% in 1980, 50 percentage points higher than in 1950. In farms producing porkers, the share of farms with more than 200 porkers of more than 20 kg in the total number of porkers heavier than 20 kg increased 28 percentage points in 1980 against 1950; in 1980 this figure reached 75%, 15 times the 1950 figure. This means that three-fourths of all porkers heavier than 20 kg were already concentrated in the farms with 200 porkers or more heavier than 20 kg in 1980. 76% of breeding sows and 89% of hens were centralized respectively on the breeding sow farms with more than 50 breeding sows and on the hen farms with more than 5,000 layers in 1980.

¹ Generally speaking, horticultural holdings are smaller, as shown in table 2.5, because they are intensive. Horticulture has developed considerably since 1950. So, if horticultural holdings are included, average farm sizes will be smaller.

Table 3.11 Scale enlargement according to area in the Netherlands in 1950-80 a)

Size	1950		1960		1970		1980	
	holdings	area	holdings	area	holdings	area	holdings	area
<10 ha	61.7	28.9	52.4	25.8	36.5	14.4	29.8	9.1
10-20 ha	24.8	31.2	31.9	34.9	39.8	36.2	34.9	27.1
20-30 ha	8.0	17.3	9.4	17.7	14.4	22.1	19.1	24.7
30-50 ha	4.5	14.9	5.2	15.2	7.4	17.8	12.3	24.5
>50 ha	1.0	7.7	1.1	6.4	1.9	9.5	3.9	14.6
Average number of hectares per	11.1		12.7		15.6		18.7	

a) Not including horticulture holdings.
Source: CBS/LEI.

Table 3.12 Average size of farms according to area in the Netherlands in 1950-80 a)

	Farm size in hectare
1950	5.7
1960	7.5
1970	11.6
1980	13.9

a) All holdings, including part-time farms.
Source: CBS/LEI.

3.3.3 Specialization

Another structural change in Dutch agriculture after 1950 is specialization. In theory, specialization benefits production scale and generates more intensive knowledge and information in agriculture. Dutch agricultural specialization took place in terms of both geography and type of farm, i.e. regional specialization and farm specialization.

As discussed in section 3.1, dairy farming began to concentrate in the coastal areas before 1880. Although the trend towards regional agricultural specialization has continued since the beginning of this century, it accelerated during the 1950-1980 period. By 1980, the three main belts of agricultural production, as shown in paragraph 2.2.3, were already completely formed.

Specialization has also taken place in terms of farm type. Farm specialization is the basis of regional specialization. Taking the ratio of mixed farms to total farms as an indicator to reflect farm specialization between 1950 and 1980, we see that the ratio of mixed farms to total farms was 5% less in 1980, decreased by nearly half compared with 1965. That means that more than 95% of all farms were specialized farms at the end of the 1970s.

Table 3.13 Development of the number of animals per farm and per type in the Netherlands in 1960-80

	1960	1970	1980
<i>Milk cows</i>			
number of farms with >30 milk cows			
as % of the total number of farms with milk cows	15	32	69
% of milk cows on farms >30 milk cows in total milk cows	31	51	80
<i>Breeding sows</i>			
number of farms with >50 breeding sows			
as % of the total farms with breeding sows	0	6	34
% of breeding sows on farms >50 breeding sows in total breeding sows	0	25	77
<i>Porkers >20 kg</i>			
number of farms with >200 porkers			
as % of the total farms with >200 porkers	1	12	29
% of porkers >20 kg on farms >200 porkers in total porkers >20 kg	50	75	
<i>Layers</i>			
number of farms with >5,000 layers			
as % of the total farms with >5,000 layers	0	2	24
% of layers on farms >5,000 layers in total layers	0	41	89

Source: CBS/LEI.

3.3.4 Intensiveness

Intensiveness was another main trend of Dutch agricultural development during the 1950-1980 period. Intensive agriculture makes full use of limited land resources to produce as many products as possible in a shorter period with more inputs of capital, technology, variable factors and modern management on a specific land area. In a nutshell, intensive agriculture is one of high output with high input.

The sharp increase in the use of capital in agricultural production is a better indication of agricultural intensiveness. Total value of capital used in agriculture increased from 16 billion guilders in 1957 to 90 billion guilders in 1983 (Strijker, 1986), an annual growth rate of 7%. According to the FAO, the amount of fixed capital per hectare in 1980 was 1,953 U.S. dollars in the Netherlands, the highest in the world and 12.3 times that of the U.S.

Maybe the best illustration of intensiveness is the enormous increase in agricultural productivity. When the 1950 level is set at 100, labour productivity is 318 in 1970 and 559 in 1980. Labour productivity increased more than 4.5 times in 1980 against 1950, an annual growth rate of 6%. Land productivity in 1980 amounted to 1,785 U.S. dollars¹, 46% higher than Japan, 132% higher than Germany², and nearly 15 times higher than the U.S.

3.4 Sustainable growth: after 1980

Dutch agricultural development entered a new stage after 1980, the sustainable growth stage, which focuses on improving the relationship between agriculture and the environment.

Before 1980, in general, Dutch agricultural development aimed at the highest production and export possible. Little attention was placed on environmental issues. After 1980, environmental issues became more important.

The use of chemicals and fuel and the disposal of manure from agricultural production contributes to the pollution of rivers and canals, air, soil, and groundwater. However, agricultural production also functions as a manager of most of the green areas. In a densely populated country, this is increasingly important for recreational purposes and for maintaining green zones between the urban agglomerations. Thus agriculture is very important for a balanced environment.

The main environmental problems as a result of agricultural development in the Netherlands came from manure. Strong specialization and intensification of production systems, especially intensive livestock production, which predominantly focused on increased productivity, had a negative effect on the natural environment. The rapid increase of livestock production also increased manure production tremendously, resulting in serious environmental problems.

A great deal of superfluous manure resulted in at least four categories of environmental problems: eutrophication of surface water due to nitrogen and especially phosphate emissions, nitrate pollution of groundwater, acidification due to the volatilization of ammonia originating from manure, and, finally, accumulation of heavy metals in soils and food. Since 1980, only 30 to 35% of the phosphate that farmers currently apply is taken up by the crops. The remainder is largely absorbed by the soil. Already, 30% of Dutch soil is saturated with phosphate. Approximately 75% of the total amount of nitrogen presently applied in the agricultural sector is accounted for as surplus, as these minerals are not incorporated in the products supplied by livestock and arable crops. Nitrate concentrations in groundwater continue to rise, resulting in some cases in the closing of wells. More closings are expected. Ammonia from manure contributes more than 30% of the total acid deposition. Manure also contains heavy metals, such as cadmium, copper, mercury, lead and zinc. The application of manure to land substantially contributes to the accumulation of heavy metals in soils and food.

¹ In 1975 US dollar.

² West Germany.

Increasing environmental problems in agriculture urged policy-makers to develop instruments to reduce and control the pollution caused by intensive farming practices. The Dutch government has taken several measures aimed at the protection of the natural environment and the sustainable growth of agriculture since 1980. These measures have driven Dutch agricultural development into the sustainable-growth phase in which agriculture provides not only better food but also a better environment.

4. Main features of Dutch agricultural development

The success of Dutch agricultural development has been shown in previous chapters, but an explanation for this success must still be given. What factors made Dutch agricultural development so successful? Although Dutch agriculture benefited a good deal from its favourable natural background (see chapter 2), it appears that the factors behind the successful development of Dutch agriculture are not natural but institutional. Behind the prosperity of Dutch agriculture is a set of institutional systems, including land ownership and tenure system, free trade system, financial system, marketing system, cooperative system, organizational system, education and research and extension system, and government policy system. These eight systems represent the principal experiences of Dutch agricultural development.

4.1 Land ownership and tenure system

A land ownership and tenure system refers to the way people own land and how they rent it to others if they choose not to cultivate it themselves. In agriculture, a land ownership and tenure system is very important because of the close relationship between agriculture and land. Land is not only the location of agriculture but also a basic and important production factor. Because land is the basis of agriculture, the land ownership and tenure system is the basis of the institutional systems needed for agricultural development.

The land ownership and tenure system has many impacts on agricultural development, the most important one being the impact on agricultural productivity. An individual proprietor who owns his land knows that increased effort or skill leading to increased land output will also improve his income. This result does not necessarily follow if the land is owned by someone else. If a tenant's rent contract is only for a year or two, a rise in output may result in the landlord threatening to evict the tenant so that all or much of the increase in production can be snared through a rise in the rent. In this case, the tenant does not have the incentive to improve productive conditions and raise output and the increase in agricultural productivity which is the lifeblood of agricultural prosperity will not take place. It is obvious that from an incentive and management point of view the ideal land ownership and tenure system for agricultural development is one in which the land is owned by farmers or tenants can rent land for a specific duration from the landlords.

4.1.1 Types of land ownership and tenure system

The family farm is the cornerstone of agricultural production. The agricultural sector is dominated by private enterprises, i.e. the family farm. This is the main characteristic of all institutional systems in Dutch agriculture.

In general, there is an efficient system of land ownership and tenure in the Netherlands. The family farm is a feature of this system. About 70% of land used for agriculture at present is owned by farmers themselves, i.e. owner-occupied land; another 30% of farmland is rented, partly from landlords and partly from the State.

Tables 4.1-4.5 show the changes in the type of land ownership and tenure system in the Netherlands at various stages. These figures show that:

- the owner-occupied land type dominates the agricultural land ownership and tenure system, but the position of owner-occupied land went down before 1950 and rose afterwards. The share of owner-occupied land increased 25 percentage points in 1995 compared with 1950. This means that the trend of the farmland ownership and tenure system has been towards the owner-occupied land type since 1950. The government policy aimed at controlling farmland price so as to stimulate farmers to buy land resulted in this trend;
- the share of fully owned holdings is diminishing as the size of holdings increases. The percentage of farms with 5 ha of land or less, where the farmers are full owners, is 25% of all farms; but the percentage of farms with more than 50 ha of land where the land is fully owned by farmers is only 1.5% of all farms;
- the share of fully owned land area first rose and then declined as the farm size increased;
- more than half of rented land is privately owned. But the position of the government as a leaser is increasing, from 21.7% in 1977 to 24.8% in 1987. On the other hand, the position of farmers who lease land is decreasing, from 22.7% in 1977 to 13.6% in 1987, a decline of almost ten percentage points in ten years;
- about one-tenth of total rented land comes from farmers' parents at present and shows a downward trend, indicating that farmers' parents are not the major source of rented farmland.

4.1.2 Strong points

The fact that most of the farmland is owned by the farmers themselves is an important aspect of the land ownership and tenure system. As mentioned earlier, there are no problems with the owner-occupied land system because the farmers who use their own land for agriculture know how to do so efficiently.

With reference to the rented land system, there are strict policy and law instruments to protect the interests of tenant farmers and landlords. The Netherlands is one of the six EU countries which employ administrative procedures designed to control the conclusions and modifications of lease agreements¹. There is legislation which provides for strict government intervention in the relation between landlord and tenant in the Netherlands.

¹ The other five countries are Denmark, Germany, France, Ireland, and Spain.

Table 4.1 The position of owner-occupied and rented land in the Netherlands

Year agricultural	Agricultural land area in ha			% in total land area	
	owned	rented	total	owned	rented
1921	1,035,223	966,019	2,001,242	51.7	48.3
1930	1,095,928	835,706	1,931,634	51.0	49.0
1940	1,080,954	1,243,238	2,324,192	46.6	53.4
1950	1,029,152	1,305,967	2,335,119	44.1	55.9
1955	1,084,191	1,223,813	2,308,004	47.0	53.0
1970	1,112,124	1,030,473	2,142,597	51.9	48.1
1979	1,205,513	827,971	2,033,484	59.3	40.7
1985	1,275,630	743,394	2,019,023	63.2	36.8
1990	1,342,409	663,199	2,005,608	66.9	33.1
1995	1,361,653	603,094	1,964,747	69.3	30.7

Source: CBS/LEI.

Table 4.2 The type of land tenure system according to holdings in the Netherlands

	Fully owned holdings in %	Partly owned holdings				total %	Fully rented holdings in %
		80-99%	50-79%	20-49%	<20%		
1970	38.1	8.8	14.1	10.4	6.0	39.3	22.6
1975	42.5	8.8	14.3	10.3	5.7	39.1	18.4
1985	47.1	10.6	15.1	9.9	5.2	40.8	12.1
1995	52.8	11.5	13.7	8.9	4.2	38.3	8.9

Specification 1995
Hectare per holding

0.01 to 5	25.2	0.6	1.8	1.3	0.4	4.1	2.8
5 to 15	14.1	2.5	3.9	2.6	1.1	10.1	2.3
15 to 30	8.0	4.1	4.1	2.4	1.3	11.9	2.0
30 to 50	3.9	2.9	2.6	1.6	1.0	8.1	1.3
> 50	1.5	1.5	1.4	1.0	0.5	4.4	0.5

Source: BS/LEI.

Table 4.3 The type of land tenure system according to land area in the Netherlands

	Fully owned holdings in %	Partly owned holdings				total %	Fully rented holdings in %
		80-99%	50-79%	20-49%	<20%		
1970	27.9	10.5	14.9	11.6	8.2	45.2	26.9
1975	29.9	11.3	16.2	12.1	8.3	47.9	22.2
1985	31.9	15.5	18.5	12.9	7.7	54.6	13.5
1995	34.3	19.5	18.9	12.2	6.3	56.9	8.8
<i>Specification 1995</i>							
<i>Hectare per holding</i>							
0.01 to 5	2.9	0.1	0.3	0.2	0.1	0.7	0.4
5 to 15	7.0	1.4	2.1	1.4	0.6	5.5	1.2
15 to 30	9.7	5.2	8.7	2.9	1.6	18.4	2.5
30 to 50	8.3	6.1	5.6	3.5	2.1	17.3	2.8
> 50	6.4	6.7	5.9	4.1	2.0	20.7	2.0

Source: CBS/LEI.

Table 4.4 The type of rented land system in the Netherlands

	Rented from the owners living in Netherlands				Total %	Rented from the owners living abroad %
	private persons		public organization			
	farmers %	others %	government %	others %		
	1977	22.7	38.7	21.7			13.3	96.4	3.6
1983	18.2	40.4	23.9	14.1	96.6	3.4
1987	13.6	42.8	24.8	15.4	96.6	3.4

Source: CBS/LEI.

Table 4.5 The type of rented land system in the Netherlands

	Rented from parents in %	Rented from others in %
1970	18.0	82.0
1977	15.3	84.7
1983	13.0	87.0
1987	13.0	87.0
1993	11.3	88.7

Source: CBS/LEI.

This legislation ensures efficient land use and maintains a reasonable relation between tenant and landlord. The key points of the Dutch rented farmland system are as follows:

- the Land Board is in charge of lease agreements. All tenancy agreements are subject to the approval of the authority. The authority assesses the merits of contracts on the basis of rent levels, land distribution and quality, and location of farmhouse and farm buildings;
- a special division of the law courts, the Tenure Chambers, settles all legal disputes;
- the term of tenancy in each contract must be at least 12 years for farms and 6 years in the case of single plots of land;
- the term of tenancy will automatically be extended by six-year terms unless either party gives notice to quit within a specified period before the termination of the tenancy term;
- the tenant may within a period of one month after receipt of such notice apply to the appropriate Tenure Chamber for an extension of the term of tenancy;
- the Minister of Agriculture, Nature Management and Fisheries can set maximum rents for various classes and qualities of land and farmhouses and buildings to control and maintain reasonable rent levels. When approving tenancy contracts, the Land Boards use the fixed maximum levels as a guide in defining the proper maximum permissible rent in a particular case;
- in cases where a tenant is compelled to quit land for non-agricultural purposes he may claim compensation for losses sustained. Compensation may be claimed not only in cases of dispossession but also if a tenancy contract is refused extension or annulled due to the non-agricultural purpose of the land. When assessing the compensation, due consideration is given to the possibility of tenancy extension as embodied in the original contract;
- provisions have been made by means of which a tenant may transfer his tenancy to his wife, one of his children, step-children or adopted children, or his co-tenant in case of illness, disablement or age (65 years). In such cases, however, the Tenure Chamber may refuse a request for transfer if the proposed succeeding tenant is considered unable to provide sufficient guarantee for reasonable management of the leased property;
- the death of the tenant does not automatically cancel the contract; certain heirs have the right to continue the lease. The Land Chamber can cancel contracts or order the continuation of the lease with all or several heirs;
- the landlord cannot sue for the rent, and neither party can cancel the agreement, as long as the lease agreement has not been notified to the authorities;
- in case of neglect of leased property, the Tenure Chamber, at the request of the landlord, will assess such neglect and fix a term within which any directives as defined by the Tenure Chamber must be carried out. Failure to carry out such directives may result in annulment of the agreement;
- rents may be reviewed after every three-year period. An application for a review of the rent must be submitted to the Land Board before the end of a three-year tenancy term. It is of course possible for the parties concerned to revise the rent by mutual

- agreement, but in that case also the approval of the Land Board is required;
- the tenant has the right of preemption when the leased land is sold. If the landlord does not respect the right of preemption, he is obliged by the Land Tenure Law to pay damages to the tenant.

4.2 Free trade system

The advantages of free trade between countries have been recorded by classical economic theory. By engaging in production according to its comparative advantage and then exchanging products with other countries freely, every country can make the best and fullest use of its resources and obtain the highest welfare. In other words, every country can benefit from free trade.

Though for many reasons there is still no full free trade in the world, the Netherlands is one of the principal actors upholding and striving for this goal.

Agricultural trade is a very important pillar of the Dutch national economy, as demonstrated in paragraph 2.2.6. The Dutch economy benefits from agriculture, agricultural development benefits from trade, and agricultural trade benefits from the free trade system. Free trade is a cornerstone of Dutch agriculture.

The Dutch Government has devoted itself to free trade and has taken trade as the basic national policy in the course of agricultural development. Early in the 17th century, i.e. the Dutch 'Golden Age', thanks largely to the extensive trading network set up by the Dutch East India Company (V.O.C.), the Republic acquired great prosperity¹. The V.O.C., which was established in 1602 to coordinate trade with South-East Asia, was for a long time the largest commercial enterprise in the world. It was active in shipping and trade on every coast of the Indian Ocean. In the course of the 20th century, especially after World War II, the Netherlands became increasingly active in creating international organizations to promote free trade. It is a Founding Member of the EC, OECD, UN, NATO and various other international organizations. In 1958 it established, together with Belgium and Luxembourg, the first customs union in the world, the Benelux, with completely free movement of labour, capital and services. The Maastricht Treaty on closer economic and political integration, transforming the EC into the European Union (EU), was drafted by the Dutch government in December 1991 when the Dutch held the rotating Presidency of the EC.

The main points of Dutch free trade system are as follows:

- completely free trade of agricultural products inside the Netherlands (no trade barriers among the provinces). Stations for collecting fees, a system aimed at restricting the free movement of products among regions in some countries, cannot be found in the Netherlands. There is a single market. It is obvious that the domestic free trade is the basis of the free trade with other countries;
- completely free movement of production factors inside the Netherlands;
- free goods trade with the surrounding countries, thanks to the EC, and later, the EU;
- all trade activities must conform with the requirements for a good trading system.

¹ Before 1795, the Netherlands was called the Republic of the United Netherlands.

Regulations are made not just by the government and parliament. Mostly, they are made by individuals involved in the production, trade and consumption of agricultural products. There is constant interaction between producers, traders, and consumers in order to comply with the rules;

- in a free trade system, as well as in a market economy system, the role of government is to provide a good framework for the producers, traders and consumers.

4.3 Cooperative system

Without a doubt, the agricultural cooperative has played a key role in Dutch agricultural development. In theory, the necessity for this is determined by the structure of the markets. The relation among farmers is defined as 'full competition'. There are many farmers, generally small farmers, with an open production process and free access to agriculture. This means that the influence of the individual farmer on total supply or demand is negligible. On the opposite side of the market, the situation is generally more or less monopolistic. Full competition on one side of the market and more or less monopolistic competition on the other side creates a need for agricultural cooperatives. The more the market diverts from 'full' competition, the greater the impulse to build up a countervailing power.

Dutch cooperatives exist throughout the agricultural and trade sectors. Since their introduction, they have increased in operational scale, merged gradually to achieve attractive economies of scale, and crossed national boundaries. The Dutch cooperative system is summarized in the following section.

4.3.1 Agricultural cooperatives

In the Netherlands, the term 'cooperative' is reserved for a very specific form of economic collaboration, based on private enterprise and voluntary organization. The definition of an agricultural cooperative is (NCR, 1993): *'An economic organization in which farmers permanently collaborate and integrate aspects of their economic activity (in general the market function), at joint risk and joint expense, in order to make the economic activity concerned as profitable as possible, while maintaining the self-supporting nature of the other functions of the agricultural enterprise'*.

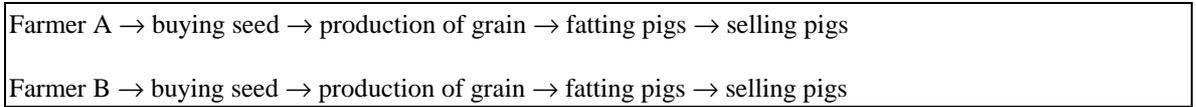


Figure 4.1 Individual farmer process

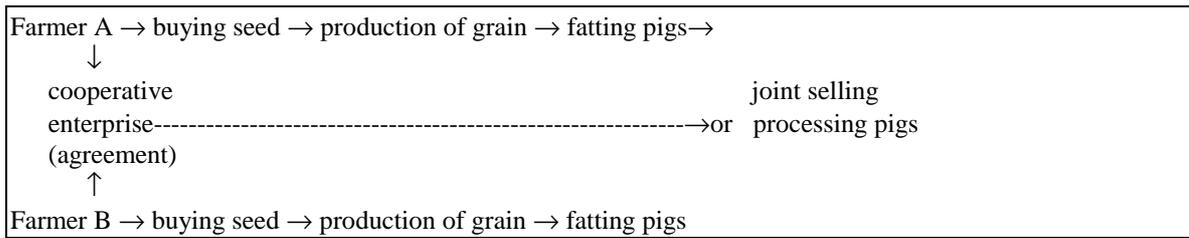


Figure 4.2 Cooperative activity

Figures 4.1 and 4.2 show the processes involved in selling pigs, for example, or other final products such as sugar beet, milk, flowers or vegetables, both individually and in collaboration with others.

Both figures show four activities or functions for the farmer. The farmer as such does not carry out any market activity and the processes flow into each other until the farmer has to sell his final product on the market. For an individual farmer, all activities are carried out by himself. In the case of cooperatives, two separate farmers A and B have agreed to collaborate for the purpose of commercialization on the basis of an agreement made in advance, including the possibility of processing for to achieve higher value in the final product.

From the above figures and definition, the principles of agricultural cooperatives may be summarized as follows:

- they are collaborations between private enterprises;
- they are collaborations between independent entrepreneurs. Each farmer retains individual responsibility for all production decisions and the production process on his own farm. This means that agricultural cooperatives are collaborations between independent farms. In other words, the agricultural cooperative system is a form of 'external' economic organization;
- they are strictly based on the agreements made by farmers;
- they are founded on a voluntary basis and are managed and controlled democratically by members;
- they are fully independent of the government; there is no government intervention;
- the cooperatives incur costs and make profits which are distributed among the members by means of an agreed internal procedure. The standard to be used in this respect is to be derived from the market structure and the type and degree of competition. This means an objective distribution procedure based on the quantity and the quality of the economic activity each member undertakes with his cooperative;
- collecting the economic activities of farmers means 'pooling'. In the pooling system, every farmer does not necessarily receive the same price. The price differs depending on the delivered products. From their inception, many agricultural cooperatives have fixed the price paid according to the quality of the produce. This is seen and accepted by the farmers as an objective system;
- internal rights and duties must be shared among the members of the cooperative or-

- ganization. This concerns financing, risk sharing, responsibility for the voting system;
- concerning the voting system, daily practice has shown that, within a maximum limit, the majority vote is increasingly gaining ground in the Netherlands. The growing differences between the various farmers stimulate this development. This means that the 'one-man/one-vote' principle adopted from the Rochdale pioneers must not be seen as an 'axiom' for an economic organization such as a cooperative;
 - economically speaking, agricultural cooperatives depend directly on the production process of their member farmers. This production process determines the cooperatives' primary objective and function. In other words, the cooperative is the 'extension' of its members;
 - closed membership. This means that if a farmer is a member of a cooperative, he must sell all his products through the cooperative. He is not allowed to sell part of his products to retailers directly or for another member;
 - multi-membership. This means that one farmer may be a member of more than one cooperative organization.

4.3.2 Methods of agricultural cooperatives

The method used by agricultural cooperatives is one of horizontal and vertical integration or differentiation. A cooperative in which farmers pool and jointly sell their products is a kind of horizontal integration, a kind of producers' society.

If additional activities related to other market functions can be adopted, such as processing, wholesale and export activities, i.e. if cooperatives collect the products (horizontal integration) and take over the downstream commercial functions following the actual production process at member farmer level, the cooperative represents a kind of vertical integration.

The 'radiation effect' of the cooperative is very important because the cooperative has an impact on the price levels of all farm products. No enterprise can take the liberty of disregarding the achieved price levels (i.e. achieved inter alia by the action of the cooperative), because it will risk being pushed out of the market.

4.3.3 Defence of the cooperative interests

Local and regional cooperatives are organized either in so-called 'commercial' central cooperatives or 'non-commercial' central organizations, societies or federations. The cooperative interests are mainly defended by their central representative organizations.

Almost all the Dutch agricultural cooperatives are organized in the National Cooperative Council for agriculture and horticulture (NCR), as figure 4.3 explained. NCR, a national umbrella organization, was established in 1934 as the result of a joint action of the agricultural cooperatives to defend cooperatives at the national level against the attacks of the non-cooperative enterprises, which denied cooperatives the right to establish themselves and boycotted them.

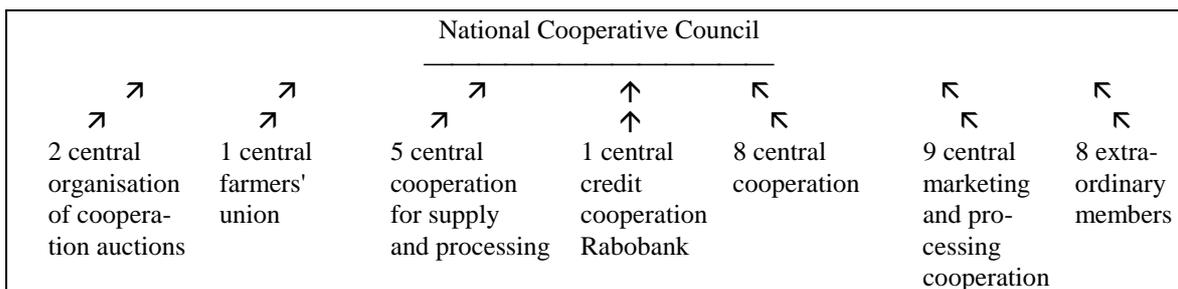


Figure 4.3 NCR as an umbrella organization

The main aims of the NCR can be described as follows:

- to further the cooperative enterprise and other corresponding economic forms of collaboration between farmers;
- to represent the interests of the members, especially as a representative coordinating body of the agricultural cooperatives, at national and international level.

The NCR endeavours to fulfil these aims by:

- studying economic, legal, fiscal or organizational problems, especially where these problems effect the principles of cooperation either directly or indirectly;
- supplying information on principles of cooperation, both within the agricultural sector and to others such as the Dutch Government, the Parliament and the press, schools and foreign countries;
- publishing a quarterly magazine, called the 'Cooperative Magazine', brochures and other printed matter about the cooperatives;
- giving lectures about the history, theory and practice of the cooperatives;
- consulting the Dutch and European Governments with respect to cooperative problems and legislation.

In practice, the NCR Secretariat deals with a wide range of activities. It is a small office with a strong input of experts from the member organizations on the various subjects to be dealt with. They work in committees or working groups. On the one hand, the committees advise and guide the NCR Board with respect to its policies. On the other hand, some committees act as contract authorities for cooperative employees in a specific area.

4.4 Financing system

Capital is the lifeblood of agriculture, especially modern agriculture. It is absolutely impossible to transform agriculture from traditional to modern without sufficient capital. How and where to get capital remains an important issue in agricultural development. It is obvious that farmers cannot be financed fully by their own means. There must be some channels outside farms to finance agriculture. An effective financing system is crucial for agricultural development.

Total invested capital for Dutch agriculture as a whole has grown sharply over the past few decades. At NLG 182 billion, the 1994 value of assets was almost 3.5 times the 1974 figure, NLG 52.5 billion (Rabobank, 1995)¹. Total capital has grown by an average of 3.7% annually since 1984. Generally speaking, the picture of agricultural capital structure nowadays is as follows: of total invested capital, 59% comes from farmers' own capital, 23% from borrowed capital, and 18% from landlords' capital. This means that nearly a quarter of total invested capital is contributed by financial institutions. From table 4.6 it can be seen that the share of borrowed capital in total invested capital (not including landlords' capital) has been growing. This trend reflects the dependency of Dutch agriculture on borrowed capital. In other words, non-farmer financial resources are becoming increasingly important.

The effective financing system of agriculture will be described in the next section.

Table 4.6 *Capital structure of agriculture in the Netherlands a)*

	1974 in %	1980 in %	1988 in %	1992 in %	1994 in %
Own funds	79	77	75	73	72
Borrowed capital	21	23	25	27	28

a) Not including landlords' capital; as at 1 January.

Source: CBS/LEI.

4.4.1 Financing sources

In general, Dutch agriculture draws on four major sources of finance.

Family as a source of finance

Family loans occur rather frequently, especially when farms are passed on from father to son. If the successor cannot get this kind of loan from his father, credit institutions must be approached. However, for most young farmers it will be impossible to generate enough income (after consumption and taxes) to pay the interest and redeem the loans if the farms are passed on against market prices, because of substantial increases in capital requirements for financing farm assets. In 1991 for example, one needed 1.65 million guilders on average to finance a farm against market prices. A take-over against this market price is impossible. In terms of continuity of family farms, the parties involved (successor, parents and other children) have to look for other options for valuing the take-over.

In general, the take-over price of a farm is much lower than the market value. For most assets taken over, an appraisal will take place which comes down to the market value

¹ The increase is not just the result of investment, as it is prompted by price rises for various assets. Land price rises have been particularly high.

of those assets at that moment. For land and quotas¹, there are special fiscal arrangements. In the case of a take-over within the family the successor only has to pay a price equivalent to the value of leased land, i.e. about 60% of the value of free land. This means that the take-over price is only about 60% of the market price. The successor (being a family member) can take over the quota for free. Only when the successor pays less than the above-mentioned prices (after all parties have given their blessing to the proposal) does he have to pay taxes on the gift, which are calculated at the current rates minus amounts paid for the assets taken over.

There are two take-over types in the Netherlands: the direct take-over and the gradual take-over, which mostly takes place in the form of a partnership. With reference to the first type, the son or daughter usually works on the farm of his parents as a paid labourer in the years before the take-over. (When the farm is economically too small for two full-time workers, the son can work outside the farm.) For liquidity reasons, a large part of his wages remains within the farm (as a credit note on the balance sheet), for which the successor receives interest. In this way he builds up his own capital. In many ways, parents and successor work towards the final take-over and invest to guarantee future continuity. In reference to the second type, the parents and the successor enter into a partnership before the take-over with profits partially accumulated on the successor's account. Besides sharing the profits, the successor can also participate in the capital gains. A partnership will also give the prospective successor more legal certainty concerning the take-over. The share of the successor in the capital gains depends on: the way the parents bring the assets into the partnership (against market value or against fiscal value, each with its different fiscal consequences) and the arrangement made in the partnership contract; depending on the development in asset prices and the contents of the contract, the successor has the possibility to accumulate more capital of his own. Consequently, he will have to finance a smaller part of the take-over with borrowed capital.

Financial institutions

In this group, there are a large number of more or less specialized institutions for different agricultural capital requirements. These institutions, which are commercial lenders, lend money to farmers on business terms. The farmers have to pay interest on the loan, while security is usually required to cover the amount lent.

Commercial lenders can be divided into three groups:

- agricultural credit institutions and merchant banks. Within this category, Rabobank occupies by far the most important position in the agricultural sector. About 90% of total agricultural sector loans are provided by Rabobank;
- finance companies. These mainly give loans for the financing of movable property such as laying batteries, specialized machines, pig equipment and so on. They do so mainly in the form of leasing or hire purchase. Frequently, however, the purchase of movable assets can be financed through an ordinary bank. Compared with bank financing, the rate of interest for leasing and hire purchase is considerably higher.

¹ Quotas are used to limit the production in the EU. Farmers have to pay for getting the quota.

Financing through a finance company would be considered if the purchase has a limited economic life. Purchase of this nature would generate sufficient turnover and profit to guarantee that interest and capital can be repaid over the relatively short time usually allowed for the completion of such transactions;

- mortgage banks, saving banks, insurance companies, private persons. Sources in this category only grant mortgage loans on real estate. These institutions do not normally allow overdrafts on current accounts. The financing possibilities are very often limited to a first mortgage.

Landlords

Landlords' capital is a typical characteristic of Dutch agriculture. It represents the value of land and buildings held on lease, and consequently does not stand for borrowed capital required by farmers to finance their operations. Owing to the increase in land price, the landlords' capital share in total capital provision has been pushed up. But the continuous decrease of leasehold land has had an adverse effect on the landlords' capital.

The tenant farmer has a considerable advantage in that the rent he pays is generally much lower than the interest and repayment capital required when borrowing to finance the purchase of land. Thus, landlords' capital also plays an important role in Dutch agricultural financing.

Government

The Dutch government plays an important role in this field, providing financing for the agricultural sector in a variety of ways. Only the role of landlord is reviewed here; others will be mentioned in section 4.8.

In the Netherlands, central and local government often acts as the landlord, sometimes granting long leases. It does so by means of the Public Lands Service and the SBL¹. In addition, it is possible to engage the services of the Land Bank to arrange a transfer of ownership, purchase of a previously rented farm or expansion of a business. When the Land Bank provides assistance, the land is let on a long lease. The annual ground rent is 2.5% of the purchase price of the land, and the amount of the rent may be revised every six years. Applications to the Land Bank must satisfy a number of criteria.

4.4.2 Financing methods

The financing methods mentioned here are only the methods used in commercial financial institutions. Such a method concerns a combination of security, the amount involved and the term of the loan. The various forms of financing are shown in table 4.7. In practice, the method of financing used depends to a great degree on the specific business circumstances.

¹ Stichting Beheer Landbouwgronden (Foundation for the Administration of Agricultural Land).

Mortgage Financing

Mortgage financing is the method most used in Dutch agriculture because it is the most favourable for the farmland. As to the amount borrowed and the minimum redemption:

- normal mortgage financing is not likely to exceed a maximum of 70% of the valuation;
- however, a 'topping up' mortgage is possible, but together with the normal mortgage financing it must not exceed 90% of the valuation. The grant of a 'topping up' mortgage partly depends on the profitability and solvency of the business;
- depending on the nature of the securities, the minimum redemption payments required may not come into effect for five years and after that period will be from 1.5% per annum for mortgages on land to 5% per year for wooden buildings. In the case of 'topping-up' mortgages, the redemption percentage is at least 5% and frequently higher.

When mortgages are granted on leasehold property or construction rights, the amount of the loan depends to a very large extent on the provisions of the contract. Loans granted vary from 25% of the valuation where a right of demolition is included in the contract to 50-70% when the contract contains a firm right to compensation.

Seasonal Crop Credits

Seasonal crop credits are intended to meet a temporary need for operating capital. This form of financing is mainly intended for arable farms in which expenditure and income fluctuate markedly with the seasons and there is often a large credit requirement until harvest time. Temporary credit can be granted on the basis of the proceeds expected from the cropping programme. The loan must be repaid after the sale of the produce.

The securities usually required for a harvest loan are the transfer of ownership of the crop and an assignment of debts. Crop credits can also be a useful source of financing for the mixed arable-pig farm.

Interest Accumulation Arrangement for Young Farmers

The aim of this kind of arrangement is to lighten the financing charges on young farmers in particular by taking over existing farms or businesses.

In land-tied businesses, no redemption or interest payments are made on the mortgage loan for the first five years. During the first five years 5, 4, 3, 2 and 1% interest, respectively is added to the principal of the loan. After the first five years the liabilities are as follows: (a) the previously agreed redemption payments on the principal; (b) the interest on the principal plus accrued interest; (c) the accrued interest to be redeemed in 10 years.

In enterprises not tied to land, that part of the loan for which the Agricultural Loan Guarantee Fund (ALGF) has provided a guarantee can be paid back in accordance with a

Security	Object	Level of lending	Maximum life
1. mortgage	land, buildings, glasshouses	up to 70% of the valuation	agriculture:30-55years horticulture under glass: 15-20 years
2. mortgage	buildings, on right of build-	up to 50-70% of the valuation	15-20 years
3. maximum-sum mortgage	land, buildings, glasshouses	up to 20% of the valuation (on top of the normal mortgage)	15 years
4. transfer of demolition right	buildings and glasshouses on leasehold land	up to 25% of the valuation	agriculture: 15 years horticulture under glass: 10 years
5. transfer of right to compensation	buildings and glasshouses on leasehold land	up to 50% of the valuation	agriculture: 15 years horticulture under glass: 10 years
6. personal security	guarantor's financial status	limited	20 years
7. guarantee by the ALGF	viable business	not applicable	20 years
8. transfer of ownership machinery	dairy herd, tools and imple- ments, under glass: 5 years	up to 50% of the valuation	15-20 years; agriculture: 5-8 years; horticulture
9. transfer of ownership of harvested crops etc. and assignment of debts (crop credits for arable farming)	arable farming crops	up to 25% of prospective proceeds	9 months
10. transfer of auction money	auction money	up to 25% of auction money	9 months
11. transfer of ownership of bulbs etc. and assignment of debts	reproductive flower bulb stock	up to 40% of the valuation of the bulbs and prospective proceeds	6 months
12. assignment of accounts receivable	accounts receivable	up to 60-70% of the accounts receivable	to be established from year to year
13. transfer of ownership, assignment of debt, if necessary, supplemented by suretyship	stock of pigs and poultry (livestock financing)	dependent on the accounts receivable	to be established from years to year
14. transfer of ownership + suretyship or repurchase or understakeing	heavy equipment and machinery	75-100%	4-5 years

Figure 4.4 Principal types of finance in agriculture in the Netherlands.

graduated redemption system. Before this arrangement is adopted, investigation shows whether this method of redemption is suitable for the particular enterprise, which must be capable of meeting the much higher charges after the fifth year.

Livestock Financing

There are a number of credit arrangements designed specifically for the financing of livestock. They can be divided into what is known as free arrangements and bound arrangements.

Under a free arrangement the proprietor is completely free in the choice of both customer and supplier, while a bound arrangement is based on a partial surety from the supplier and/or customer. The latter imposes on the proprietor the obligation to buy his stock from a particular supplier and to sell to a specified customer. This obligation is independent of any other concerning price guarantees, etceteras. When a proprietor wishes to change his supplier and/or customer, the situation can be reviewed to determine how the financing can be adapted, possibly to a free arrangement. Loans granted under free arrangements are generally somewhat lower than those given under bound contracts.

4.4.3 Major agricultural financial institute: the Rabobank

As mentioned above, about 90% of bank lending to the agricultural sector comes from the Rabobank Group, with the remainder, about 10%, being provided by the commercial banks. To make the agricultural financial system comprehensible, the Rabobank must be introduced independently.

Generally speaking, the Rabobank is one of the largest banks in the Netherlands at present. Measured by total assets, it is the second largest bank. Measured by market share, it is the largest on the domestic market. Internationally, it is one of the 40 largest banks in the world. The strength of the Rabobank's position is reflected in the following market shares. The Rabobank awards approximately 90% of all bank credits granted to the agricultural sector. Some 40% of small and medium-sized companies bank with the Rabobank, against approximately 15% of the large companies. The Rabobank handles 35% of the private savings market and 25% of the residential mortgage market. A third of all payment transactions is performed by the Rabobank.

The nature and objective of the Rabobank

As discussed in chapter 3, the Rabobank was basically established as a farmers' credit cooperative. The main objective is granting credit to members/entrepreneurs under the most favourable rates and conditions possible. This means that the Rabobank provides loans to the members and supplies other bank services, both under the most favourable conditions possible, and also in economically difficult times.

The goal of any cooperative is to provide optimal service to its members. For a credit cooperative like the Rabobank, this means offering optimal financial service. The Rabobank members are all business clients that receive business loans. Members do not have to pay a contribution fee but become members automatically when they receive loans for conducting their businesses. Private clients do not become members automatically, but may request membership.

The structure of the Rabobank

There are two types of Rabobanks:

- the local Rabobanks. Each local Rabobank is an independent, autonomous unit with its own responsibilities carried by its own Board. Each has its own geographical area within the confines of which it performs its operations on behalf of its local clients. The local Rabobanks are all members of the central Rabobank and connected with each other through the central bank;
- Rabobank Nederland, i.e. the Central Rabobank¹. This is a separate cooperative institution whose object is to promote the interests of the local Rabobanks. All local Rabobanks are members of Rabobank Nederland.

The Rabobanks are also associates in various other (affiliated) institutions, of which the most important is Rabohypotheekbank N.V. (Rabo Mortgage Bank).

The local Rabobanks

The local Rabobanks are organized in a cooperative way based upon the principles of Raiffeissen. These principles are:

- member liability. In the past, the members assumed unlimited liability for any deficits remaining if the cooperative had to be liquidated. This unlimited liability effectively guaranteed clients that their deposits and savings could be paid back at any time. With this guarantee, local clients are prepared to leave their money with the credit cooperative. Presently (since 1980), liability at the Rabobank organization is limited to NLG 5,000 per member, as the increased reserves are nowadays sufficient as a safeguard for the debts. This liability takes the place of a capital contribution by the members. Together with the reserves which the banks have built up over the years from retained profits, members' liability enhances the solidity of their own credit institution. Members' liability serves as an extra stimulus to the Rabobanks to pursue a cautious banking policy. As a result, the cooperative banks have, since their inception, never experienced the need to have recourse to their members' liability;
- cross-guarantee system. This makes the local Rabobanks and the central bank liable for each other's commitments. In line with this cross-guarantee system, all participants of the Rabobank organization are entitled to financial support where funds are inadequate to meet all liabilities. Premiums are not levied, but any amount paid would eventually be apportioned among the participants. Through the cross-guarantee system it is also possible for the smaller local Rabobanks or those which are not as solvent as the others to profit from the excellent financial position of the Rabobank Group in the financial markets;

¹ In 1972, two central cooperative umbrella banks, viz. Cooperative Central Raiffeissen Bank and Cooperative Central Farmers' Credit Bank, merged into one central bank, i.e. Cooperative Central Raiffeissen-Farmers' Credit Bank (Raiffeissen-Boerenleenbank, shortly Rabobank). Following the example of their central banks, local Raiffeissen and farmers' credit banks merged and increasingly started to call themselves Rabobanks.

- restricted area. Each local Rabobank is active in a restricted area, serving the local community, maintaining good personal contacts and being active in local associations (such as sports, music, etceteras);
- prudential management. Credits will only be granted to creditworthy members;
- reservation of profits. Profits are not distributed among members but have to be added to reserves. The profits are dedicated to improving the financial base so as to enlarge the borrowing capacity (and as such the lending capacity) and to reduce the liability and risks of the members. This provision aims at enabling the cooperative banks to constitute their own capital, needed both to shoulder any losses and to expand their service capabilities for the benefit of the local community.

Each local Rabobank is an association of persons on a cooperative basis, with the objective of serving the financial interests of its members. The local Rabobanks grant loans to business and private clients, mainly for business investments and home financing (mortgage). To finance these loans, they attract savings and deposits from clients in the local community.

Up to certain financial limits the local Rabobanks are completely free in conducting their business. For larger amounts they need approval of the central bank, due to the possible risks involved. Each local bank has to look after its own financial position, including solvency, liquidity and profitability.

The advantage for members of the local bank is not only that they get cheap financing, but also that they have considerable influence on the bank's policy.

The central Rabobank

All local Rabobanks are members of and have shares in the central Rabobank. The balance sheet total of each respective local bank determines the number of shares.

The central Rabobank, Rabobank Nederland, is thus a daughter company of all the local Rabobanks. Strikingly, it is not the mother company of the 510 local member banks¹, but the daughter of 510 mothers.

The central Rabobank has two different kinds of tasks: those resulting from the relationship with the local member banks and more conventional banking tasks. The central Rabobank is involved in policy-making for the whole organization (strategy, marketing, sponsoring, public relations), advising and assisting local banks in cost-reduction plans, economic and financial developments, product development, etceteras. Another important task is liquidity management. The central Rabobank helps the local Rabobanks to channel any surplus funds they may have to local Rabobanks with deficits. Furthermore, the central Rabobank supervises the local Rabobank's solvency and liquidity. The Dutch central bank has formally delegated this task of supervision of the member banks to the central Rabobank.

As a banking institution, the central Rabobank serves the larger companies, which are often too big and need too much specialised advice to deal with a local member bank.

¹Now there are 510 local Rabobanks. The central Rabobank consists of 510 local banks.

Other banking activities carried out by Rabobank Nederland are the foreign banking activities and money- and capital market transactions. The difference between the central Rabobank and the local Rabobanks is that the central bank issues shares, whereas the local banks do not.

The management of the Rabobank

Scientific management is one of the important features of Rabobank. It is based upon the down-up model rather than the up-down model.

The management model of local Rabobanks consists of four parts, as shown in figure 4.5. The General Meeting has the highest formal authority within the local Rabobanks. Normally, the members come together in the General Meeting once a year. The members of the Board of Directors and the Supervisory Board are elected by the General Meeting. The General Meeting has to approve the overall policy, the annual accounts and the allocation of profits to activities of local or general interest.

The Board of Directors generally comprises three to five members. The number is kept small to promote decisive policy-making and ensure discretion in the treatment of credit applications.

The Board of Directors defines general overall policy on liquidity, solvency and profitability; ensures compliance with the Articles of Association and is accountable to the General Meeting and the Supervisory Board.

The Management conducts the daily banking activities, such as granting loans and attracting deposits. It implements the policy decisions of the Board of Directors and looks after the liquidity, solvency and profitability of the bank.

The Supervisory Board comprises at least three members. It not only supervises but also advises the Board of Directors and the Management. It has to approve certain important decisions, such as on the budget, appointment of managers, closing/opening of branches.

The management of the central Rabobank, as shown in figure 4.6, looks very much like the management of the local Rabobanks. There is an Executive Board in charge of daily financial and economic management; a Board of Directors in charge of general policy, cooperative aspects, relationships between central bank and local banks and between local banks; a Supervisory Board, consisting of members of affiliated banks and holdings, in charge of supervision, advice and approval of certain important decisions; a General Meeting with about 3,000 delegates of local member banks.

There is an extra body in the management structure of the central bank, the Regional and Central Delegate Assembly. The reason for its existence is that it is virtually impossible to discuss major issues with the member banks at the General Meeting, since, as mentioned above, there are about 3,000 delegates at that meeting. Therefore the total number of member banks is divided into about 22 'circles', each comprising 10-30 local member banks. These 22 'circles' of local member banks each meet twice a year in a regional delegate assembly which discusses major issues and passes on the results to the central bank. Each regional assembly will send three delegates to a central delegate assembly, which meets four times a year. In the central delegate assembly, delegates of the

central bank also participate. The objective of the regional and central delegate assemblies is to improve communication between central bank and local banks, which at a general meeting of three thousand persons would not be possible. In the assembly meetings, issues are discussed and delegates can prepare for changes. Consultation processes take place, which usually lead to unanimity or at least large majority acceptance. This organizational decision-making structure facilitates good communication between the many independent and autonomous parts of the Rabobank organization.

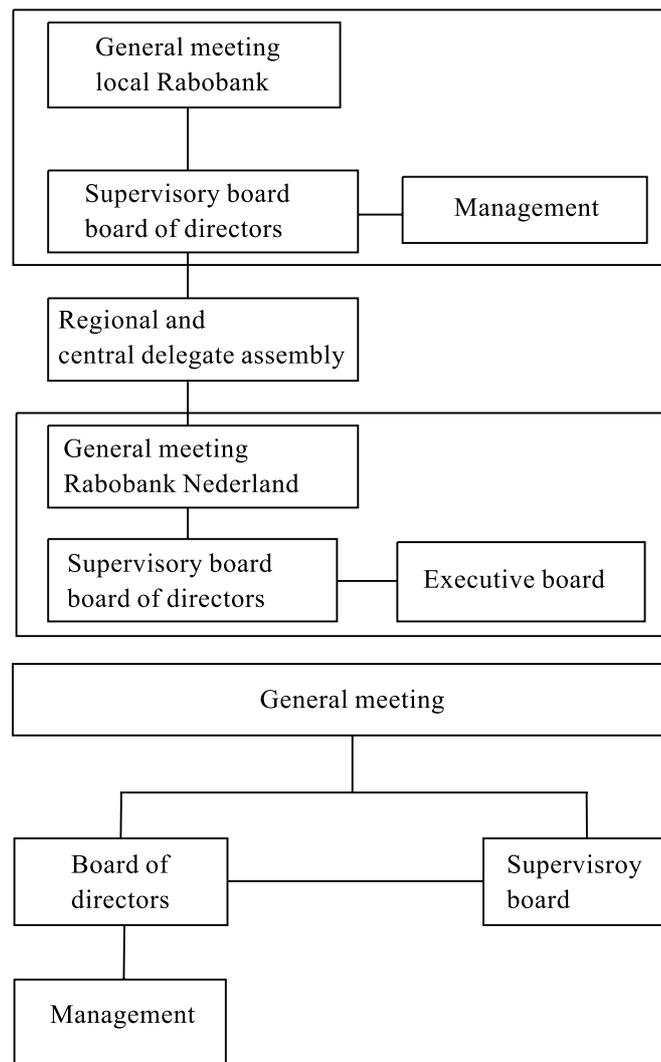


Figure 4.6 Local Rabobank management

4.5 Marketing system

Marketing plays an important role in agricultural development. It not only deals with how to sell agricultural products effectively in domestic and foreign markets, but also bridges the gap between consumers and producers. In this way, changes in consumer preference, which are the guides to adjusting food production, can be transmitted to producers. Marketing is an interactive process between producers and consumers.

4.5.1 The major features of the marketing system

There is already a good agricultural marketing system in the Netherlands. Its major strong points can be summarized as follows.

Consumer orientation

Strong market-consumer orientation is the basic feature of the Dutch agricultural marketing system. Market-consumer orientation means that agricultural and food production is only a tool to meet the consumer's need for food. The ultimate aim of agricultural and food production is to meet the needs of the consumer market. It is the market that determines the structure of agricultural and food production. In product development, packaging, brand names and services, those involved in agricultural and food production must always see the consumer as 'king'.

In order to keep the strong market-consumer orientation, a number of market-consumer orientated institutions were established in the Netherlands. Of these, mention must be made of the Commodity Boards and the Industrial Boards.

The Netherlands is the only country in the world that has Commodity Boards (Produktschappen) and Industrial Boards (Bedrijfsschappen). These institutions provide an institutional network for vertical and horizontal marketing integration, thus representing the interests of all participants (producers, processors and traders) in the product chain. The cooperation and communication within different industries as well as the successful penetration of foreign markets can be explained by the existence of the Boards.

The Commodity Boards were set up in the 1950s, when the agricultural production structure typically consisted of a great many small farms and processing companies. They are composed of representatives of the producers, processing industry, and traders concerned with the commodities coming within their scope. Each Commodity Board consists of two or more groups of enterprises performing different economic functions in respect of a particular product or group of allied products. Thus, Commodity Boards are vertical organizations created on behalf of specific sectors. They include the entire production chain for each product: production, processing, wholesale and retail trade. They exercise control on the markets and may issue regulations under government supervision which are binding for all groups of people dealing with the products concerned. Thirteen Commodity Boards have already been established in the Netherlands, namely: 'Livestock and meat', 'Poultry and eggs', 'Potatoes', 'Field crop seeds and seed potatoes', 'Vegetables and fruit', 'Fishery produce', 'Cereals, oil seeds and pulses', 'Ornamental horticultural produce', 'Horticultural

seeds', 'Dairy produce', 'Margarine, fats and oils', 'Animal feeds', 'Beer and distilled spirits'. Commodity Boards are independent in their formulation of sector policy, such as sector structure, product quality, marketing and promotion, technical and market research, animal welfare, education and training, environment, innovation, public relations and information, working conditions, and consultation with the government. By these means, organized industry is able to deal with many affairs itself, which has resulted in the reduction of government intervention in the economic sphere. Commodity Boards do not engage in buying and selling but in market research, promotion and technical research for the generic product. The total promotional budget of the Commodity Boards is more than 150 million guilders.

The Industry Boards are composed of enterprises performing equivalent or related economic functions. They are horizontal organizations, representing the interests of one sector (wholesale and retail dealers of agricultural products, for example). The Industrial Board for Agriculture (Landbouwschap)¹, which includes nearly all agricultural producers, has been empowered, under government supervision, to prescribe rules and regulations applicable to everyone engaged in the agricultural industry, not only on technical and economic matters, but also in the social field.

There are many other private institutions involved in marketing promotion, especially export promotion. At present, various agribusiness firms, including cooperatives, have become national or even international companies in the Netherlands. They run their own individual marketing programs.

In general, the Dutch Government is not involved directly in agricultural marketing, although it does promote agricultural products in international exhibitions, etc., and endeavours to create a good policy environment for agricultural marketing. There is one department in MLNV that is active in agricultural export promotion. Its main activities are the organization of trade meetings, arrangement of joint participation in exhibitions and trade fairs, supervision of missions and assistance by agricultural attaches.

Conducting marketing throughout the product chain

Conducting marketing throughout the product chain is another feature of the Dutch agricultural marketing system. In general, each farm product has its own chain of activities, from pre-production (supply and service) through production (agricultural production process) and on to post-production (treatment and processing, trade and distribution). Marketing activities are conducted in connection with the product chain.

A product chain can be described as 'a more or less independent cluster of vertically integrated economic activities related to the production, processing and trade of an agricultural product or a group of agricultural products, including separate activities involved in the delivery of the necessary goods and services whereby all firms and institutions maintain a significant relation to each other' (Post, 1989). The main goal of the product chain is twofold. On one side, to coordinate and optimize the flow of products in the three stages in the chain (production, processing, trade). On the other side, to offer products to

¹ Landbouwschap will be finished at the end of 1997. Its functions will be transferred to other organizations.

consumers of the required quality and in the right place.

There are three main types of product chain: (a) undifferentiated, in which producers and firms or enterprises have roughly the same economic power in the market at every stage of the product chain; (b) processing-production oriented, in which a dominant role is played by the processing firms, which have a monopoly position at that stage of the product chain, making the entrance of new firms rather difficult and giving firms at other stages of the product chain only limited economic power compared with the processing industry; (c) demand dominated, in which market power is concentrated on the demand side and the product chain is dominated by traders and consumers.

Figure 4.7 shows the marketing activities conducted throughout the product chain in the seed potato industry. Horizontal and vertical integration's around the potato can be seen clearly.

Auction as an important tool

First introduced in 1887, auctions have gradually become the dominating marketing institution in the Dutch agricultural sector, especially in horticulture. Growers sell most of their flowers, vegetables and fruits at auctions. The rapid development of the auction system is due to the fact that growers realize the importance of a strong marketing organization.

The auctions have expanded their activities from pricing and product composition into other marketing activities, such as minimum pricing schemes, promotion, logistics, and product policy. The auctions cooperate in umbrella organizations which coordinate activities such as national minimum price schemes and promotional programmes. Some retail chains are critical of the auction system, since daily purchasing through auctions does not suit retail sales planning. The auctions have developed additional selling operations, such as brokerage operations in pot plants and auctioneering for delivery at a future time.

Based on the cooperatives

Cooperatives are very important in Dutch agricultural development. As mentioned in section 4.3, they play a vital role in agricultural marketing. Most of the marketing activities are carried out by cooperatives in the Netherlands. Three cooperative companies account for more than 80% of the milk supply, two cooperative auctions dominate the flower market, cooperative auctions also dominate the vegetable market, and one cooperative dominates industrial potato processing. Perhaps nowhere in the Dutch agro-economy is the cooperative role more strongly expressed than in potato marketing. Cooperatives currently control 40% of all whole potato transactions and 100% of the starch potato industry, as well as the vast majority of seed exports. Totally, 95% of all seed potatoes are marketed by cooperatives or 'cooperative-type' organizations. Thus, one important feature of the Dutch agricultural marketing system is that it is based to a great extent on the cooperatives.

		Type of integration	
		horizontal	vertical
Channel participants	P R D U C E R S	<ol style="list-style-type: none"> 1. Powerful specialist Bedrijfschap (the Landbouwschap) for seed producers 2. Non-fragmented and powerful farmers union representation 3. Strong commercial integration of producers in producer cooperatives 	<ol style="list-style-type: none"> 1. Strong institutionalized vertical integration through the Produktschap (the Pootaardappel Contract Commissie) 2. Marketing cooperatives, epitomizing the ideals of vertical Integration, control 60% of all seed potato exports
	M E R C H A N T S	<p>-----</p> <ol style="list-style-type: none"> 1. Powerful self-regulatory Bedrijfschap for traders 2. Enhanced cooperation between traders (and also strong political representation) though VECO and NCR 3. Traders' Bedrijfschap shares control of the Produktschap with the Landbouwschap. This provides traders with another horizontal forum in managing surplus buying through STOPA, and generic promotions and market development through NIVAP 	<ol style="list-style-type: none"> 3. Companies operating on the cooperative principles of vertical integration, control a further 35% of all seed potato exports 4. Non-cooperative, private seed potato traders are increasingly utilizing vertical integration by entering into a proper contractual economy with producers

Figure 4.7 A model of the integrative of marketing in seed potato industry in the Netherlands

4.5.2 Auctions in the marketing system

As discussed above, auctions play an important role in agricultural marketing, especially in flowers and vegetables. About 95% of the glasshouse vegetables are sold through the auctions. The auctions form a very important part of the Dutch agricultural marketing system.

The first auction, the vegetable and fruit auction, was established during the last decade of the 19th century. From that time onward, the auction system has displayed very vigorous development. The auction is a strong marketing tool. Flower and vegetable marketing without auctions is unthinkable at present.

The auction is a typical free market. The products are either graded and packed by the farmers or at grading and packing stations. Each auction market society has its own stock of containers, which are available to producers and buyers on payment of a deposit plus rent for use. As soon as produce arrives at the auction market, its quality is examined according to fixed standards. Subsequently it is auctioned by means of an electric auction clock. After the auction, the products come into the distribution hall and are delivered by the distribution staff to the right buyers.

The most important tool in the auction is the auction clock. It is the heart of the auction. This is how it works. Opposite this clock are the seats of the buyers. Between the clock installation and the seats there is some space for exhibiting the produce, or samples, enabling buyers to examine it. When the produce is brought in front of the clock, the auctioneer announces the name of the producer and any remarks (quantity and quality) made by the auction inspector, after which the auction proceeds. The pointer on the clock is put into motion, indicating figures on the dial. It moves from the highest figure on the clock downwards. As soon as it indicates the price a buyer is prepared to pay, he presses an electric button on his desk, at the same time also indicating the quantity he wants to buy. The pointer stops at once. Instantly, a number corresponding with the buyer's seat is illuminated in the centre of the dial or on a separate number-board, all other buttons being automatically disconnected. The following round gives another chance to buyers who were too late. All sales are automatically registered by the computer.

4.6 Organizational system

One of the main features of agriculture is that agricultural production is conducted in most cases by individual family farms. This is very different from other industries. For example, other industries cannot be modernized on the basis of individual family enterprises, but agriculture can.

One problem resulting from this is how to look after the interests, economic and social, of individual farmers. From the economic point of view, individual farmers are in a state of perfect market competition, which means that any one individual farmer does not have the ability to influence the market. But there is a different picture on the opposite side of the market, apart from the individual farmers, where monopoly exists to some extent. From the social point of view, individual farmers are separated from each other and it is not easy to make their voices heard. How to represent their social position is a problem.

Although the interests of individual farmers can be represented by the government, this is not enough, because the government represents other social classes as well. The Dutch experience has proved that the farmers' organization is the best way to look after the interests of individual farmers.

4.6.1 The structure of farmers' organizations

Farmers' organizations in the Netherlands mentioned in this report include farmers' unions, farm workers' unions, technical agricultural organizations, and umbrella organizations.

Farmers' Unions

There are a great number of regional farmers' unions, which are the basis of the central farmers' union in the Netherlands. As discussed in section 3.3, farmers' organization in the Netherlands started at the regional level. These regional organizations are an important economic and political factor. The regional organizations were united nationally into three

central farmers unions based on ideological currents. They were: The Netherlands Catholic Farmers' and Growers' Union (KNBTB), with about 55,000 members; The Royal Netherlands Agricultural Committee (KNLC), with about 47,000 members; The Netherlands Protestant Farmers' and Growers' Union (NCBTB), with about 21,000 members. The farmers' unions at both the regional and central levels work very closely together.

In 1995 those three central farmers' unions were united into a single central farmers' union: The Dutch Federation of Agricultural and Horticultural Organizations (LTO-Nederland). Presently, LTO not only represents those three farmers' organizations. It represents the collective interests of seven regional organizations and professional organizations at national and international level. All in all, it looks after the interests of more than 100,000 entrepreneurs in agriculture who are members of these regional and professional organizations.

LTO also has several committees/working groups for the different types of farming, for example dairy farming, arable farming, pig farming, glasshouse vegetable production, etcetera. Besides these committees for specific types of production there are committees for different subjects/questions such as 'land use' (planning), 'international affairs' (EU, WTO), 'social affairs' (salaries, labour conditions). The position of women in the farm sector is discussed in a special working group.

Logically, farmers are not direct members of LTO but of one of the regional organizations. The regional organizations are direct members of LTO. Thus, the regional organizations receive financial contributions from the farmers. The level of contribution depends upon the farm size.

The primary aims of the farmers' unions are:

- to represent and promote the economic and social interests of entrepreneurs and their families in the agricultural sector at regional, national and international levels;
- to play an active part in the improvement of agriculture's regional, national and international market position;
- to promote the integration of all areas in market-oriented production chains and create a fully valuable position in these chains for entrepreneurs in the primary sector;
- to work towards innovation with a view to durable and competitive agriculture and improvement in the quality of rural life;
- to aim at interaction and cooperation with social organizations outside agriculture with full responsibility to its own members;
- to promote the position of agriculture in society as integrated and valuable.

Farm Employees' Unions

Farm workers have their own joint forces. At the national level there are also three farm employees' unions: General Netherlands Agricultural Workers' Union, The Netherlands Catholic Agricultural Workers' Union, The Netherlands Protestant Agricultural Workers' Union. Since 1970, the two latter unions have been absorbed into larger employees' organizations. Farm employees' unions represent the interests of those who are employed by farmers.

Technical agricultural organizations

The entrepreneurial spirit of Dutch farmers, stimulated by government subsidies, has generated a large number of supplementary organizations, especially in the area of information provision. Many of these bodies have been set up by the farmers' unions. The varied collection of service organizations can be classified under the name 'technical agricultural organizations'. The technical agricultural organizations are often directed, to a large extent, by the farmers. These organizations frequently collaborate with educational, research and extension programmes.

The willingness of groups of farmers to work together on production improvement, cost reduction and production increase has also led to a great blossoming of so-called study clubs in which groups of farmers try to find possibilities for improving business management and planning through sharing experiences and comparing business results. In horticulture, growers have set up a society, The Dutch Association of Study Clubs for Horticulture (NTS), to coordinate the many study clubs. NTS looks after the interests of growers with respect to research and is, as their representative, the permanent consultation partner with research establishments and horticultural auctions.

Umbrella organizations

As discussed above, there were three central farmers' organizations and three farm workers' organizations before 1995. The problem of coordinating these organizations, particularly farmers' organizations and farm workers' organizations, was mitigated by the fact that the employers' and the employees organizations do not confront each other like two non-communicating blocs, but on the contrary have achieved a large measure of cooperation. The formation of the Industrial Board for Agriculture under public law bears witness to this coordination and cooperation.

Since its establishment in 1954, the Landbouwschap has evolved into the official body for cooperation and pooling expertise between agricultural employers and employees. Committees have been formed for all aspects of agriculture. It also has regional councils concerned particularly with the promotion of agricultural interests in relation to land use and physical planning and it plays an important role in international relations. Finally, it acts as a permanent consultative body for MLNV.

Since the merger of the three central farmers' unions and the sharp decrease in farm employees make the specific coordinative umbrella organization less necessary, Landbouwschap will be closed at the end of this year. But this does not mean that its functions will also disappear. They will be transferred to related organizations.

4.6.2 The main features of the farmers' organization system

The main strong points of the Dutch farmers' organization system may be summarized as follows:

- farmers' organizations are indispensable in agricultural development. Without them, the interests of farmers cannot be looked after well and farmers cannot be effectively

organized;

- farmers' organizations are not only the economic organizations but also major players in political and social affairs. This political force is necessary to balance the different social interest groups and maintain social stability;
- farmers' organizations are fully independent. They are the farmers' own organizations. They may contact with other organizations, including government bodies, but they do not belong to the government;
- farmers' organizations are fully autonomous. They are organized, run and managed only by the farmers themselves. Their internal affairs are not disturbed by external powers;
- farmers' organizations are fully free to enter. Farmers have the full right to choose whether they will be organized into the farmers' organizations or not. Farmers are not obliged to become members of farmers' organizations;
- farmers' organizations have the full right to express their wishes. All legal measures, including demonstration, can be used to put forward their requirements and opinions;
- farmers' organizations are managed on the basis of democracy. The chairman and the members of the LTO Board are elected by its members, the chairmen of regional organizations are elected by their own members, and the chairmen of committees are elected by farmers carrying out that specific type of farming. This means that the farmers are in a position to influence the course of events at the farmers' organizations;
- farmers' organizations (Landbouwschap) have the power to make regulations in the technical, social, economic, environmental and administrative spheres, under government supervision. These regulations must be observed in the sector (or sector segment). This is an element of the autonomy granted by the Government--a measure of independence. Compliance with these regulations is enforced by the Government. The existing regulations relate to veterinary health, research at experimental farms and gardens, and quality improvement in a wide range of products. In addition, the provision of information, training and education for farm employees is laid down in regulations;
- farmers' organizations are closely involved in collective labour agreement consultations. Ten different agreements are already in force for arable and grassland farming, (glasshouse) horticulture, bulb culture, arboriculture, poultry production, agricultural crafts (contractors), farm management services, land development services, willow and reed cultivation and finally peat cutting;
- farmers' organizations act as consultative bodies for the Government and Parliament. The problems and wishes of the agricultural world are discussed at the monthly meetings between the Minister of MLNV and a delegation from the farmers' organizations (Landbouwschap). The flow of information from farmers' organizations is directed at Government and Parliament, at the officials involved with agricultural policy, at the farmers, and furthermore at all persons who play a role in the agricultural decision-making process;
- the heart of the work of the farmers' organizations is formed by the representation of interests by all means or measures and the exercise of influence on government pol-

- icy relating to agriculture and rural development for the benefit of agricultural holdings at international, national, regional and local levels;
- the Government does not intervene in the affairs of farmers' organizations, but there are all kinds of communications, regular contacts and close collaborations between Government and Parliament and farmers' organizations.

4.7 Education, research and extension system

The Netherlands has a strong agricultural education, research and extension system. We have mentioned many times that this system is the key pillar supporting Dutch agricultural development.

4.7.1 Education system

Dutch farmers can speak English. Dutch farmers are competitive. These are some of the benefits of Dutch education.

There are a number of strong points in the Dutch agricultural education system.

Various levels

Dutch agricultural education is vocational education. It consists of four levels.

(A) Lower education

Every child in the Netherlands receives primary education. Because education is compulsory up to 16 years, almost everyone follows secondary education after primary school. Lower agricultural education is a form of secondary education. It is a general education oriented towards a profession. After 6 years in a general primary school, pupils follow a 4-year course of study at the lower agricultural school. The first two years are obligatory.

Lower agricultural education is meant for every young farmer. It provides an agricultural basis. But the lower agricultural school is not an end station for the pupils. It is rather a preparation for intermediate or higher agricultural vocational training. After finishing, pupils can move on to further training programmes within and outside agricultural education.

(B) Intermediate education

Intermediate agricultural education takes two, three or four years. Students choose a specialization in intermediate agricultural school. Intermediate agricultural education trains students for a variety of jobs in sectors connected with agriculture. Many students are preparing to be independent farmers.

(C) Higher education

There are five colleges of higher agricultural education in the Netherlands where training is given for executive functions in businesses, institutes and agricultural organizations. The

course covers all aspects of agriculture. Students following higher agricultural education take 4 or 5 years to gain the title of 'ingenieur' (ing.), the equivalent of a bachelor's degree in other countries. Prerequisites include prior education to senior secondary level (with physics and chemistry) or intermediate agricultural education. Most agricultural consultants in the Netherlands have studied at one of the higher agricultural colleges.

After higher agricultural education, there are a number of possibilities for further education, such as the one-year agricultural teachers' training course, higher management training, the one-year commercial economic course, admission to the Agricultural University and the Faculty of Veterinary Medicine of Utrecht State University.

(D) University education

This is a degree programme. Agricultural training at university level is given at the Agricultural University of Wageningen (AUW). A university course leading to the title of 'ingenieur' (Ir), equivalent to a master's degree in other countries, takes an average of 5.5 years.

Students who wish to specialise further within a certain discipline can extend their training with the so-called second phase. Second-phase students work and study for 4 years as Assistants-in-Training towards the degree of Doctor of Agricultural and Environmental Sciences.

Flexible forms

Besides the regular agricultural education mentioned above, there are many other flexible forms which provide agricultural knowledge to farmers and others involved in affairs connected with agriculture. Agricultural evening classes are one of these flexible forms. Most evening classes offer specialized courses in a number of agricultural subjects.

Practical agricultural training schools also give specialist training and refresher courses and enable teachers, consultants, farmers, industry businessmen and researchers to meet and exchange information.

Agricultural courses, especially refresher courses, are also given by agricultural experimental stations and extension organizations.

Looked after by MLNV

Agricultural education in the Netherlands comes under the MLNV. This is an exceptional situation. Almost all other (vocational) education is entirely the responsibility of the Ministry of Education and Sciences.

Undoubtedly, the fact that agricultural education is looked after by the government body responsible for agriculture helps to maintain close ties between groups and individuals involved in education, information and advice, research and business in the agricultural sector.

Supported by the Government

Agricultural education receives a great deal of support, especially financial support, from the Government. Lower and intermediate agricultural education at agricultural education centres, agricultural colleges and the agricultural university is financed by the Government. Lower and intermediate agricultural educational programmes at private schools are also heavily subsidized by the Government. The evening classes, although private, are subsidized almost entirely by the Government.

Involvement by farmers' unions

Farmers' unions are involved in agricultural education. They look after the financial aspects of private agricultural schools, even though these schools are heavily subsidized by the Government.

Focus on practice

Agricultural education in the Netherlands focuses on practice, training the students' ability to solve problems independently. In lower agricultural education, the work in each school is closely related to agricultural conditions in the neighbourhood. Nearly all students in intermediate agricultural education and at higher agricultural colleges and the agricultural university receive training at a practical training school as part of their course. At the practical training schools, students are taught to deal with real issues.

4.7.2 Research system

Agricultural research in the Netherlands takes place in many organizations. But, as shown in table 4.9, the institutes of the Agricultural Research Department (DLO) account for the major part of agricultural research. Their research budget amounts to nearly 50% of the total budget for agricultural research. This means that nearly half of agricultural research is carried out by the DLO institutes in the Netherlands.

In general, the Dutch agricultural research system is composed of four parts:

(A) Experimental stations and Regional Research Centres

Experimental stations and Regional Research Centres (ROCs) carry out the so-called practical research, the research that is closest to farmers. This is a feature of the Dutch agricultural research system. ROCs are (clusters of) experimental farmers. They are independent foundations with their own personnel. The experimental stations are foundations with personnel employed by the Government. Both groups are financed half by the Government and half by the farmers. In general, the experimental stations and the ROCs are oriented towards a specific branch of the industry. They concentrate on synthesising the available knowledge within and around agricultural research. This knowledge is collected and translated for use at farm level. Co-ordinated research programming for each branch of the industry is achieved in consultation with the business community, the extension service

and the Government. Farmers, as users of the results and co-financiers, are intensely involved with this.

Table 4.9 *Agricultural research organisations and their share in the total budget for agricultural research in the Netherlands.^{a)}*

	Budget in mil. NLG	Share in %
DLO institutes	315 ^{b)}	45
Experimental stations and ROCs	70	10
Universities	175	25
Other research organizations	140	20
Total	700	100

a) The beginning of 1990s; b) About 70% from the Government.
Source: MLNV.

(B) Agricultural research institutes

Agricultural research institutes include DLO institutes and non-DLO institutes. Strategic and applied research and some basic research is carried out at these institutes. The DLO, as a special agency in agricultural research, is part of the MLNV. The DLO institutes engage in applied research producing background knowledge which, via practical research, can be converted into techniques which farmers can use directly. They also pass on basic knowledge to the larger firms in the agricultural sector which undertake their own research. The DLO institutes are divided according to discipline, not branch of industry. The DLO is partly financed by the Government. The business community commissions contract research projects. In the future, the DLO will have a more independent position and will have to earn a larger proportion of its own budget by means of contract research. Nowadays, Government aid has changed from a basic subsidy to financial contributions to specific research programs.

Non-DLO institutes include the institutes for Applied Scientific Research (TNO), the National Institute of Public Health and Environmental Hygiene (financed by the Ministry of Housing, Town and Country Planning and Environmental Management), the cattle-feed industry institute and a few private research establishments including the Sugar Beet Research Institute, the Netherlands Fertilizer Institute and the Netherlands Institute for Dairy Research, which do not belong to the DLO but also undertake applied and basic research for the agricultural sector. In addition, many private and cooperative firms carry out their own research in some areas.

(B) Universities

Universities account for an important part of agricultural research. From figure 4.4 we can see that the research budget of universities is second only to the DLO budget. About one fourth of agricultural research are carried out at universities. The most important establishment in this category is the Agricultural University in Wageningen. AUW undertakes

primarily basic research, as well as some applied research. About 70% of the research at UW is financed by MLNV.

(D)The National Council for Agricultural Research

The National Council for Agricultural Research (NRLO) was founded as a coordinative agency in which research establishments, social organizations and the Government could consider requests for future research. The NRLO develops reconnaissance studies in the field of science and technology and inventories research needs. For this purpose, the NRLO established programming committees for each branch of the agricultural industry and, every four years, presented its long-term outlook for agricultural research. For the MLNV, this long-term outlook was an important starting point for research policy. At present, the NRLO is an advisory council for the MLNV. It does foresight studies on developments in the Dutch agricultural and food sectors and tries to develop different strategies for science and technology policy.

4.7.3 Extension system

The extension system plays a very active role in Dutch agricultural development. A wide range of consultants and experts in government services, farmers' organizations, independent extension bureaux, cooperatives and other supply and processing businesses are engaged in agricultural extension programmes in the Netherlands.

Extension service from the government services

The Agricultural Extension Service (DLV) is the largest agricultural extension organization in the Netherlands. It has evolved from its former function as a government service into a more independent agricultural extension organization. At the national level, the DLV is directed by an Agricultural Advisory Committee made up of representatives of government and farmers' organizations. At the regional level, each DLV team is supported by a guidance committee made up of members of technical agricultural organizations, representatives of farmers' organizations and a representative of the food industry trade union, which functions as a sounding board for the team.

The DLV gives advice on production, technology and economy to the agricultural business. It has more than 60 regional teams spread over 26 offices throughout the country. The teams are divided over 15 agricultural sectors. Each team consists of a team leader and agricultural experts. The agricultural experts visit farmers on their holdings, write articles for the trade press, put folders and brochures together, organise group gatherings, guide farmers' study clubs, address meetings, organise demonstrations and make a contribution to agricultural courses. Advice is given not only on daily operations but also on long-term business developments. But the agricultural experts do not make decisions for the farmers.

Extension service from farmers' organizations

Farmers' organizations are very much involved with agricultural extension services. The Socio-economic Advisory Service (SEV) is a socio-economic extension agency with more than 200 consultants employed by the regional farmers' unions and the trade unions in the agricultural sector and the feed industry.

The SEV services support farm families and employees in decisions concerning business and family. The SEV consultants provide counselling about questions related to business succession, modifications and closure, family finances, insurance, town and country planning, environment, land and lease matters and legal affairs. They provide extension services by means of individual consultation and written advice, work with materials and groups, address meetings and offer education on economic and social topics. Where there are social-economic problems, the SEV consultants always take the personal circumstances of the entrepreneur and his family into account. In the case of a take-over, the position of the family successor as well as of the parents will be discussed, not only in financial but also in social terms.

Besides giving socio-economic advice, the farmers' organizations also provide technical economic extension services in horticulture via the Foundations for Cultivation Guidance. These foundations give intensive guidance on cultivation to growers. In addition, farmers' organizations often employ legal and other specialists whom farmers and consultants can approach for help.

Extension services from the supply and processing business

Supply and processing businesses are also involved in agricultural extension services in the Netherlands. They usually employ their own consultants. Their extension services are often coupled with the sale of means of production. Their consultants operate independently, and the advice they give is treated as a separate activity, not part of sales. In dairy farming, farmers receive specifications on the composition of milk from each cow and advice on checking for diseases via the dairy cooperatives or special inspection services.

Extension services from private extension bureaux

In principle, the supply and processing business consultants operate private extension services. In addition, commercial extension bureaux are important sources of private extension services. During the last 15 years, the role played by private extension services has increased a great deal in the Netherlands. Commercial extension bureaux, particularly in the horticultural industry, have taken over a significant part of the traditional consultancy market.

4.8 Government policy system

Government plays an important role in agricultural development, even though the Netherlands has a typical free-market economy system. Departments of the Government are almost everywhere in the agricultural sector. Policy is the tool used by Government to promote agricultural development. The policy system forms an important part of the Dutch experience of agricultural development.

4.8.1 Aspects of the Government function

Government departments are involved in almost all aspects of Dutch agricultural development.

Agricultural education, research and extension is the field in which the Government plays perhaps the most significant role. As demonstrated in section 4.7, it is the Government that set up the agricultural education, research and extension establishments, financed agricultural education, research and extension activities and promoted the development of agricultural education, research and extension. All of which has made education, research and extension the pillar of agricultural development. Dutch agricultural development is unthinkable without education, research and extension programmes. And agricultural education, research and extension is unthinkable without Government support.

The Government also plays an important role in financing. It is the Government that promoted the establishment of Rabobank, which is the major financier for the agricultural sector, as discussed in section 4.4. The Government not only exerts influence on agricultural financing by means of monetary policy, supervision of bank business activities, and structure policy, but also provides important financial services for the agricultural sector through the Agricultural Loan Guarantee Fund (ALGF), Agricultural Development and Reorganization Fund (ADRF), and Land Planning (LP).

The ALGF was initiated in 1951 with the objective of promoting the development of the agricultural sector, and in particular the expansion of productivity in agricultural firms. It acts as an institutional guarantor, therefore, and does not lend money itself. It guarantees interest payments and repayments on the money loans granted by banks to farmers. Any entrepreneur operating an agricultural enterprise in the Netherlands who fails to obtain sufficient security may apply for a guarantee for the following purposes: (a) takeover of a holding or founding a new enterprise, (b) modernization or expansion, and (c) refinancing, but only where adequate proof is presented of the company's prospects of improving its profitability. Applications for guarantee will be evaluated on the basis of criteria including: (a) entrepreneurship and professional expertise, (b) past financial policy, company size and production circumstances, (c) company profitability, and (d) company's capital and reserves. The crucial condition is that the budget must demonstrate that sufficient savings will result and that liquidity trends are such that fluctuations in income will not endanger the company's continuity. The standard normally applied for guarantee obligations is that the Fund will assume obligations equal to five times its total guarantee capital. The total guarantee fund reached NLG 189 million at the end of 1994, 7.6 times the 1952 total.

The ADRF was established in 1963 with the objective of promoting the development

and reorganization of agriculture. This meant on the one hand supporting the winding-up of enterprises and making provisions for persons leaving agriculture and, on the other hand, stimulating improvement of the operational structures of the remaining enterprises by means of subsidies. Over the years, many reorganization and development schemes have been introduced. Most of them have now fitted into EU structural policy or are an elaboration of that policy.

The Land Planning Act, which came into force in 1985, states that land planning is intended to improve the use of the countryside in accordance with its functions as laid down in the context of physical planning. It can encompass measures and facilities for agriculture and forestry, nature and landscape, infrastructure, open air recreation, cultural history. There are four types of land use measures in the Land Planning Act: reorganization, reallocation, use adaptation, and reallocation by agreement. The costs of land planning measures are borne by the Government and the owners involved. The average share in the total costs of 'reorganization' and 'reallocation' borne by the State is 60%. The remaining 40% is paid by the owners and by third parties such as municipalities and district water boards.

In the field of marketing, as mentioned in section 4.5, although the Government does not involve itself in the concrete affairs of agricultural marketing it promotes agricultural trade with other countries via various measures.

In the area of cooperatives, the Government has laid down cooperative regulations and laws to provide an institutional framework for cooperatives and parties involved in cooperatives.

In field of price policy, the Government assists the agricultural industry not only by providing research, consultancy and educational facilities and measures for structural improvements in farming, but also by means of an active agricultural price policy designed on the one hand to stimulate more production, higher quality and a healthier environment and, on the other hand, to safeguard agricultural producers to some extent against risks resulting from wide price fluctuations. In the early 1930s, following the great crisis, the Government implemented a price-support policy, i.e. it fixed annual minimum guaranteed prices for a number of important products. The guaranteed prices were based on the cost prices of the individual products covered. The cost-price calculations were based on the costs of production on farms which were socially and economically justifiable. The term 'socially and economically justifiable farms' means that the scale and type of production and the efficiency of farm management of the sample farmers from whom the data for cost pricing were collected were subject to special requirements. In addition to all expenses, the cost of family labour, the interest on invested capital and a remuneration for farm management are included in the calculated cost price. This remuneration is related to the salary scales of farm managers in the state farms in the polders of the Lake Yssel district. The cost prices calculated by LEI formed the basis for discussions about the level of the price guarantees between the Minister of MLNV and the Industrial Board for Agriculture. Not only the calculated cost prices but also other factors were taken into consideration when deciding on agricultural price policy. Of importance was the development of marketing possibilities. Since 1968, when the Common Agricultural Policy (CAP) was introduced, the Dutch Government has implemented the CAP and played an important role in promoting its

improvement and rationalization.

In area of the environment, the Government is active in environmental construction aimed at maintaining sustainable development.

4.8.2 Some strong points of the Government policy system

The strong points of the Dutch Government policy system can be summed up as follows.

- the basic purpose of agricultural policy is to maintain production to meet a certain demand, to improve productivity, to raise the competitive capacity of the agricultural sector in the world market, to preserve a balance between agricultural production and the environment, to promote cooperation among all parties involved in the agricultural sector;
- the principal means used by the Government are economic and legal. This means that the Government does not directly intervene in the affairs of the agricultural sector. The Government functions through economic levers. All Government activities are based upon the laws;
- the basic principle of the Government in managing agricultural development is that the Government absolutely does not engage in business. The Government is the coach, not a player;
- the Government always maintains good communications with farmers' organizations, cooperatives and other parties more or less involved in the agricultural sector;
- the Government is responsible for adjusting policies according to the changes taking place in the agricultural sector and the domestic and international markets so as to bring policies as much as possible in line with consumer demand at home and abroad.

4.8.3 Policy priorities for the coming years

For the coming years, Dutch agricultural policy will focus on providing the agricultural sector with a new perspective for the future and protecting the interests of nature and landscape.

To realize these aims, the Government has opted for a policy which (a) offers more incentives to promote innovation in the sector, (b) sticks to the objectives for nature and landscape but stresses people's own responsibility in the management of the natural heritage, and (c) promotes cooperation between research, education and extension bodies and encourages efforts in the areas of R&D and innovation.

5. Significance of the Dutch agricultural development experience for development economics

Development Economics deals with the manner in which developing countries develop from less developed economies to developed economies. Agricultural development is one of the main issues in Development Economics. Backward agriculture is the basic feature of developing countries. The transformation of backward agricultural practices into modern ones is the fundamental base on which developing countries modernize their economies. As analysed in the above chapters, the Netherlands has had a successful agricultural development, in the course of which it has created valuable experience. Undoubtedly, it is very necessary for developing countries to absorb the Dutch experience of agricultural development. To help the Dutch experience benefit others as much as possible, it is necessary to introduce a new concept about the Dutch experience of agricultural development into Development Economics.

5.1 A current 'Dutch Concept' in Development Economics

There is already one 'Dutch Concept' in Development Economics: the Dutch Disease. But this concept has a more or less negative connotation.

For virtually the entire post-World War II period until the middle of the 1970s, the Netherlands enjoyed remarkable prosperity in almost all respects. Inflation rarely exceeded 3% per year, GDP growth rarely dropped below 5% per year, and unemployment fluctuated around 1% of the total labour force. Much of this prosperity, as we have described in the above chapters, was due to the fact that the traditional export sector, i.e. the agricultural sector, was highly competitive with the rest of the world. The agricultural sector earned a large part of the revenue by means of export. However, in the early 1960s substantial reserves of natural gas were found in the Netherlands. Gas became an important export product during the following years. By 1975, gas exports had increased to about one tenth of total exports, while the Netherlands enjoyed a trade surplus of about 4% of GNP. Gas exports had a double effect. On the one hand, they sharply increased the trade surplus and Government revenue. The Government used the taxes on gas to fund its drastically increased spending, particularly welfare spending. On the other hand, the inflow of foreign exchange from gas exports buoyed up the exchange rate, with the Dutch guilder appreciating by about 30% relative to its major trading partners from 1973 through 1978. The increased value of the guilder made a notable impact on the traditional export sector, i.e. the agricultural sector. Traditional exporters were hit with a double blow: on one side, domestic costs increased; on the other side, guilder earnings from each dollar's worth of exports decreased. Dutch agricultural exports became less competitive in the world market and unemployment rose sharply as the relatively labour-intensive export sector stagnated. GDP growth also dropped from the annual rate of 5% in the 1960s to 1-2% by the end of

the 1970s. It is obvious that the gas 'bonanza' brought mixed blessings to the Netherlands.

The above experience was already summarized as a concept in Development Economics, i.e. the 'Dutch Disease'. This concept refers to the impact on the traditional export sector and the damage to the national economy caused by enormous exports of natural resources (natural gas, oil) (Gillis, 1983).

A number of developing countries, such as Nigeria, Mexico and Indonesia, have suffered from the Dutch Disease.

5.2 Can a different 'Dutch Concept' in Development Economics be derived from Dutch agricultural development experience?

Can we summarize a different 'Dutch Concept' in Development Economics derived from the Dutch experience of agricultural development as described in the above chapters? The answer is 'yes'. Because the experience of Dutch agricultural development is of universal significance, I call this new concept the Dutch Model of agricultural development.

5.3 Contents of the Dutch Model

I define the contents of the Dutch Model of agricultural development in terms of the following points:

- small family farms in primary production on the one hand, with large-scale, internationally oriented and competitive operations on the other. Very often these large scale operations are cooperatives or have a cooperative function;
- a good institutional framework, including the land tenure system, trading system, cooperative system, financing system, marketing system, farmers' organization system, education/research/extension system and policy system. These systems form a solid ground on which all parties involved in the agricultural sector are free to carry out their activities;
- outward-looking development. Agricultural resources are allocated according to domestic and foreign market demand. Agricultural production is initiated according to the comparative advantages;
- efficiency priority. Efficiency is taken as the key to agricultural production. High competitive capacity is based on high productivity. High productivity is based on technical progress;
- knowledge and information generation and diffusion in the agricultural sector;
- central government guidance.

6. Relevance of Dutch agricultural development experience to China

China is the largest developing country in the world. Its agriculture, in general, is still in a traditional state. How to modernize China is a big question facing every Chinese and also interesting the rest of the world. Undoubtedly, the modernization of China cannot be based on traditional agriculture. The modernization of China cannot do without agricultural modernization. Thus it seems very clear that more attention must be paid to agricultural development in the course of Chinese modernization. There can be no overall modernization of the Chinese economy without agricultural modernization. Developing agriculture is an indispensable part of modernizing China. Needless to say, the experience of Dutch agricultural development is very useful to China.

6.1 Chinese agriculture compared with Dutch

China has made many achievements in agricultural development. Especially since 1980, many changes have taken place in the agricultural sector and rural areas. Nowadays Chinese agriculture is well-known for the fact that it successfully feeds 22% of the world's population with only 7% of the world's farmland. This is a big contribution to the world made by Chinese agriculture.

But compared with Dutch agriculture, Chinese agriculture is still very backward. In terms of land area, China has more than 230 times the surface area of the Netherlands; in terms of population, China has some 80 times more people than the Netherlands; in terms of the agricultural working population, China has more than 1,300 times the number of agricultural workers in the Netherlands. However, in terms of gross value of agricultural production, China's is only 5 times that of the Netherlands; in terms of agricultural exports, China accounts for even less than the Netherlands. From the above numbers, the backwardness of Chinese agriculture and the gap between Chinese and Dutch agriculture can be seen clearly.

Obviously, the gap between Chinese and Dutch agriculture is due to the 'efficiency gap' between the two countries. China's agricultural productivity is very much lower than that of the Netherlands. China uses more than 1,300 times the Netherlands agricultural labour force to produce only 5 times the agricultural products. From 1950 through 1988, the contribution of productivity growth to agricultural growth in the Netherlands was 83%. But the contribution of productivity growth to agricultural growth in China from 1952 through 1990 was only 15% (Feng, 1995). This shows that agricultural growth in the Netherlands comes mainly from productivity increase. Productivity increase accounts for about six sevenths of Dutch agricultural growth, while it accounts for only one seventh of Chinese agricultural growth. Thus the improvement of efficiency is the key to Chinese agricultural development. There can be no development in Chinese agriculture without productivity improvement.

6.2 Main obstacles to Chinese agricultural development

Many Chinese people hold the opinion that the main obstacle to Chinese agricultural development is overpopulation and lack of land. Seen in the light of the Dutch experience, however, this opinion proves to be wrong. The population density of the Netherlands is about 3 times that of China, yet the Netherlands has a very strong agricultural sector. The experience of Dutch agricultural development has shown that natural factors are not the main obstacle to agricultural development.

In my opinion, the main obstacles to Chinese agricultural development are not natural but institutional. It is the lack of effective institutional systems that hampers the development of Chinese agriculture. If a set of effective institutional systems is not built up in the near future, Chinese agriculture will not emerge from backwardness.

6.3 What China can learn from the Dutch experience

By now it has become very clear. What China can and must learn from the Dutch experience of agricultural development is not how to build windmills, grow tulips or make wooden shoes, but how to construct a set of effective institutional systems. China must learn to build up effective land ownership and tenure systems, free trade systems, cooperative systems, financing systems, marketing systems, farmers' organization systems, education/research/extension systems, and government policy systems to support its agricultural development.

Owing to the limitations of time and space, the question of how to concretely create such institutional systems in China will not be discussed in this report, which has answered all the questions related to its title. In fact, the way to establish institutional systems in China has been already referred to in the fourth chapter.

Literature

Bauwens, A.L.G.M. and L. Douw, 'A minor problem in the Netherlands'. In: *Rural development*. LEI, The Hague, 1986.

Berkum, S. van and H. van Meijl, 'A Survey of Trade Theories'. In: *Working Paper*. LEI, The Hague, 1997.

Bijman, W.J., 'Potatoes and biotechnology'. In: *Technological development and social acceptance in the Netherlands*. LEI, The Hague, 1994.

Brouwer, F.M. and S. van Berkum, *CAP and environment in the European Union*. Wageningen Pers, Wageningen, 1996.

Caldwell, W.M., 'The Dutch PIG industry-growth and challenge in the 1980s'. In: *Economic Report No. 139*. College of agriculture, North of Scotland, 1982.

CBS, *Statistical Yearbook*. 1996.

Egerstrom, L., Pieter Bos and Gert van Dijk, *Seizing control: the international market power of cooperatives*. Lone Oak Press, LTD, 1996.

Eurostat, *Agricultural income*. 1995.

Eurostat, *Economic accounts for agriculture and forestry*. 1989-1994.

Feng, Haifa¹, *On Total Factor Productivity In Agriculture*. Tianze Press, 1989.

Feng, Haifa, *Theory and Method of the Evaluation of Agricultural Efficiency*. China Agricultural Publishing House, 1992.

Feng, Haifa, *The Study of China's Agricultural Efficiency*. China Defence Science & Technology Press, 1993.

Feng, Haifa, *Farmers and Industrialization*. China Guizhou People's Publishing House, 1994.

¹ In Chinese.

Feng, Haifa¹, *WTO and Chinese Agricultural Development*. Economic Research Journal 97-1, 1997.

Folmer, C., *Agricultural relationships between Germany and the Netherlands*. CPB, 1995.

Folmer, C. and M.A. Keyzer, *The common agricultural policy beyond the Mac Sharry reform*. Elsevier, Amsterdam, 1995.

Foreign Agricultural Service, Ministry of Agriculture and Fisheries, *Dutch agriculture*. 1959.

Foreign Information Service, Ministry of Foreign Affairs, *The Netherlands in brief*. 1994.

Foxall, G.R., *Cooperative Marketing in European Agriculture*. Gower Publishing, 1982.

Geertjes, K., *De Nederlandse in- en uitvoer van agrarische producten: Jaarcijfers 1994-1995 ingedeeld naar herkomst en bestemming*. LEI, The Hague, 1996.

Gillis, M., D.H. Perkins, M. Roemer and D.R. Snodgrass, *Economics of development*. 1987.

Griffiths, R.T., 'The Creation of a National Dutch Economy: 1795-1909' In: *Tijdschrift voor Geschiedenis* 95. 513-537, 1982.

Grind, G.A.M. van der, *History and organization of agriculture, Working Paper*; Landbouwschap.

Hack, M.D., A.G. van de Zwaan and A.M.A. Heybroek, *International competitiveness in the arboricultural sector*. Rabobank, 1992.

Hack, M.D., H. Tap and A.M.A. Heybroek, *A View of International Competitiveness in the Floristry Industry*. Rabobank, 1992.

Hamsvoort, C.P.C.M. van der and J.J. de Vlieger, *Recent and future developments in the Dutch dairy chain*. LEI, The Hague, 1995.

Huizinga, W. and D. Strijker, *Two lectures on the historical development of Dutch agriculture, 1600-1985*. LEI, The Hague, 1986.

¹In Chinese.

Kelholt, H.J., *Developments in the processing of milk and the intra-EU trade in dairy products*. LEI, The Hague, 1996.

Kleijn, E.H.J.M. de, H. Tap and A.M.A. Heybroek, *International competitiveness in the vegetable-growing sector*. Rabobank, 1992.

Kleijn, E.H.J.M. de and A.M.A. Heybroek, *A View of International Competitiveness in the Arboricultural Sector*. Rabobank, 1992.

Lamont, J.T.J., 'Horizontal and Vertical Integration in the Seed Potato Industry'. In: *Agricultural Marketing System*, British Food Journal 94-8, 1994.

Landbouwschap. *A profile of the Landbouwschap*.

Landbouwschap, *At the center of agriculture in the Netherlands*. 1994.

LEI. *Beyond the past: Three scenarios for the future of Dutch agribusiness 1990-2015*.

LEI. *Dutch agriculture and the EC*.

LEI. *Agricultural Economics Research Report*. (various years).

LEI, *The agricultural marketing system in the Netherlands*. 1994.

LEI, *Landbouwcijfers*. 1996.

MLNV. 'The Common Agricultural Policy in the future'. In: *Discussion pape*.

MLNV. *Change and Renewal*.

MLNV, 'Information and External Relations Directorate'. In: *Aspects of Dutch Agriculture*, 1976.

MLNV, *Agricultural Structure Memorandum*. 1991.

MLNV, *An introduction to the flow of information in Dutch agriculture*. 1992.

MLNV, *Facts and figures*. 1995, 1996.

MLNV, *Background information*. 1996.

MLNV, *Programme International Nature Management, 1996-2000*.

Maris, A. and J.D. Veer, *Dutch agriculture in the period 1950-1970 and a look ahead*. LEI, The Hague.

- Maris, A. and J.H. Post, *Outline of the development of Dutch agriculture after 1950*. LEI, The Hague, 1973.
- Meulenbergh, M. (editor), 'Food and Agribusiness Marketing in Europe' In: *International Business Press*. 1993.
- Noort, P.C. van den (editor), *Ins and outs of agricultural tenancy policies*. KPR speciale produkties, De Bilt, 1990.
- NCR, *Agricultural and horticultural cooperatives in The Netherlands*. 1993.
- Netherlands Foreign Trade Agency, *Review of the Dutch Economy*, EVD, 1996.
- Netherlands Foreign Trade Agency, *Review of the Dutch Industry*, EVD, 1996.
- Netherlands Foreign Trade Agency, *The Netherlands compared internationally*, Ministry of Economic Affairs, EVD, 1995.
- Nicholson, J., 'The Dutch Glasshouse Industry'. In: *An Economic History*, Wye College Press, 1995.
- Noort, P.C., 'Productivity measurement in agriculture'. In: *Working paper OECD*, 1970.
- OECD, 'Netherlands'. In: *OECD environmental performance reviews*, 1995.
- Oosterom, W. van, 'The cooperative Rabobank Group'. In: *Working Paper*, Rabobank, 1997.
- Poppe, K.J., *Actuele ontwikkeling van bedrijfsresultaten en inkomens in 1995*. LEI, The Hague, 1995.
- Post, J.H., *Possibilities for an integrated agriculture*. LEI, The Hague, 1987.
- Post, J. and J.J. de Vlieger, *The agribusiness complex*. LEI, The Hague, 1989.
- Post, J.H., *Agriculture and EU policies in rural area: past and future*. Wageningen Pers, 1993.
- Rabobank, *The financing of Dutch agriculture and horticulture*. 1980; 1990; 1993; 1995.
- Rabobank Group, *Review of operations for the first half of 1996*. Rabobank, 1996.
- Rutten, H., *Productivity growth of Dutch agriculture, 1949-1989*. LEI, The Hague, 1992.

- Salz, P., *Policy instruments for development of fisheries*. LEI, The Hague, 1986.
- SDU, *Atlas van Nederland in 20 delen*. 1989.
- Terluin, Ida J., *Comparison of real output, productivity and price levels in agriculture in the EC*. LEI, The Hague, 1990.
- Terluin, I.J., *Production, prices and income in EC agriculture: an analysis of the economic accounts for agriculture 1973-88*. LEI, The Hague, 1991.
- Tracy, M., *Agriculture in Western Europe: Challenge and Response, 1880-1980*. Grenada Publishing, 1992.
- VNO-NCW, 'Country Profile, Recent Developments and Prospects' In: *The Dutch economy*. June-December, 1995.
- Wee, H. van der and E. van Cauwenberghe, *Productivity of land and agricultural innovation in the low Countries*. Leuven, 1978.
- Woude, A.M. van der, 'Large estates and small holdings, lords and peasants in the Netherlands during the late Middle Ages and early modern times'. In: *P. Gunst en T. Hoffman (eds.), Grand domaine et petites exploitations*.
- Wye College, *A comparative study of agricultural marketing in the Netherlands and the United Kingdom*. University of London, 1993.
- Zachariasse, L.C., *Farm management information systems planning and development in the Netherlands*. LEI, The Hague, 1993.
- Zachariasse, L.C., *Perspectieven van intensief grondgebruik in Zuid-Holland*. LEI, The Hague, 1993.
- Zachariasse, L.C., *The farmer in small and large scale farming in a new perspective - objectives, decision making and information requirements*. LEI, The Hague, 1995.
- Zachariasse, L.C., *Kader en perspectief voor de Europese Landbouw in een mondiaal verband*. LEI, The Hague, 1996.
- Zachariasse, L.C., *De land- en tuinbouw in een toekomstig perspectief*. LEI, The Hague, 1997.
- Zachariasse, L.C., *Energie en Economie*. LEI, The Hague, 1997.
- Zachariasse, L.C. and K.J. Poppe, *Administratieve ontwikkelingen in de agrarische sector*. LEI, The Hague, 1994.

Zachariasse, L.C. and K.J. Poppe, *Trends in de agrarische sector*. LEI, The Hague, 1995.

Zhu, Daohua and H. Feng¹, *On China Rural Industrialization*. China Agricultural Publishing House, 1995.

Zanden, J.L. van, *The transformation of European agriculture in the nineteenth century: the case of the Netherlands*. VU, University Press, Amsterdam, 1994.

¹ In Chinese.

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