

The seed sector in the Netherlands

An overview of production, trade and related institutions

B.M. Kamphuis



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This report provides a general introduction to the Dutch seed sector. It gives a statistical overview of the position of the Dutch crop sector in the European Union based on the areas of the major crops. The position of the Netherlands on the world seed market is described with import and export statistics, in particular on the vegetable sector, but also on other horticultural and arable seeds and planting material. In addition to statistical information, the report provides an extensive description of the institutional framework of the Dutch agricultural sector in general and the seed sector in particular.

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Preface

This report has been written in the context of the framework of the 'Nepal-Europe Seed Sector Alliance project'. The major goal of the project is to establish working relations between the Seed Entrepreneurs' Association of Nepal (SEAN) and European organisations in the seed sector and to facilitate new trade and investment opportunities for Nepalese and European entrepreneurs in the seed sector. Because of the leading position of the Netherlands in the vegetable seed sector, the Nepalese seed sector is in particular interested in the Dutch seed sector, for capacity building purposes and business development as well. Knowledge transfer is central in the project and this report has been written for that purpose. In addition to statistical information on the position of the Dutch seed sector on the world market, the report provides an extensive description of the institutional framework of the Dutch agricultural sector in general and the seed sector in particular.

The project is financed by Asia Invest Program of the European Union and the Dutch Ministry of Agriculture, Nature and Food Quality. Though this study is carried for a specific target group, namely the Nepalese seed sector, we hope and expect that it will be useful for others, too.



Prof. Dr. L.C. Zachariasse
Director General LEI B.V.

Summary

This study has been carried out in the framework of the Nepal-Europe Seed Sector Alliance project, which is funded by the Asia Invest Program of the European Union. The purpose of this report is to provide a general introduction to the Dutch seed sector. In order to show the sector in its context the report comprises not only statistics about the development of seed production and trade, but also a brief description of the institutional framework in which the Dutch seed sector operates.

After an introductory chapter on the background of the project chapter 2 gives an overview of the position of the Dutch crop sector in the European Union based on the areas of the major crops in the EU countries and some data about the seed production. The Netherlands has about 2 million ha of agricultural land, of which about half is arable land, representing only 1% of the total arable land in EU-25. Compared with the other EU countries the Netherlands has a relatively large share in root crops (potatoes and sugar beet) (8.4% of EU-15), vegetables (4.8%) and ornamentals (in particular cut flowers, flower bulbs) (32%). The major vegetables-producing countries are Italy, Spain and France. The Netherlands has a rather large share in the production of onions, carrots and leek. According to the data of the year 2002, the most important seed producing countries by area in Europe are Denmark and France. The total area for seed production in the Netherlands approved by the Dutch General Inspection Service for Agricultural Seeds (NAK), the Inspection Service for Horticulture (Naktuinbouw) and the Inspection Service for Flower Bulbs (BKD) was about 110,000 ha in 2003, of which about 33% seed potatoes, 20% grasses and 22% flower bulbs.

In chapter 3, the position of the Netherlands on the world seed market is described with import and export statistics. According to the most recent estimates of International Seed Federation for 2003, the Netherlands is the world's largest seed exporter, with 24% of the total world export value, before the USA (19%) and France (15%). More than half the seed exports from the Netherlands goes to other EU countries, in particular to Germany, France, Italy, United Kingdom and Spain. The USA and Japan are the most important customers outside the EU.

After this rather statistical chapter, the major players in the international seed market are described briefly in chapter 4. The international vegetable seed market is dominated by a few large seed companies, of which a larger part from the Netherlands.

Chapter 5 provides an extensive description of the institutional framework of the Dutch agricultural sector in general and the seed sector in particular. In order to understand the context in which the Dutch seed sector operates, this chapter describes briefly the most relevant organisations for the seed sector in the Netherlands according their position in the Plant Variety Development Chain. Besides Plantum NL, which is the association of Dutch breeding and propagation companies and companies that trade in seeds and young plants, the seed inspection services are described. This chapter also includes an overview of the specific features of the co-operation in the Dutch agro-sector, through farmers'

associations, statutory industry organisations and co-operative enterprises. In the seed sector, large private specialised seed breeding and trading companies prevail, particularly for vegetable seeds. Seed potatoes and flower bulbs, however, are grown mainly by individual farmers. Most potato growers are member of a co-operative in the field of potato breeding, collecting, processing and trading. Trading in the flower bulb sector is mainly done by private trading companies.

The report ends with an overview of the Dutch agricultural knowledge system, in which education, research, extension work together closely with the farmers' unions.

1. Introduction

The Netherlands is one of the world's leading countries in the production and trade of plant reproduction material, in particular for vegetables seed. The developments in the Dutch seed sector and the factors behind its success is therefore of interest for other countries, for the main competitors as well as for developing countries, which could learn from the Dutch experiences and expertise. That was precisely the reason for the Nepalese seed sector to take the initiative for a project with the Dutch seed sector in the framework of the Asia Invest Program of the European Union. Although the agro-climatic diversity of Nepal (ranging from tropical low lands in the south to high mountains in the north) provides suitable conditions for the production of different kinds of vegetable seeds, about 60% of the commercially required vegetable seeds are imported and the demand is increasing, in particular for hybrid seeds. The domestic market consequently provides good perspectives for the production of high quality vegetable seeds. There are also opportunities for seed export to neighbouring countries such as India and Bangladesh. To seize these opportunities, however, the Nepalese seed sector needs to be modernised and to improve its competitiveness. For that purpose, the Seed Entrepreneurs Association of Nepal (SEAN) is interested in establishing an alliance with the main representative of the Dutch seed sector, Plantum NL, for both capacity building and business development. Both organisations, jointly with LEI, submitted a proposal to the Asia Invest Programme, which offers support to this type of activities. In this 'Nepal-Europe Seed Sector Alliance Project', LEI functions as a bridge between the two seed associations and is responsible for project management, research and knowledge transfer.¹

Knowledge transfer is central in the project and for that purpose several activities are carried out. Besides trainings and seminars in Nepal by Dutch experts and a study tour of Nepalese experts to the Netherlands, the project includes the preparation of reports on the Dutch and Nepalese seed sector.

The purpose of this report is to provide a general introduction to the Dutch seed sector. In order to show the sector in its context the report comprises not only statistics about the development of seed production and trade, but also a brief description of the institutional framework in which the Dutch seed sector operates. Chapter 2 gives an overview of the position of the Dutch crop sector in the European Union based on the areas of the major crops in the EU countries and some data about the seed production. In chapter 3, the position of the Netherlands on the world seed market is described with import and export statistics. Although the project focuses on the vegetable sector, the report also provides information on trade in other horticultural and arable seeds and planting material.

After this rather statistical chapter, the major players in the international seed market will be described briefly in chapter 4. Because the project aims at institutional strengthening and capacity building, chapter 5 provides an extensive description of the

¹ In addition to the EU Asia Invest programme, the Dutch Ministry of Agriculture, Nature and Food Quality contributes financially to the project.

institutional framework of the Dutch agricultural sector in general and the seed sector in particular.

2. The Dutch crop sector in the context of the European Union

Crop production in the European Union

The position of the Dutch crop sector can be derived from the acreages of the major crops in the EU countries. The following tables give an overview. In table 2.1 the countries of the European Union are sorted according to the size of the usable agricultural area in 2002. On top of the list of the former European Union of 15 member states are France and Spain, 30 million and 25 million ha respectively. The new member states are lead by Poland with 17 million ha, Germany has 17 million ha, and Italy and UK each about 15.4 million ha. All the other EU member states have less than 5 million ha of agricultural land. The Netherlands has about 2 million ha of agricultural land, of which about half is arable land, representing only 1% of the total arable land in EU-25. Compared with the other EU countries the Netherlands has a relatively large share in root crops (potatoes and sugar beet) (8.4% of EU-15), vegetables (4.8%) and ornamentals (in particular cut flowers, flower bulbs) (32%).

Table 2.1 Land use in the European Union in 2002 (in 1,000 ha)

Country	Agricultural Area in 1,000 ha	Of which: arable land	Of which:							
			cereals a)	dried pulses b)	root crops	industrial crops	fodder crops	vege- tables	fruit crops c)	orna- mentals d)
France	29,599	18,318	9,328	437	647	1,862	4,450	250	1,097	27
Spain	25,169	12,893	6,729	549	266	870	927	355	na	2
Germany	16,974	11,791	6,941	208	755	1,371	1,540	108	58	31
United Kingdom	15,722	4,495	3,245	249	334	452	na	na	na	0
Italy	15,421	8,241	4,263	63	320	362	2,072	457	2,701	13
Ireland	4,372	1,118	299	2	53	2	19	3	1	1
Greece	3,917	2,801	1,303	26	67	481	301	148	na	1
Portugal	3,816	1,634	515	21	62	40	390	42	165	1
Austria	3,374	1,378	814	46	68	114	218	11	69	2
Sweden	3,140	2,654	1,116	32	87	71	982	18	5	1
Denmark	2,676	2,479	1,528	40	108	84	432	11	7	0
Finland	2,216	2,217	1,190	9	60	76	na	na	na	0
Netherlands	1,951	1,011	233	4	275	12	330	72	20	40
Belgium	1,393	833	310	2	163	36	251	40	17	6
Luxembourg	128	62	29	1	1	4	25	0	2	0
<i>European Union (15)</i>	<i>129,866</i>	<i>71,925</i>	<i>37,844</i>	<i>1,688</i>	<i>3,264</i>	<i>5,836</i>	<i>11,938</i>	<i>1,515</i>	<i>4,140</i>	<i>125</i>

Table 2.1 Land use in the European Union in 2002 (in 1,000 ha) (Continuation)

Country	Agricultural area in 1,000 ha	Of which: arable land	Of which:							
			cereals a)	dried pulses b)	root crops	industrial crops	fodder crops	vege- tables	fruit crops c)	orna- mentals d)
Poland	16,891	13,038	8,294	100	1,157	488	441	206	271	3
Hungary	6,320	4,959	2,954	26	89	621	760	108	196	9
Czech Republic	3,652	2,775	1,562	34	117	434	527	13	na	1
Lithuania	2,903	1,639	918	36	164	75	227	22	na	1
Slovakia	2,236	1,377	820	13	59	208	255	14	na	0
Latvia	1,596	973	415	3	77	23	344	14	12	0
Estonia	698	613	259	2	16	33	271	2	16	0
Slovenia	505	168	98	1	13	8	45	3	30	0
Cyprus	137	87	58	1	6	0	22	na	32	0
Malta	10	9	0	na	2	na	5	2	na	0
<i>European Union (25)</i>	<i>164,814</i>	<i>97,562</i>	<i>53,223</i>	<i>1,904</i>	<i>4,965</i>	<i>7,725</i>	<i>14,834</i>	<i>1,900</i>	<i>4,697</i>	<i>139</i>
<i>Netherlands</i>										
% of EU-15	1.5	1.4	0.6	0.2	8.4	0.2	2.8	4.8	0.5	32.0
% of EU-25	1.2	1.0	0.4	0.2	5.5	0.1	2.2	3.8	0.4	28.8

a) Including rice; b) In grain equivalents; c) Including wine and olives; d) Including nurseries and vine stocks.

Source: Eurostat, Luxembourg.

Table 2.2 *Area of selected vegetables in the European Union in 2002*

Country	Vegetables harvested ha	Of which: (ha)							
		cabbage	leek	lettuce	tomato	cucumber	red pepper	carrots	onions
Italy	479,760	48,851	650	22,472	122,046	2,087	13,758	13,977	13,890
Spain	402,040	33,562	2,750	37,607	59,518	7,450	22,959	7,642	23,245
France	285,134	37,283	7,020	13,143	6,355	588	758	16,495	10,371
Germany	156,387	22,270	2,145	7,752	282	533	31	8,961	6,911
Greece	129,505	11,755	1,610	4,050	35,500	2,010	3,800	1,090	9,060
United Kingdom	112,733	28,385	1,717	8,535	484	169	55	7,772	9,705
Netherlands	77,089	11,563	3,300	2,550	1,226	658	1,235	8,046	21,101
Portugal	65,517	8,601	0	2,536	13,408	0	1,616	1,598	1,544
Belgium	53,781	8,945	4,800	2,011	630	83	90	4,050	1,220
Austria	13,235	2,265	148	1,388	169	204	173	1,316	2,332
Finland	9,207	1,713	68	401	121	78	5	1,609	974
Ireland	6,002	2,132	69	153	27	14	0	694	152
Denmark	5,992	1,456	426	296	53	39	0	1,562	944
Sweden	5,538	951	99	1,186	64	61	0	1,820	805
Luxembourg	159	6	6	19	2	0	0	14	3
<i>European Union</i>	<i>1,802,079</i>	<i>219,738</i>	<i>24,808</i>	<i>104,099</i>	<i>239,885</i>	<i>13,974</i>	<i>44,480</i>	<i>76,646</i>	<i>102,257</i>
<i>Netherlands</i>									
% of EU-15	4.3	5.3	13.3	2.4	0.5	4.7	2.8	10.5	20.6

Source: Eurostat, Luxembourg.

Table 2.2 gives an overview of the area of some selected vegetables in 2002. The major vegetable-producing countries are Italy, Spain and France. The Netherlands have a rather large share in the production of onions, carrots and leek.

Tomatoes, cucumber, and peppers in the Netherlands are mainly grown in greenhouses. The total area of greenhouses in the Netherlands is 10,500 ha, of which 40% for vegetables and the rest mainly for cut flowers and pot plants.

Seed production

There are quite some differences in the seed statistics, mainly due to differences in definitions. The available Eurostat figures on area for the production of seeds of vegetable, fodder, root and industrial crops (other than oil seeds crops) give an indication on the importance of different countries for seed production (table 2.3). According to the data of the year 2002, the most important seed producing countries by area in Europe are Denmark and France. The Netherlands is on the fourth place with about 18,500 ha of seed crops. The data of the Dutch Seed Inspection Service (NAK), however, show that there is much more seed production in the Netherlands (see table 2.4).

The total area for seed production in the Netherlands approved by the Dutch General Inspection Service for Agricultural Seeds (NAK), the Inspection Service for Horticulture (Naktuinbouw) and the Inspection Service for Flower Bulbs (BKD) was about 110,000 ha in 2003, of which about 33% seed potatoes, 20% grasses and 22% flower bulbs. These figures do not include flower seeds and nurseries.

Table 2.3 Area for the production of seeds of cereals, vegetable, fodder, root and industrial crops (other than oil seeds) in selected European Countries in 2002

Country	Ha	Country	Ha
Denmark	71,040	Lithuania	3,600
France	55,921	Estonia	3,100
Germany	23,855	Latvia	3,000
Netherlands	18,547	Slovak Republic	2,715
Italy	15,952	Belgium	1,971
Sweden	12,439	Czech Republic	1,067
Hungary	11,142	Croatia	1,000
Finland (2000)	9,800	Portugal	937
Romania	8,139	Austria	750
Poland	7,180	Greece	600

For some countries, such as the UK, data are not available, while there are obvious differences in the definitions; compare data of the Netherlands in table 2.3 and 2.4.

Source: Eurostat, Luxembourg.

Table 2.4 Crop areas for seed production in the Netherlands

	1995	2000	2003
Arable crops: a)	82,806	88,233	83,826
Of which:			
- Seed potatoes	36,616	38,668	36,843
- Grasses	21,715	23,049	21,815
of which English rye grass	11,211	13,697	13,119
- Cereals	6,007	5,786	5,131
of which winter wheat	3,191	3,497	2,772
- Flax	3,553	3,420	3,743
- Pulses	289	79	252
- Forages	142	28	136
- Industrial crops (incl. beet)	82	9	15
Vegetable seeds in the open b)	1,010	795	1,012
Of which:			
- Beans	425	353	419
- Spinach	123	234	261
- Peas	166	40	139
- Cauliflower	26	22	43
Flower bulbs c)	18,086	22,543	24,538
<i>Total</i>	<i>102,642</i>	<i>112,220</i>	<i>110,238</i>

Sources:

a) Approved areas by NAK (Inspection service for arable crops); b) Registered for inspection by Naktuinbouw (Inspection service for horticultural crops); c) Registered by BKD (Inspection service for flower bulbs).

3. The Netherlands on the global seed market

3.1 World seed sector overview

A large part of the seed used by farmers and growers is farm saved seed, in particular in developing countries, where it is estimated at 75% of the total amount of used seed. The International Seed Federation (ISF), which is comprised of national seed company associations, estimates the commercial world seed market at approximately USD 30 billion. Table 3.1 gives an overview of the estimated size of the internal market for seed and other planting material for 49 selected countries, with a total estimated internal market of about USD 25 billion. In this list, the USA is the largest market with USD 5.7 billion. The internal market of the 20 European countries in this list accounts for about USD 6 billion, of which France and Germany are the largest ones.

Table 3.1 Estimated size of the internal commercial market for seed and other planting material of selected countries (in USD million)

Country	Market size (USD)	Country	Market size (USD)	Country	Market size (USD)
USA	5,700	Hungary	200	Finland	80
China	3,000	Denmark	200	Paraguay	70
Japan	2,500	Sweden	200	Ireland	60
CIS	2,000	Austria	170	Portugal	60
France	1,370	Turkey	170	Bangladesh	60
Brazil	1,200	Morocco	160	Colombia	40
Germany	1,000	South Africa	150	Bolivia	35
Argentina	930	Czech Republic	150	Peru	30
Italy	650	Greece	140	Zimbabwe	30
India	600	Egypt	140	Slovenia	30
United Kingdom	570	Belgium	130	Saudi Arabia	18
Canada	550	Chile	120	Zambia	15
Poland	400	Nigeria	120	Ecuador	12
Mexico	350	Kenya	100	Malawi	10
Spain	300	New Zealand	90	Dominican Rep.	7
Netherlands	300	Slovakia	90		
Australia	280	Switzerland	80	Total	24,667

Source: International Seed Federation.

The data provided in this table are the most recent figures provided by the members of ISF, for most countries for the year 2003, for some countries one or two years earlier. The data include seeds and other planting material.

A major part of seed is sold domestically. According to the ISF data, roughly 15% of the estimated commercial seed is exported. Figures from 1998 show that about 31% of the exported seed value is generated by horticultural crops and 15% by maize (see figure 3.1).

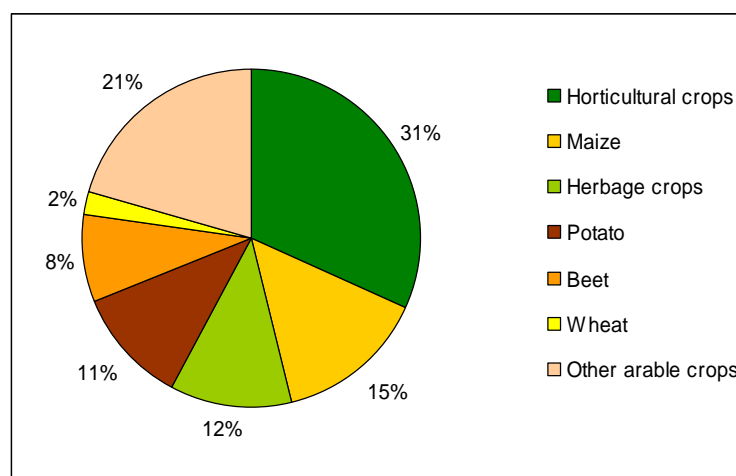


Figure 3.1 Share of some major crops in the total seed export value in 1998

Source: International Seed Federation.

The commercial world seed market has grown quickly in the last decades, as it is shown in figure 3.2. The growth is mainly accounted for by arable crop seed, in particular maize/corn, soybean and cotton.

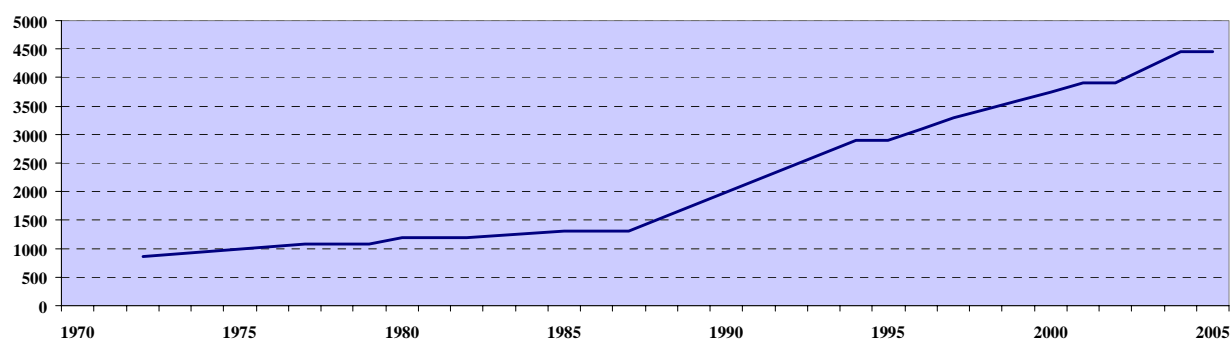


Figure 3.2 Evolution of seed exchanges worldwide

Source: International Seed Federation.

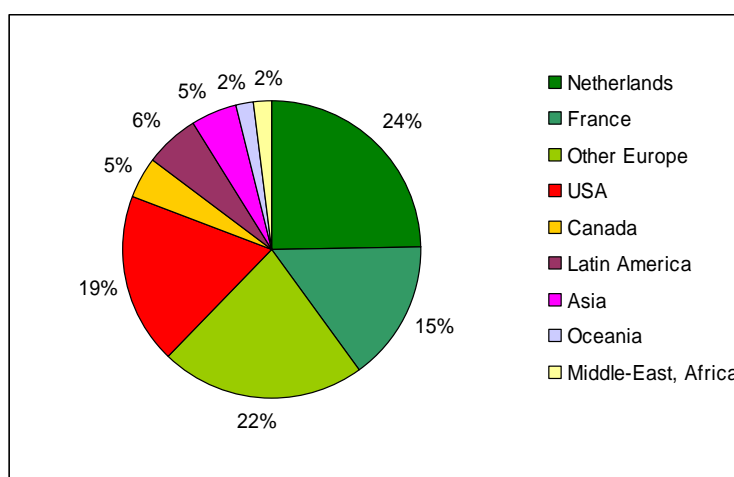


Figure 3.3 Export turnover of seed industry by continent and selected countries
Source: International Seed Federation.

3.2 Dutch trade in seed and planting material

Despite its rather small area for seed production compared with other countries in the European Union (table 2.3), the Netherlands plays an important role in the international seed trade. Figure 3.4 shows the share of the EU-15 countries in the total export value of seeds and other planting material of the European Union in 2003).¹ The Netherlands accounts for 47% of the total EU export of seeds and planting material, France for 18% and Germany for 10%. More than three-quarters of the export of seed and planting material of the EU-15 countries is within Europe, 10% is exported to the America's and the rest all over the globe (figure 3.5)

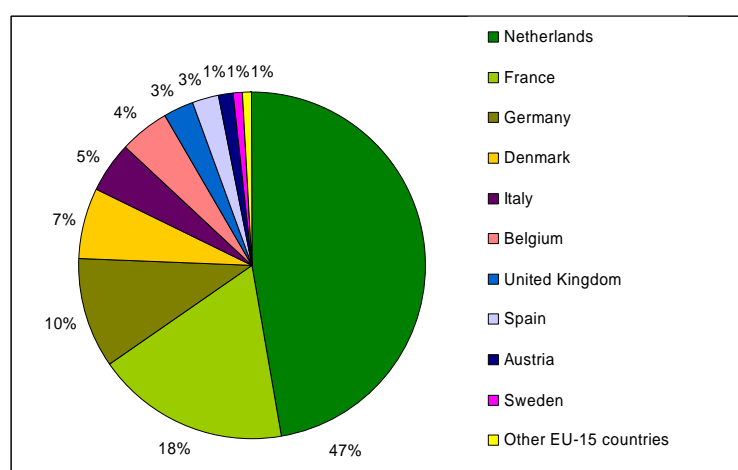


Figure 3.4 EU-15 export value of seed and planting material by country in 2003
Source: Eurostat.

¹ The data used in this chapter include seeds and other propagating material as well, including vegetable and arable crop seeds, seed potatoes, flower bulbs and young plants and cuttings. See details under table 3.3.

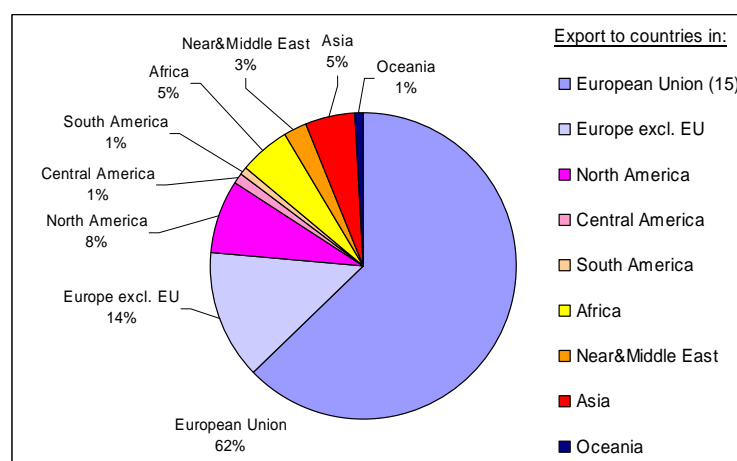


Figure 3.5 Destination of EU-15 seed and planting material export in 2003

Source: Eurostat.

Dutch export of seed and other planting material

From 1988 to 2003, the value of the Dutch seed exports doubled from EUR 0.8 to 1.6 billion (table 3.2). The growth was largely generated by vegetable seeds and plants and rooted cuttings.

Table 3.2 Dutch export of seeds and planting material in the period 1988 - 2003

Dutch export of:	Export value in EUR million				
	1988	1990	1995	2000	2003
Flower bulbs	401	449	549	569	594
Vegetable seeds a)	124	140	207	354	460
Seed potatoes	146	202	266	207	222
Other seed material	112	118	152	296	359
Of which:					
- Vegetable plants	0	0	0	46	61
- Cuttings	8	12	13	113	139
- Flower seeds	25	31	38	41	44
- Arable crop seeds	79	75	101	96	114
Total seeds and propagating material	783	909	1,174	1,425	1,635

a) Including fruit seeds (about 5%).

Source: Eurostat, Luxembourg.

The total vegetable seeds export increased from about EUR 124 million in 1988 to 460 million in 2003. The largest growth markets in Europe are Spain, Italy, Turkey, Poland and Hungary. Outside Europe, in particular the export the USA and China grew fast. The major competitors on the vegetable seed market are the USA, France, Israel and Japan.

The export value of flower bulbs increased from about EUR 400 in 1988 to about EUR 600 million in 2003, while the export value of seed potatoes varied around EUR 200 million.

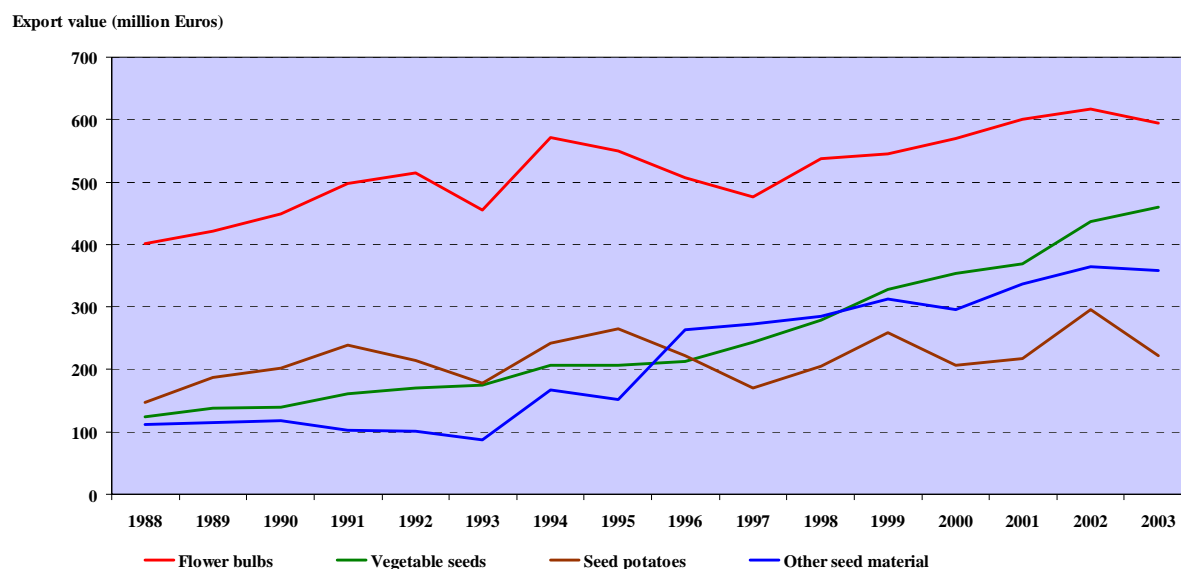


Figure 3.6 Development of the Dutch export of seed and planting material in the period 1988 - 2003
Source: Eurostat, Luxembourg.

More than half the seed exports from the Netherlands goes to other EU countries, in particular to Germany, France, Italy, United Kingdom and Spain. The export to the USA is of the same size as that to Germany. There are differences by product. The USA and Japan are the largest customers of flower bulbs and Spain of vegetable seeds. Africa buys almost a quarter of the export value of seed potatoes, of which half is going to Algeria. The other planting material is mainly sold to the neighbouring countries Germany, Belgium and the UK (table 3.3).

Dutch seed imports

While the Netherlands is exporting about EUR 1,63 billion of seeds and other planting material, it is importing for about EUR 417 million (table 3.3 and 3.4). An important part of the imported horticultural seeds and planting material is grown in other countries on behalf of Dutch seed and propagating companies, on their own farms or by others under contract. After processing in the Netherlands, the seed material is sold on domestic and foreign markets.

Vegetable seeds import counts for about EUR 127 million. The two major importers are France and the USA. The other important exporters to the Netherlands are Germany, Italy, Israel, Japan and New Zealand. The second important category of imported planting material comprises of cuttings and young three plants of different kinds, total import value

Table 3.3 Dutch export of seeds and planting material in 2003

Export from the Netherlands to: a)	Total export in EUR million					Share in export				
	flower bulbs	vegetable seeds	seed potatoes	other seeds	total seeds	flower bulbs	vegetable seeds	seed potatoes	other seeds	total seeds
<i>European Union (15)</i>	227.5	272.1	105.5	264.9	870.1	38.3	59.2	48.2	73.9	53.3
- Germany	52.7	37.8	17.0	84.6	192.1	8.9	8.2	7.8	23.6	11.8
- France	37.6	39.8	15.9	40.9	134.1	6.3	8.7	7.3	11.4	8.2
- Italy	41.0	45.5	17.3	19.3	123.0	6.9	9.9	7.9	5.4	7.5
- United Kingdom	44.5	27.7	8.0	38.0	118.3	7.5	6.0	3.7	10.6	7.2
- Spain	11.4	78.5	15.1	8.9	113.9	1.9	17.1	6.9	2.5	7.0
- Belgium	5.3	21.6	10.3	44.8	82.0	0.9	4.7	4.7	12.5	5.0
- Portugal	5.2	2.1	10.2	3.2	20.8	0.9	0.5	4.7	0.9	1.3
- Greece	1.3	6.3	7.9	2.6	18.1	0.2	1.4	3.6	0.7	1.1
- Sweden	11.6	2.9	0.7	2.7	18.0	2.0	0.6	0.3	0.8	1.1
- Austria	4.4	3.8	2.0	6.8	17.1	0.7	0.8	0.9	1.9	1.0
- Denmark	3.0	3.0	0.6	8.2	14.8	0.5	0.7	0.3	2.3	0.9
- Finland	8.1	2.3	0.4	1.5	12.3	1.4	0.5	0.2	0.4	0.8
- Ireland	1.4	0.7	0.1	3.0	5.2	0.2	0.2	0.0	0.8	0.3
- Luxembourg	0.1	0.0	0.1	0.4	0.5	0.0	0.0	0.0	0.1	0.0
<i>Europe excl. EU-15</i>	60.3	70.6	34.9	31.7	197.5	10.1	15.4	15.9	8.8	12.1
- Norway	10.8	1.5	0.0	1.6	13.9	1.8	0.3	0.0	0.5	0.9
- Switzerland	15.9	3.5	1.4	12.1	32.9	2.7	0.8	0.6	3.4	2.0
- Turkey	0.6	16.2	2.5	3.2	22.5	0.1	3.5	1.1	0.9	1.4
- Poland	15.1	14.8	1.7	3.2	34.8	2.5	3.2	0.8	0.9	2.1
- Hungary	3.2	5.7	2.9	2.8	14.6	0.5	1.2	1.3	0.8	0.9
- Russia	7.3	8.6	8.5	1.9	26.3	1.2	1.9	3.9	0.5	1.6

Table 3.3 Dutch export of seeds and planting material in 2003 (Continuation)

Export from the Netherlands to: a)	Total export in EUR million					Share in export				
	flower bulbs	vegetable seeds	seed potatoes	other seeds	total seeds	flower bulbs	vegetable seeds	seed potatoes	other seeds	total seeds
<i>Africa</i>	2.5	19.4	51.4	3.5	76.8	0.4	4.2	23.5	1.0	4.7
- Algeria	0.0	0.6	26.1	0.0	26.7	0.0	0.1	11.9	0.0	1.6
- Egypt	0.4	4.9	12.5	0.1	17.8	0.1	1.1	5.7	0.0	1.1
<i>North America</i>	161.8	40.5	0.0	19.8	222.1	27.2	8.8	0.0	5.5	13.6
- USA	140.1	32.1	0.0	17.5	189.7	23.6	7.0	0.0	4.9	11.6
- Canada	21.7	8.4	0.0	2.3	32.4	3.6	1.8	0.0	0.6	2.0
<i>Central America</i>	15.8	5.3	5.3	2.4	28.8	2.7	1.1	2.4	0.7	1.8
- Mexico	12.4	2.1	0.0	1.6	16.2	2.1	0.5	0.0	0.5	1.0
<i>South America</i>	7.0	5.1	0.8	9.2	22.0	1.2	1.1	0.4	2.6	1.4
<i>Near and Middle East</i>	3.7	26.4	16.9	4.7	51.7	0.6	5.7	7.7	1.3	3.2
- Israel	1.9	7.4	6.5	2.1	17.9	0.3	1.6	3.0	0.6	1.1
<i>Asia</i>	102.3	13.8	4.2	20.5	140.7	17.2	3.0	1.9	5.7	8.6
- China	15.2	3.0	0.0	3.1	21.4	2.6	0.7	0.0	0.9	1.3
- Japan	68.4	2.2	0.0	14.0	84.6	11.5	0.5	0.0	3.9	5.2
- Taiwan	9.9	0.2	0.0	0.6	10.7	1.7	0.0	0.0	0.2	0.7
<i>Oceania</i>	13.2	6.6	0.0	1.9	21.6	2.2	1.4	0.0	0.5	1.3
- Australia	11.1	5.1	0.0	1.0	17.3	1.9	1.1	0.0	0.3	1.1
<i>Total seeds</i>	594.1	459.7	219.1	358.6	1631.4	100.0	100.0	100.0	100.0	100.0

a) All EU-15 countries are listed in the table, as well as all other countries that import more than 10 million seeds or other planting material from the Netherlands. The data of the continents include all respective countries.

Categories:

Flower bulbs: bulbs, tubers, tuberous roots, corms, crowns and rhizomes; Vegetable seeds: vegetable seeds and fruit seeds for sowing; Seed potatoes; Other seeds: seeds of other arable crops, vegetable-, strawberry- and pine-apple plants, cuttings and young plants of trees, shrubs and bushes, indoor plants and seeds of plants mainly cultivated for flowers

Source: Eurostat, Luxembourg.

Table 3.4 Dutch import of seeds and planting material in 2003

Import of The Netherlands from: a)	Import value in EUR million						Import volume in 1,000 tonnes					
	vege- tables	cut- tings	other horti- culture	maize	other arable seeds	total value	vege- tables	cut- tings	other horti- culture	maize	other arable seeds	total value
<i>World b)</i>	<i>126.9</i>	<i>124.8</i>	<i>73.7</i>	<i>35.9</i>	<i>55.1</i>	<i>416.5</i>	<i>11.3</i>	<i>44.6</i>	<i>19.2</i>	<i>17.0</i>	<i>114.0</i>	<i>206.0</i>
<i>European Union 15</i>	<i>50.2</i>	<i>18.1</i>	<i>13.1</i>	<i>25.8</i>	<i>29.7</i>	<i>136.8</i>	<i>5.4</i>	<i>5.8</i>	<i>4.4</i>	<i>10.2</i>	<i>50.3</i>	<i>76.1</i>
France	23.3	1.9	3.8	18.7	4.5	52.3	1.8	0.4	0.4	6.7	15.0	24.4
Germany	8.4	4.3	3.3	4.1	13.1	33.2	0.7	0.3	0.2	1.7	9.5	12.4
Belgium	1.0	6.8	1.1	0.8	5.2	14.8	0.0	2.6	0.3	0.6	16.7	20.2
Denmark	5.3	0.5	1.0	0.0	5.1	11.9	2.4	0.1	0.0	-	6.2	8.7
Italy	8.6	1.9	0.3	0.1	0.1	11.1	0.3	2.3	0.0	0.1	0.1	2.9
United Kingdom	1.6	0.0	2.9	-	1.5	6.0	0.2	0.0	2.9	-	2.6	5.8
Spain	2.0	2.5	0.7	0.2	0.0	5.4	0.0	0.1	0.5	0.1	0.0	0.7
Austria	0.1	0.1	0.0	1.8	0.1	2.0	0.0	0.0	-	1.0	0.2	1.2
<i>Europe excl. EU-15</i>	<i>4.2</i>	<i>5.0</i>	<i>12.3</i>	<i>5.3</i>	<i>3.2</i>	<i>30.0</i>	<i>0.2</i>	<i>1.5</i>	<i>3.4</i>	<i>4.0</i>	<i>5.0</i>	<i>14.1</i>
Poland	0.5	4.1	8.4	-	0.2	13.2	0.0	1.3	2.8	-	0.3	4.4
Turkey	2.8	0.6	3.6	0.3	0.2	7.5	0.0	0.0	0.5	0.3	0.2	1.1
Hungary	0.8	0.3	0.3	5.0	1.2	7.5	0.1	0.2	0.0	3.7	2.1	6.2
Czech Rep.	0.1	0.0	0.0	-	1.6	1.7	0.0	0.0	-	-	2.4	2.5
<i>Africa</i>	<i>1.7</i>	<i>31.0</i>	<i>1.8</i>	<i>0.1</i>	<i>0.0</i>	<i>34.6</i>	<i>0.1</i>	<i>2.9</i>	<i>0.5</i>	<i>0.0</i>	<i>0.0</i>	<i>3.6</i>
Kenya	0.1	13.5	0.1	-	-	13.7	-	1.1	0.0	-	-	1.1
South Africa	1.5	6.0	1.3	0.1	0.0	8.9	0.1	0.4	0.4	0.0	0.0	1.0
Uganda	-	6.8	0.0	-	0.0	6.8	-	0.8	-	-	0.0	0.8
Tanzania	0.1	4.7	0.3	-	0.0	5.1	-	0.6	0.1	-	0.0	0.7
<i>North America</i>	<i>21.4</i>	<i>0.6</i>	<i>11.5</i>	<i>0.3</i>	<i>7.9</i>	<i>41.7</i>	<i>1.2</i>	<i>0.1</i>	<i>0.4</i>	<i>0.0</i>	<i>5.6</i>	<i>7.2</i>
Usa	21.3	0.5	11.5	0.3	6.2	39.9	1.2	0.1	0.4	0.0	3.9	5.6
Canada	0.1	0.0	0.0	0.0	1.7	1.8	-	-	-	-	1.6	1.6

Table 3.4 Dutch import of seeds and planting material in 2003 (Continuation)

Import of The Netherlands from: a)	Import value in EUR million						Import volume in 1,000 tonnes					
	vege- tables	cut- tings	other horti- culture	maize	other arable seeds	total value	vege- tables	cut- tings	other horti- culture	maize	other arable seeds	total value
<i>Central America</i>	0.3	33.5	0.1	-	-	33.9	0.0	22.3	0.0	-	-	22.4
Costa Rica	0.2	25.6	0.0	-	-	25.9	0.0	17.2	0.0	-	-	17.3
Guatemala	0.1	5.5	0.1	-	-	5.6	0.0	3.2	-	-	-	3.2
Honduras	0.0	2.4	-	-	-	2.4	-	1.9	-	-	-	1.9
<i>South America</i>	2.7	4.9	9.7	3.8	0.1	21.2	0.0	0.5	5.5	2.3	0.0	8.3
Chile	1.6	0.1	5.8	3.8	0.1	11.3	0.0	0.0	2.7	2.3	0.0	5.1
Brazil	0.1	4.8	3.9	-	0.0	8.9	0.0	0.5	2.8	-	-	3.3
Peru	1.0	-	-	-	-	1.0	0.0	-	-	-	-	0.0
<i>Near & Middle East</i>	7.6	7.4	1.3	-	-	16.3	0.0	0.4	0.3	-	-	0.7
Israel	7.6	7.4	1.3	-	-	16.3	0.0	0.4	0.3	-	-	0.7
<i>Asia</i>	11.3	17.9	3.8	-	0.2	33.2	0.3	8.9	1.0	-	0.2	10.4
China	0.8	12.0	1.7	-	0.1	14.6	0.1	6.3	0.5	-	0.2	7.0
Japan	6.6	0.1	1.3	-	0.1	8.1	0.1	0.0	0.1	-	0.0	0.2
Thailand	3.1	1.1	0.0	-	0.0	4.2	0.0	0.2	0.0	-	-	0.2
Taiwan	0.3	2.0	0.6	-	-	2.9	0.0	1.3	0.4	-	-	1.7
India	0.5	1.1	0.2	-	0.0	1.8	0.1	0.0	0.0	-	-	0.2
Sri Lanka	0.0	1.5	-	-	0.0	1.5	-	1.1	-	-	0.0	1.1
<i>Oceania</i>	8.1	1.1	3.5	0.0	9.5	22.2	0.5	0.1	1.6	0.0	42.1	44.2
New Zealand	5.8	0.8	3.1	0.0	2.6	12.3	0.4	0.1	1.4	0.0	1.5	3.4
Australia	2.3	0.3	0.4	-	7.0	10.0	0.1	0.0	0.2	-	40.6	40.8

a) Countries from which the Netherlands imports more than EUR 1 million of planting material. The data of the continents include all respective countries; b) Total imports of the Netherlands, including imports of which geographical origin is not specified in the statistics.

Categories:

Vegetable seeds: including fruit seeds; Cuttings: in- and outdoor rooted and unrooted cuttings and young plants of trees; Other horticulture: including flower bulbs, seeds for flowers and young plants; Maize; Other arable seeds: including seed potatoes.

Source: Eurostat, Luxembourg.

of EUR 125 million, mainly from Costa Rica, Kenya and China. The other imported horticultural planting material consists of a broad range of products. The total import value is EUR 74 million, of which EUR 39 million for flower bulbs and EUR 32 million for flower seeds. A substantial portion of the flower bulbs is imported from Poland, while the USA is a large supplier of flower seeds.

The import value of arable seeds is about EUR 91 million, mainly maize seed, in particular for silage, and seeds of other forage crops and grasses. A major part of the arable crop seeds is imported from neighbouring countries in the Europe, the USA and Australia.

4. The major players in the seed market

The world top seed companies

Table 4.1 shows the top seed companies in the world. The four largest seed companies account for over 70% of all US corn seeds and over 90% of all cotton seeds.

Table.4.1 The top seed companies in the world

	Name of seed company	Head office in:
1	Pioneer	USA
2	Monsanto	USA
3	Syngenta	Switzerland
4	Groupe Limagrain	France
5	Seminis	USA
6	Sakata	Japan
7	KWS Saat AG	Germany
8	Cargill/Dow	USA
9	Delta and Pine Land	USA

Source: Different sources, amongst others companies' websites.

The international vegetable seed market is also dominated by a few large seed companies. The twelve companies mentioned in table 4.2, control about 80-90% of the total world vegetable seed market. Some of these companies are part of multinational companies, mainly pharmaceutical and chemical companies. The others are independent companies. Being part of a large multinational makes it possible for the seed company to have access to the capital market for financing their long-term investments in research. However, there is a tension between the short-term expectations of the shareholders and the long-term research activities. The seed divisions contribute relatively little to the companies' overall results and, therefore, some seed divisions have become independent (again) through management buy-outs. On the other hand, it is expected that for the necessary large-scale and long-term research activities, further co-operation and mergers will take place (Rabobank 2002).

Tabel 4.2 The twelve most important players on the international vegetable seed market

Company	Brand names	Country	Parent Company
Seminis	Royal Sluis, Peto, Asgrow, Bruinsma	USA	Monsanto
Syngenta	Sluis en Groot, Rogers	Switzerland	Syngenta
Vilmorain-Clause	Vilmorain, Tezier, Kyowa Nickerson-Zwaan, Clause	France	Vilmorain
Nunhems	Sun, Nunhems	Netherlands	Bayer
Takii	Takii	Japan	Independent
Sakata	Sakata	Japan	Independent
Rijk Zwaan	Rijk Zwaan	Netherlands	Independent
Enza	Enza	Netherlands	Independent
Bejo	Bejo	Netherlands	Independent
De Ruiter Seeds	De Ruiter Seeds	Netherlands	Independent
Hazera Genetics	Hazera	Israel	Independent
Zeraim Gedera	Zeraim	Israel	Independent

Source: Different sources, amongst others companies' websites.

The major Dutch vegetable seed companies

The Dutch plant breeding and propagation industry is a sector with a long history. Some of the current companies were founded more than a century ago. In the course of time, some of them remained independent companies, while others merged with other companies, in the Netherlands and abroad. Currently the seed sector, including ornamental and field crops, employs about 10,000 people, many of them highly-skilled with university training. Plant breeding is a creative discipline relying on modern technologies that evolves rapidly. Major investments are an integral part of the fast pace of change. The industry invests on average 14% of its turnover in research and development each year to assist finding new varieties, developing faster breeding methods or innovative techniques for multiplying plants. The following table gives an overview of the major Dutch vegetable breeding companies. The websites of these companies are listed in Appendix 2.

Tabel 4.3 The major Dutch seed breeding companies

Company	Parent Company	Major crops
a. Bejo Zaden	Independent	A broad spectrum of vegetable seeds for outdoor cultivation
b. De Groot en Slot Allium BV	Independent	Allium-specialist, onions, scallions, etc.
c. Enza Zaden BV	Independent	A broad spectrum of vegetable seeds
d. Holland-Select BV	Independent	Vegetables, such as dwarf beans, climbing beans, broad beans, market peas, baby carrots and scorzonera.
e. Meo Voto Zaden BV	Independent	onion, carrot, cauliflower and sweetcorn seeds.
f. Nickerson-Zwaan	Vilmorin	Lettuce, cucumber, leek, onion, radish and the brassica range of cabbage, cauliflower, Brussels sprouts and broccoli
g. Nunhems	Bayer	A broad spectrum of vegetables seeds, such as Artichoke, Asparagus, Cabbage, Carrots, Celeriac, Chicory, Climbing beans, Cucumber, Eggplant, Gourd, Leek, Melons, Okra, Onion, Beans, Peas, Pepper, cucumber, Radish, lettuce, Squash, Tomato and Watermelon.
h. Oriëntal Seeds BV	Independent	Trading of a broad spectrum of vegetables, flowers, herbs and arable crops
i. Rossen Seeds B.V.	Independent	A broad spectrum of hybrid seeds of vegetables such as tomato's, cucumber, eggplant, pepper, melon and lettuce
j. Rijk Zwaan Nederland BV	Independent	Vegetable seeds, in particular tomatoes and lettuce
k. De Ruiter Seeds	Independent	Hybride seeds of vegetables, in particular tomato, pepper, hot and sweet pepper, cucumber, eggplant and melon.
l. Seminis (incl. Royal Sluis, Bruinsma)	Montsanto	Very broad variety of vegetables seed
m. Syngenta Seeds	Syngenta	Vegetables, in particular tomato, pepper, cabbage and courgette
n. Takii Europe B.V.	Takii Japan	North-European Vegetables
o. Western Seed International BV	Independent	Tomato, pepper, melon, watermelon, cucumber, eggplant, squash and papaya varieties.
p. Agrisemem BV	Independent	Lettuce, beans, cabbage, Brussel sprouts and celeriac

5. Institutional framework of the Dutch seed sector

5.1 General Introduction

The production structure of seeds and other propagating material is rather diverse. The main share of vegetable seed is produced by a few large specialised seed breeding and trading companies as it has been described in the former chapter. Multiplication is carried out at the companies themselves or by (contract) farmers in the Netherlands or abroad. Seed potatoes and flower bulbs on the other hand, are produced on many individual family farms, which collaborate in specialised associations for marketing purposes. In order to understand the context in which the Dutch seed sector operates, this chapter describes briefly the most relevant organisations for the seed sector in the Netherlands. The function of these organisations can be illustrated at hand of their position in the Plant Variety Development Chain, which is shown in figure 5.1.

The variety development chain starts with the available genetic resources. Beginning with promising genetic resources, the breeder develops the new variety by either using this germplasm directly or by incorporating it into existing varieties. For official registration and granting Plant Breeders' Rights, the new varieties developed have to be tested. The variety testing procedure comprises of the following steps:

- *Step 1: Filing an application*
The applicant files an application for protection at the national or international body for variety protection.
- *Step 2: Checking an application*
The protection authority checks the application on completeness and eligibility and takes the necessary measures for organising the technical examination.
- *Step 3: Technical examination*
The candidate variety is tested on Distinction from existing varieties, Uniformity in its characteristics and Stability in the long run (DUS testing).
- *Step 4: Variety Denomination*
The new variety must be designated by a unique variety denomination.
- *Step 5: Grant of title*
If the examination results are satisfactory and all other requirements have been fulfilled, plant variety rights are granted, mostly for a period of 25 years.

In addition to DUS tests, new varieties of field crops are tested on agricultural performance, in order to assess whether they are an improvement compared with existing varieties. This Value for Cultivation and Use test (VCU) is carried out by authorised (independent) research institutes. In some cases the breeder carries out part of the tests under supervision of the research institutes. If the variety is promising, an adequate seed supply has to be built up (in most countries) under control of a certification authority, in order to make sure that the end-user will receive good quality seed that is true-to-variety

when compared to the originally tested variety and the variety will be released. Once the variety is brought on the market, a royalty collection scheme should be in operation to ensure the breeder a return on his investment and to finance further breeding. The developed variety will enter the gene pool for usage worldwide, based on the breeders' exemption rule in the UPOV regulations.

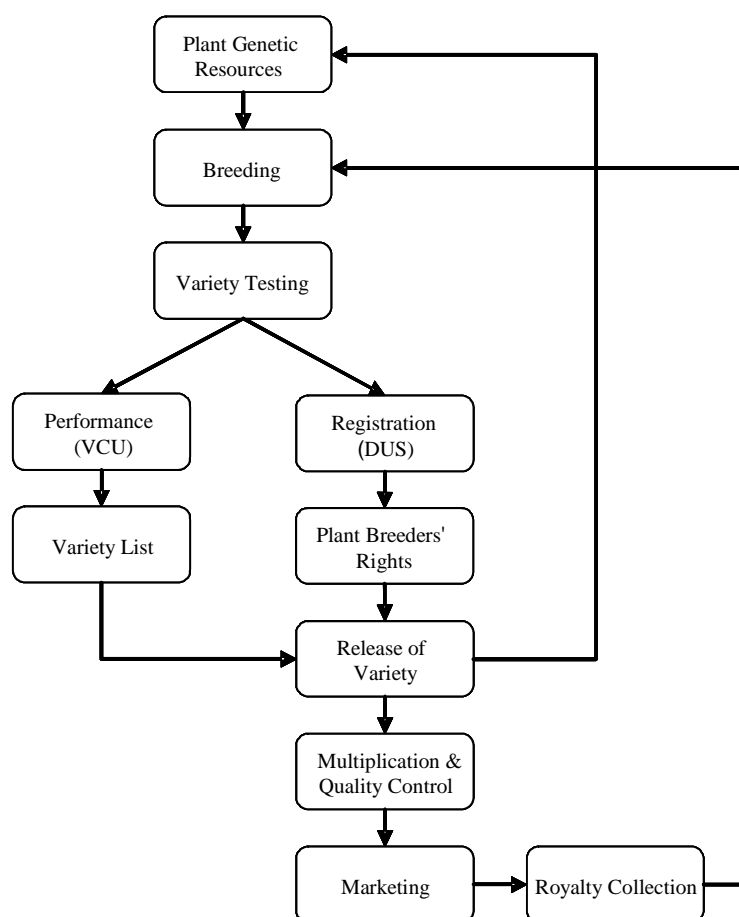


Figure 5.1 Plant Variety Development Chain
Source: Van Wijk et al. (2003).

The breeders in the Netherlands are represented in the Dutch Association of Seed Breeders and Traders (Plantum NL), which will be described in the following section (5.2). The central authority in the Netherlands for granting plant breeders' rights is the Board for Plant Breeders' Rights (in Dutch: Raad voor het Kwekersrecht). European breeders can also apply for plant variety protection at the European Community Plant Variety Office (CPVO).¹ The DUS testing is delegated to the Centre for Genetic Resources the

¹ The European Community Plant Variety Office (CPVO) has been operating since 1995. CPVO is a decentralised Community agency, has its own legal status and is self-financing, mainly on the basis of the

Netherlands (CGN) and the Inspection Service for Horticulture (Naktuinbouw). The Dutch inspection services for seed and propagating material build their expertise upon long-term experiences. The first inspections services were founded decades ago; the flowerbulbs inspections service, for instance, was founded in 1921. In the course of time, the various inspection services have been reorganised and merged, resulting in three independent non-profit inspection services for (a) agricultural crops (NAK), (b) horticultural crops (Naktuinbouw) and (c) flowerbulbs (BKD). The main features of the organisations involved in quality testing and monitoring are described in section 5.3. This section also includes an overview of the tasks of the Dutch Plant Protection Service (PD), a governmental agency that is responsible for phytosanitary inspection in the Netherlands. After that, the representation of farmers' interests via farmers' associations, commodity boards and co-operative enterprises will be shortly described (section 5.4). The last section (5.5) highlights the functions of education, research and extension.

5.2 Plantum NL

Plantum NL is the association of Dutch breeding and propagation companies and companies that trade in seeds and young plants. The association was founded in 2001 as a successor of different organisations: the Dutch Association of Plant Breeders (NVP), the Dutch Association for Seed and Plant Material (NVZP), the department of propagating material of the Association of Wholesalers of Floriculture Products (VGB) and CIOPORA Netherlands (a branch of the International Community of Breeders of Asexually Reproduced Ornamental and Fruit-Tree Varieties).¹

The approximately 450 companies represented by Plantum NL are active in agriculture (field crops, grasses, potatoes), horticulture (vegetables) and floriculture (flowers, flower bulbs, nursery stocks). The total turnover of Plantum NL members is Euro 1.6 billion. Plantum NL promotes the interests of its members at both a national and an international level in various fields such as:

- intellectual property rights;
- international trade and phytosanitary issues;
- crop protection and environment;
- organic farming;
- biodiversity and biotechnology;
- research and development;
- legislation and legal issues;
- social and economic affairs;
- public relations.

various fees paid. It is located in Angers (France). Property rights granted by CPVO are valid throughout the European Community (currently 25 member states).

¹ CIOPORA, the 'International community of breeders of asexually reproduced ornamental and fruit-tree varieties' is an international non-governmental organization founded in 1961. It is a worldwide association of individual breeders and breeding companies of vegetatively reproduced ornamental and fruit plant varieties, with a view to assist them in the protection of their intellectual property rights. CIOPORA also groups up national breeder-associations as well as lawyers, consultants and others, active in the field of intellectual property rights. CIOPORA has national branches.

Organisation of Plantum NL

Plantum NL is an association, which means that it is a non-profit organisation with members with certain rights and obligations. These rights and obligations are written down in the articles of association, registered by a public notary. These articles describe the objectives of the association, the conditions for membership, the organisational structure of the association, procedures for appointing and exchanging the board members and the financial management and reporting. In addition to these articles, the associations have rules and regulations for the day-by-day management. In general, the articles of association can only be changed by a majority of votes in the general members meeting, while the management rules can be changed by the board.

The highest authority within Plantum NL is the General Members Assembly, which convenes once a year. The Assembly elects the members of the General Board, which consists of ten members, one of them appointed as chairperson for a two years period. New board members are nominated by the five Departments of Plantum NL, two members from each department. The companies are member of one or more departments, depending on their business interests. The Departments are:

1. Department of Ornamental breeding;
2. Department of Ornamental propagation;
3. Department of Agriculture;
4. Department of Vegetable Seeds;
5. Department of Young Vegetable Plants.

The Departments are divided in several crop sections and committees, which are listed below.

- | | |
|---|--|
| <p>1. Department of Ornamental breeding</p> <p><i>Crop sections:</i></p> <ul style="list-style-type: none">- Ornamental seeds- Lily breeding- Rose breeding- Zantedeschia- Cyclamen | <p>3. Department of Agriculture</p> <p><i>Crop sections:</i></p> <ul style="list-style-type: none">- Potatoes- Grains, legumes and fine seeds- Corn- Sugar beets- Fodder crops- Trade and licensed production |
| <p>2. Department of Ornamental propagation</p> <p><i>Crop sections:</i></p> <ul style="list-style-type: none">- Alstroemeria- Carnation- Aster- Chrysanthemum- Gerbera- Pot plants- Rose- Cut flowers from seed- Section on tissue culture <p><i>Committees:</i></p> <ul style="list-style-type: none">- Promotion of Ornamentals- Research of Ornamentals | <p>4. Department of Vegetable Seeds</p> <p><i>Committees:</i></p> <ul style="list-style-type: none">- Integrated vegetable seeds- Research vegetables seeds- Social affairs vegetable seed companies |
| | <p>5. Department of Young Vegetable Plants</p> <p><i>Crop sections:</i></p> <ul style="list-style-type: none">- Asparagus- Glasshouse Vegetable Plants- Cabbage- Leek- Outdoor Vegetable Plants- Strawberry |

In order to co-ordinate issues that are of common interest for different crops, Plantum NL has ten Horizontal Committees, in which representatives of different departments participate. These are:

- Organic farming
- Biotechnology
- Biodiversity
- International trade and phytosanitary matters
- Crop protection and environmental issues
- Legislation and legal matters
- Intellectual property rights
- Research
- Social affairs
- Public relations

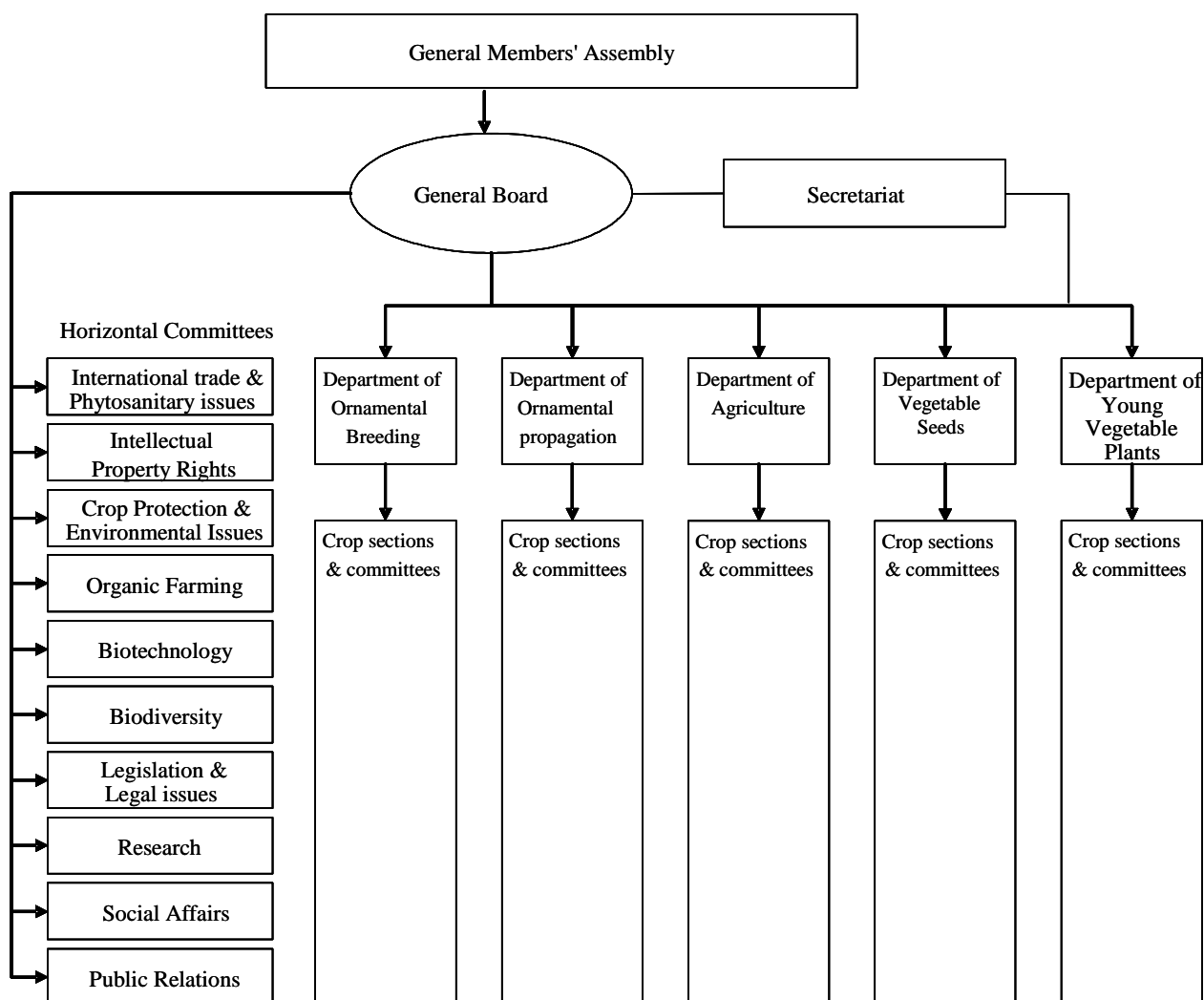


Figure 5.2 Organisational diagram of Plantum NL

The general board meets quarterly. The daily work of the organisation is carried out by the Plantum NL secretariat. The secretariat is responsible for all the administrative work, prepares the board and committee meetings and represents Plantum NL externally. The secretariat consists of fifteen people of which eleven staff (managing director, three

sector managers, and seven policymakers) and four supporting staff. The director of Plantum NL is secretary and treasurer of the general board.

Internal Communication

In order to keep posted on the developments in the sector and the expectations of the members with respect to the Plantum NL activities, it is very important for the secretariat to keep in touch with the members. The office uses different channels for communication. Most important are the direct contacts with the members during meetings of department boards, crop sections and committees. In addition to that, Plantum NL issues a monthly newsletter, publishes press communiqués on topical issues and articles in professional journals. An important medium is the website (www.plantum.nl), in particular the members' extranet site. In addition to that, the secretariat informs groups of members via specific direct mailings about topical issues.

External relations in the Netherlands

The major task of the secretariat is to promote the interests of its members and to support the seed sector in relevant fields. For that purpose, staff and board members of Plantum NL have a seat in various commissions that are involved in policy preparation and implementation.

Plantum NL has a seat in the boards of the following organisations:

- NAK, Netherlands General Inspection Service for Agricultural Seeds and Seed potatoes;
- Naktuinbouw, Netherlands Inspection Service for Horticulture;
- Commodity Board of Horticulture (PT);
- Commodity Board for Grains, Seeds and Pulses (GZP);
- HBAG: Dutch Agricultural Wholesale Board/Flowers and Plants;
- NIABA: Netherlands Biotechnology Association;
- VNO-NCW: Confederation of Netherlands Industry and Employers.

Besides formal relations through committees etc., Plantum NL has direct contacts with relevant officials and administrators of various organisations in the Netherlands, such as:

- Ministry of Agriculture, Nature and Food Quality (LNV);
- PEX: Program Export restrictions;
- Committee for Propagating material;
- Ministry of Economic Affairs (EZ);
- Plant Protection Service (PD);
- BKD: Inspection Service for Flower bulbs;
- General Industry Board for Wholesale Agriculture (HBAG);
- Dutch Federation of Agricultural and Horticultural Organisations (LTO);
- Flower Board of Holland (BBH);
- Association of Dutch Vegetables and Fruit Processing Industries(VIGEF);
- Royal Dutch Wholesalers Association for Flowerbulbs and Nurserystock (KBGBB);
- Fruittrade Association Netherlands (Frugi Venta);
- Dutch Produce Association (DPA);

- Hortifair (Organisation responsible for the annual Dutch Horticultural Fair).

International relations

An increasing part of laws and regulations binding for citizens and companies in the Netherlands is shifting from national to European jurisdiction. For that reason, it is important to have a voice in the various institutions of the European Union, the European Commission, European Parliament, etc. In this respect, the representation via the Dutch government, in particular the Ministry of Agriculture and some of the other above-mentioned institutions that have an international network, is important.

With respect to the seed sector, the 'European Seed Association' (ESA)¹ and CIOPORA (International) are the organisations recognised by the European Commission as for consultation and negotiation on issues regarding the seed sector. Through its membership in these organisations, Plantum NL can influence policy preparation and implementation. Plantum NL also has working relations with the EU Community Plant Variety Office (CPVO) in Angers (France) and the International Union for the Protection of New Varieties of Plants (UPOV) in Geneva, Switzerland.

Plantum NL is member of the International Seed Federation (ISF)², in order to keep posted on new developments in science and technology developments and to support policies that are of interest to its members.

Staff of Plantum NL have also direct contact with similar organisations in other European countries for exchange of information and support on joint policy issues.

The following list gives an overview of the major policy topics of Plantum NL and the organisations involved in consultation and negotiation on these topics:

- *Plant Variety Protection*
 - Ministry of Agriculture (LNV)
 - Community Plant Variety Office (CPVO)
 - International Union for the Protection of New Varieties of Plants (UPOV)
 - International Seed Federation (ISF)
 - European Seed Association (ESA)
 - International Community of Breeders of asexually Reproduced Ornamental and Fruit-Tree Varieties (CIOPORA)
- *Phytosanitary Issues*
 - Ministry of Agriculture (LNV)
 - Plant Protection Service (PD)
 - European Seed Association (ESA)

¹ The European Seed Association (ESA) was founded in November 2000 and merges former European seed association as well as individual companies into one single EU wide organisation representing the totality of the European seed industry active in research, breeding, production and marketing of seeds. ESA is a non-profit organisation with more than 30 national seed associations from EU Members States and more than 40 individual seed companies as members. The secretariat is located in Brussels.

² The International Seed Federation (ISF) is a non-governmental, non-profit organisation representing the world seed trade and plant breeders' community. With members spread over 70 developed and developing countries on all continents, ISF serves as an international forum to the world seed industry. The ISF secretariat is located in Nyon (Switzerland).

- *Biodiversity*
 - Ministry of Agriculture (LNV)
 - International Seed Federation (ISF)
 - European Seed Association (ESA)
- *Biotechnology*
 - Ministry of Agriculture (LNV)
 - Ministry of Economic Affairs (EZ)
 - International Seed Federation (ISF)
 - European Seed Association (ESA)
- *Crop protection*
 - Ministry of Agriculture (LNV)
 - European Seed Association (ESA)
- *Research and Development*
 - Ministry of Agriculture (LNV)
 - Wageningen University and Research Centre
 - Ministry of Economic Affairs (EZ)
- *Collective labour agreements (CAO)*
 - Labour unions
- *Occupational Health and Safety Covenant (ARBO)*
 - Ministry of Social Affairs (SZ)
 - Ministry of Agriculture (LNV)

Funding

The activities of Plantum NL are financed on the basis of membership fees, totalling about EUR 1.25 million per year.

5.3 Plant variety protection and quality control

5.3.1 Board for Plant Breeders' Rights

The Board for Plant Breeders' Rights is the authorised body for granting plant breeders' rights in the Netherlands (See organisational diagram in figure 5.3). The conditions for granting these rights and the scope of protection are regulated by the Dutch Seeds and Planting Materials Act (Zaaizaad- en Plantgoedwet 1967). The act is based on principles laid down in the UPOV-convention.¹ After the Board has acknowledged the application, the breeder must submit the respective seed or planting material for testing. The technical examination with respect to the DUS requirements is performed by special institutes in the Netherlands and, for certain crops, abroad. The authorised Dutch testing institutes are the

¹ The International Union for the Protection of New Varieties of Plants (UPOV) is an intergovernmental organization with headquarters in Geneva (Switzerland). UPOV was established by the International Convention for the Protection of New Varieties of Plants. The Convention was adopted in Paris in 1961 and it was revised in 1972, 1978 and 1991. The objective of the Convention is the protection of new varieties of plants by an intellectual property right. As of November 2004, UPOV has 58 members.

'Center for Genetic Resources Netherlands' (CGN) and 'Naktuinbouw'. (See overview of these organisations in the following sections). The tests are under control of specialised agronomists of the Board, in some cases assisted by experts who have profound knowledge of the variety assortment. The tests can take one to three growing cycles, depending on the species concerned. The applicant is informed by interim reports and a final report and has the opportunity to bring forward his point of view in a meeting of the Board. The decisions of the Board are open to appeal at the Appeal Unit of the Board.¹

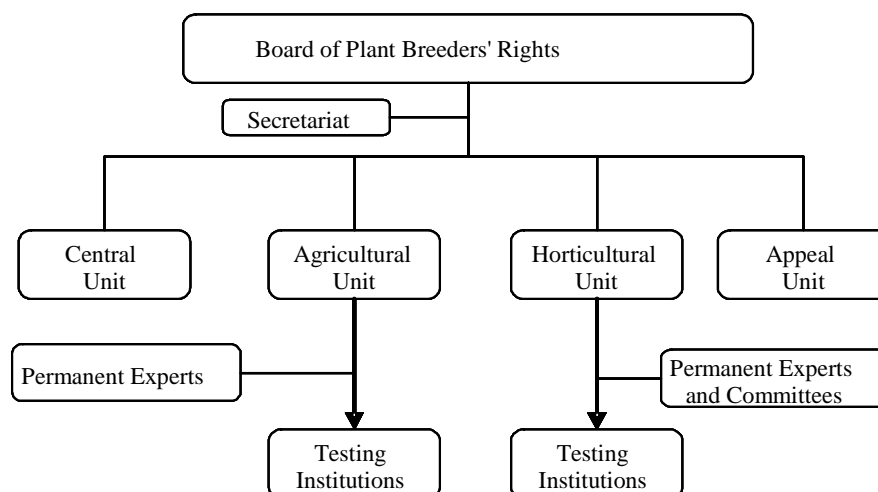


Figure 5.3 Organisational diagram of the Dutch Board for Plant Breeders' Rights

5.3.2 Centre for Genetic Resources the Netherlands (CGN)

The Centre for Genetic Resources, the Netherlands (CGN) was established as an independent institute in 1985 and after several mergers and separation CGN is now part of Wageningen University and Research Centre (Wageningen UR). CGN is responsible for a number of statutory tasks, which can be divided into two related groups of activities:

- a. implementation of the Dutch genetic resources programme;
- b. plant variety research.

More information about these activities is given below.

a. CGN Plant Genetic Resources (CGN-PGR)

The Centre for Genetic Resources, the Netherlands (CGN) is responsible in the Netherlands for statutory research tasks that relate to biodiversity and identity of species of

¹ It is expected that by the end of 2005, the new Planting Seed and Propagation Material Law will be implemented. As a result, the responsibilities of the Board for Plant Breeders' Rights and the Plant Variety Commissions for field crops, trees respectively vegetables will be placed into one institution, namely the Plant Variety Board (Raad voor Plantenrassen). The new board will be responsible for both the DUS and VCU testing. The tests will be carried out by the same institutions as it is described in this chapter.

importance to agriculture and forestry. One of these tasks is the co-ordination of the governmental programme aimed at conservation and utilisation of genetic resources, including crops and farm animal species. CGN-PGR provides policy support, maintains resource collections and promotes the use of it, in close co-operation with international partners. These activities are based on the Dutch obligations following from the Convention on Biological Diversity (CBD) and the International Treaty on Plant Genetic Resources for Food and Agriculture (IT-PGRFA) (soon to be ratified by the Dutch government). CGN operates as a partner in the European network of genebanks, ECP/GR.¹ It contributes to this network by its collections of horticultural and arable crops, and by the development of methodologies in collection management and database management.

The CGN crop collections include over 22,000 different genetic samples while the animal collections consist of a large number of samples of over 50 different breeds. Gathering information about the material in the collections and making this information available via internet is an important priority, for which appearance and properties such as molecular-genetic characteristics are analysed. There is an extensive website about the plant collections: www.genebank.nl.

b. CGN-Plant Variety Research

The leading organisation for plant variety research in the Netherlands is 'CGN Plant Variety Research'. CGN Plant Variety Research carries out statutory tasks based on the Dutch Seeds and Planting Materials Act (ZPW - 1967) including:

- Official Registration and Breeder's Rights Research (DUS) for arable and ornamental crops;
- co-ordination of trials on Value for Cultivation and Use (VCU) for field crops;
- compilation of plant variety lists.

Other activities of CGN Plant Variety Research are:

- participation of commissions of international organisations as EU, CPVO and UPOV;
- support to the development of centres of expertise with regard to plant variety research and the implementation of plant breeder's rights systems in other countries;
- organisation of (international) courses and trainings on plant variety research and breeder's rights.

Evaluation of Distinctness, Uniformity and Stability (DUS)

CGN Plant Variety Research is specialised in the DUS testing of breeding products of field crops and ornamentals as part of evaluation of applications for plant breeder's rights. This

¹ The European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR) was founded in 1980 on the basis of the recommendations of the United Nations Development Programme (UNDP), the Food and Agriculture Organization of the United Nations (FAO) and the Genebank Committee of the European Association for Research on Plant Breeding (EUCARPIA). The Programme is aimed at facilitating the long-term conservation on a cooperative basis and the increased utilisation of plant genetic resources in Europe. The Programme, which is entirely financed by the participating countries and is coordinated by a Secretariat at the International Plant Genetic Resources Institute (IPGRI) in Rome, Italy.

research is carried out under authority of the Dutch Board for Plant Breeder's Rights and the EU Community Plant Variety Office (CPVO). Every year approximately 1,400 varieties are in trials for assessment of the DUS characteristics. About 80% of the applications concerns ornamental crops and the remaining 20% apply to field crops. Each crop demands specific growing conditions under which the essential features of the variety come to maximal expression. For that purpose, CGN Plant Variety Research has at its disposal modern facilities, including a trial farm, and well-trained staff with the required expertise in the area of policies and regulations concerning registration, and knowledge of crops, varieties and cultivation. Research for plant breeder's rights is carried out according to international regulations (UPOV and EU) and under a quality management system that is in conformity with the European standards for inspection services.

Value for Cultivation and Use (VCU)

CGN Plant variety research co-ordinates the VCU testing of field crops. VCU trials are carried out according to well-described protocols. The trials consist of a pre-assessment (not for all crops) followed by a complete assessment during two or three years. CGN is responsible for the testing methodologies and the reliability of the results. VCU trials for field crops are carried out by the following institutions:

- Applied Plant Research (PPO Wageningen UR) for the testing of cereals, pulses, cash crops, maize, chicory, fodder crops and green manuring crops;
- Research Institute for Animal Husbandry (PV Wageningen UR) for the testing of white clover and grasses for pastures;
- Institute of Sugar Beet research (IRS), in cooperation with PPO for the testing of sugar beet;
- General Inspection Service for agricultural seeds and seed potatoes (NAK AGRO) for the testing of potatoes.

CGN is responsible for (a) the collection of information about value for cultivation and use (VCU) of all varieties in the Netherlands in the variety list and (b) the development of means and methods for optimal utilisation of these variety information systems. Part of this task is the production of the Dutch 'Variety List of Field Crops' annually, the 'Variety List of Trees' every five years, the 'Variety list of Fruit Crops', and contributions to the 'EU Variety List of Field Crops' as well. The 'Variety List of Field Crops' has been published since 1924. The variety lists are composed under the responsibility of 'variety list committees'. In the near future, this task will be transferred to the Plant Variety Board to be established (see footnote 7). CGN holds the secretariats of the variety lists committees and provides advice on national and international legislation and regulations (EU, OECD and UPOV).

5.3.3 Inspection Service for Horticulture (Naktuinbouw)

Naktuinbouw stands for 'Nederlandse Algemene Kwaliteitsdienst Tuinbouw', the Netherlands Inspection Service for Horticulture. The organisation is the outcome of a merger of the former inspection services for floricultural and arboricultural Crops (NAKB) and those for vegetables and flower seeds (NAKG) and thanks to that, Naktuinbouw builds

its expertise upon more than sixty years of experience. Naktuinbouw monitors and promotes the quality of products, processes and chains relating to the production of propagating material for the horticultural sector, national and international. In addition, Naktuinbouw offers a wide range of services for the floricultural, arboricultural and vegetable sectors, which aims at supporting and promoting the quality of products and processes, directly resulting from the 'public domain' (the statutory inspections) of Naktuinbouw.

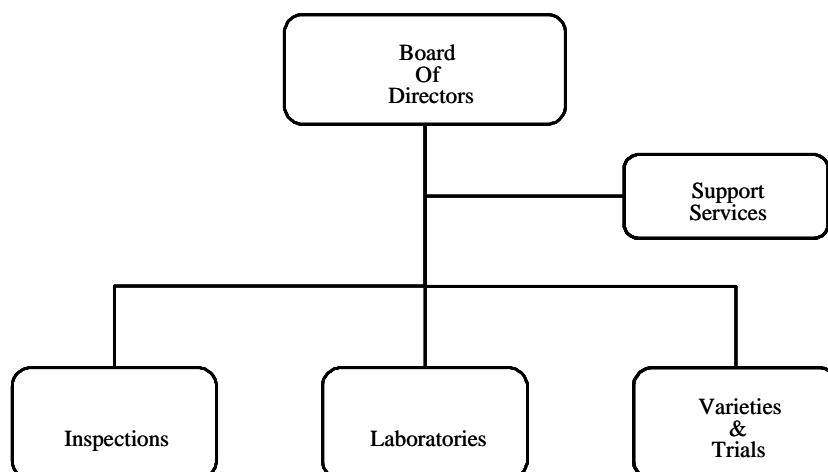


Figure 5.4 Organisational diagram of Naktuinbouw

Organisation

Naktuinbouw is a non-profit organisation. The affiliated members are producers and traders of propagating material. They themselves are responsible for the quality of their products. Naktuinbouw ensures that they are employing the required procedures and methods. The foundation has a board, which consists of representatives from the horticultural sector. Although Naktuinbouw is an independent organisation, it is under supervision of the Ministry of Agriculture, Nature and Food Quality because of its public (statutory) tasks.

Naktuinbouw has three business units:

- A. Inspections;
- B. Laboratories;
- C. Varieties & Trials.

A. Unit Inspections

The Inspections business unit constitutes the organisation's public domain and is responsible for the statutory (compulsory) inspections. As an independent organisation, Naktuinbouw carries out supervision and inspections as prescribed in European directives and Dutch legislation ('Zaaizaad en Plantgoedwet'/ Seed and Plant material act 1967). The Naktuinbouw inspectors inspect nurseries, the production process and the planting material and they issue documents required for international trade. Naktuinbouw ensures that

material not complying with the requirements will not be traded. This so-called 'standard quality control' enables producers of propagating material to guarantee standard quality (EC quality/CAC). Under supervision of the Dutch Plant Protection Service (see 4.3.6) Naktuinbouw carries out phytosanitary inspections required for issuing the so-called 'plant passport' for propagating material. In addition to the mandatory 'standard quality control', Naktuinbouw also issues certificates for propagating material meeting quality-plus-systems (Naktuinbouw Elite® and Naktuinbouw Select Plant®).

B. Unit Laboratories

Naktuinbouw Laboratories carry out tests for assessing the health status of propagating material. Seeds, plants and trees that appear perfectly normal at first sight may show quality deficiencies or carry harmful viruses, bacteria, fungi or other organisms, without visual symptoms. Naktuinbouw laboratories has the expertise and facilities required to perform such tests. The business unit can also diagnose diseased material to identify the causal agent of the disorder.

The seed analysis laboratory of Naktuinbouw is accredited by ISTA (International Seed Testing Association) as an official ISTA Seed testing laboratory and is authorised to issue ISTA certificates for seed lots of all horticultural crops.

C. Unit Varieties & Trials

Vegetable varieties must be accurately described to qualify for market approval or for protection by European or Dutch Plant Breeders' Rights legislation. Naktuinbouw's business unit 'Varieties & Trials' carries out DUS inspections on behalf of the Dutch Board for Plant Breeder's Rights and the EU Community Plant Variety Office (CPVO) with respect to vegetables, flower (seeds) and arboriculture varieties.

Next to approving varieties and variety registration, the unit manages the perennials garden of reference, carries out inspection trials, and maintains a documentation system, a reference collection of varieties in prolonged storages and a file of over 40,000 variety names. It also participates in PlantScope®, which offers a full view of ornamental plants and fruit plants, grown and/or traded in the Netherlands. PlantScope contains thousands of images of products and their applications or related topics (see website: www.plantscope.nl).

Training services

Naktuinbouw provides training services to companies in the propagating material sector with respect to skills, which are directly related to Naktuinbouw's own operations, such as:

- plant sampling;
- seed analysis;
- seed sampling;
- selecting strawberry plants;
- ornamental tree production;
- know your company.

Training is given at either the facilities of Naktuinbouw or the client. A subsidiary of Naktuinbouw, Q-Point, offers training activities related to Quality Management (including internal audits).

5.3.4 General inspection service for agricultural seeds and seed potatoes (NAK)

NAK stands for 'Nederlandse Algemene Kwaliteitsdienst', the General Inspection Service for Agricultural Seeds and Seed Potatoes. It is an independent non-profit organisation, founded in 1932. The board consists of representatives of the sector, breeders, growers, traders and users of seed potatoes and seed. Because of its public (statutory) tasks, NAK is supervised by the Ministry of Agriculture, Nature and Food Quality.

The main aim of the inspection service is to guarantee the quality of the seed material for the farmers in the Netherlands and abroad. For that reason, the Dutch seed and seed potatoes only become eligible for a NAK label after thorough inspection. The inspection requirements are among the most stringent in the world. The arable crop sector imposes these stringent requirements, higher than the minimum statutory requirements, on itself in order to strengthen its position on domestic and foreign markets. The inspection includes field and laboratory inspections. Seed potatoes are checked for viral and bacterial diseases during field inspections. All multiplication fields are inspected. Part of the crops, especially basic seed potatoes, are submitted to extra inspection on possible viral infections in the laboratory, the so-called 'post harvest control'. After that, lot inspections are carried out for diseases and external defects. If the lot is approved, certification follows. Only certified seed is allowed to be marketed.

The inspection of seed is also subdivided into field inspection and lot inspection. In the field, the inspector assesses the crop on identity, variety purity and admixtures. This is followed by an analysis of germination capacity, purity and health in the NAK laboratory. If the seed meets the requirements, it is eligible for the NAK label and can be marketed under that label.

NAK has extensive facilities at its disposal to carry out the inspection of seed and seed potatoes in an efficient and reliable way, including laboratories and a trial and control farm.

NAK AGRO

A substantial part of the inspections of NAK is carried out by its subsidiary NAK AGRO. NAK AGRO inspects crops in the field and the accompanying production monitoring system. It also inspects for product quality, processing and chain agreements. NAK AGRO follows an efficient approach; it only requires one visit of one inspector to carry out checks for the various labels/crops (potatoes, sugar beet, vegetables, grain). NAK AGRO inspects for EUREGAP, food safety and the environmental quality label. In addition, it carries out soil and crop analyses, for example, on nematodes, brown and ring rot and *Erwinia*, a bacterial disease in potatoes. The laboratory also carries out purity analyses of arable seed and VCU tests for potatoes.

NAK AGRO provides various training courses, such as the 'potato selection course', which is focussed on recognising potato diseases. In addition, there are various practical training courses for laboratory activities. Abroad, the training courses are often aimed at

implementing an effective inspection system. In order to provide optimal service, NAK and NAK AGRO collaborate with other institutes. One example is Plantconsult, a consultancy that guides and assists companies in the implementation of systems for quality management and food safety in the Netherlands and abroad as well.

5.3.5 Flowerbulbs Inspection Service (BKD)

BKD stands for 'Bloembollen Keurings Dienst', the Flowerbulb Inspection Service. The inspection service is founded in 1923. The organisation carries out private (commercial) and public (statutory) tasks.

Organisation

BKD has a board in which growers and traders are represented, such as the Product board of Horticulture and organisations such as the 'Royal General Association for Flowerbulb Cultivation' (KAVB), the Dutch Federation of Agricultural and Horticultural Organisations (LTO) and the Royal Dutch Wholesalers Association for Flowerbulbs and Nurserystock (KBGBB). Just as the other inspection services, BKD is under supervision of the Ministry of Agriculture, Nature and Foodquality.

BKD has an efficient working administrative system, qualified inspectors and a high quality laboratory, certified following STERIN- and STERLAB, assuring a high level, uniform and independent inspection services. BKD Services is the business unit of BKD that provides services to growers and traders.

Quality inspection

In addition to phytosanitary inspections on behalf of the Plant Protection Service, BKD carries out quality-inspections on some specific stocks, on the basis of the Agricultural Quality Act for Flowerbulbs (Landbouwkwaliteitsbesluit Bloembollen, 1980). This national act implies that all growers of flower bulbs are mandatory affiliated to BKD and that BKD has a say about the quality of plant material and the size of deliverable bulbs. The standards of BKD for quality inspections and the inspections methods are laid down in regulations of the Product board for Horticulture. The standards and methods are established after an extensive consultation procedure in which the growers and traders have the possibility to comment on the new standards or inspection methods. The laboratory of BKD carries out several diagnostics, such as ELISA and PCR tests on various viruses in the planting material.

BKD Services

BKD Services is not only active in the testing and reviewing of planting material, but also in advising growers and traders in the field of management and quality control and is commercially merchandising coating antibodies and conjugates against a number of plant viruses.

In addition, BKD Services offers several standard courses and tailored trainings, e.g. for 'Recognition of pests and diseases in Tulips'.

5.3.6 The Dutch Plant Protection Service

The Dutch Plant Protection Service (PD - Plantenziektenkundige Dienst in Dutch) is an executive agency of the Dutch Ministry of Agriculture, Nature and Food Quality. The main objective of the Plant Protection Service is to safeguard and promote plant health from an international perspective. Principle elements of this policy are preventing the introduction and spread of quarantine pests and diseases of plants and plant products, and assisting in managing and controlling such organisms order to be conducive to plant health. As a result of restricting and preventing the introduction of plant pests, both the use and dependence on (chemical) pesticides should be further reduced.

By means of safeguarding and promoting plant health, PD contributes to:

- a sustainable horticultural and agricultural industry of international standing;
- the prevention of unnecessary barriers of trade;
- the protection of Dutch ecosystems and biodiversity.

The Plant Protection Service is operating in a dynamic environment, an environment that is influenced by a global liberalisation of the trade in agricultural products. Dutch plant products are exported all over the world, and therefore the Netherlands have a certain responsibility in producing healthy products for a sustainable and safe global food production.

Inspections

Living plants and plant products originating from countries outside the European Union are submitted to import inspection(s) by the PD in order to prevent introduction of unwanted organisms as stipulated in national and EU regulations. In co-operation and under supervision of PD, the aforementioned inspection services carry out phytosanitary inspections, which are required for the so-called 'plant passport'. This phytosanitary certificate is required for trading propagating material in the European Union, The European Commission decides for which crops a plant passport is mandatory.

Export inspections

Consignments of living plants and plant products destined for countries outside the European Union are submitted to export inspection(s) by the PD. These inspections are carried out on the basis of worldwide accepted principles which have been laid down in the 'International Plant Protection Convention'. Moreover, the products have to meet the phytosanitary requirements of importing countries.

Management and control of pests and diseases

In order to prevent the introduction of unwanted plant pests and diseases in the Netherlands the PD invests much energy in management and control mechanisms. The Netherlands is a very important hub in the international trade in plant material. Pests and diseases are a capital threat not only for the Dutch respective sectors but to the sectors of other countries as well. As a result of guided inspections and implementation of immediate measures, introduction and establishment of harmful organisms can be prevented, consequently meeting international phytosanitary requirements and preventing export restrictions.

Integrated Pest Management

Over the last hundred years, the PD has gained extensive expertise in crop protection and its effects on plant health and environment. The PD promotes safe and effective use of pesticides and assists the Ministry of Agriculture Nature and Food Quality to design, execute and evaluate the policy of integrated pest management.

Diagnosis and identification

In support of the executive tasks, the PD performs both diagnoses and identifications. These involve bacteria, insects, fungi, nematodes, viruses and weeds. This expertise is available to institutes, extension bureaus and inspection services. Information on biological organisms, pest risk analysis, host plant range, etc. is also available. The PD uses the latest scientific techniques such as methods for DNA analyses next to classical morphology.

International aspects

Because of its technical expertise, the PD has been authorised by the Ministry of Agriculture, Nature and Food Quality to participate in international bodies such as the Standing Committee of Plant Health of the EU and panels on European and Mediterranean Plant Protection Organisation.

The PD is engaged in several projects to support countries in Central and Eastern Europe, Africa and Asia in designing and implementing plant health policies.

5.4 Representation and co-operation in Dutch agriculture

5.4.1 Farmers' associations

In order to represent their common interests in the economic and political arena, the farmers in the Netherlands searched for cooperation. Already in the 19th century, agricultural organisations were active at local and regional level. By 1850, every province had its own agricultural organisation, which organised exhibitions, livestock inspections, competitions and tests with new inventions and played a role in obtaining and allocating government subsidies for agricultural education. Although these organisations were active for the sake of the farmers, they did not really represent them. That situation changed when farmers themselves started to establish their own organisations (farmers' unions). At the beginning of the 20th century, farmers and farm workers all over the country had their own associations to represent their interests at the level of national government. These regional based unions were organised following the ideological and religious currents in the Dutch society and co-operated at national level in three central farmers' organisations. Where joint interests were at stake, the organisations worked together as much as possible, but sometimes they were diametrically opposed to one another. There was, however, a demand for an official recognised central organisation to represent the interests of the sector and act as a partner of the government. For that purpose, the organisations established the Foundation of Agriculture, which was succeeded by the Agricultural Board in 1954, which acquired a public status based on the Statutory Industrial Organisation Act (see the following section). The Agricultural Board (Landbouwschap) acted as a permanent

consultative body for the Ministry of Agriculture on all issues of interest for the sector, both at national and international level. Agri-business, politics and the civil service apparatus worked closely together and this so-called 'Green Front' played an important role in the modernisation of agriculture and horticulture in the Netherlands and in the introduction and implementation of the Common Agricultural Policy of the European Union.

This relatively closed system was broken open in a fairly short time in the 1990s, as a result of internal conflicts, changes in the Common Agricultural Policies and the rise of new actors in the field of politics, administration and pressure groups. The Agricultural Board was abolished in 1995. The Dutch Federation of Agricultural and Horticultural Organisations (LTO Nederland) took over a larger part of the autonomous functions of the Agricultural Board while the public tasks were transferred to the different commodity boards. LTO looks after the interest of the farmers and growers in national and international policies and represents them in negotiations with the authorities. LTO has representatives in all important boards and committees in and around market policy, education, information, advice and research in order to promote the interests of Dutch farmers and growers in the decision-making circles. Currently, about 60% of all farmers and growers are members of an organisation that is affiliated to LTO.¹

Besides the representation of social and political interests, various technical organisations were formed within the agricultural sector for the exchange of specific information. Many of them were established by the general agricultural organisations and are affiliated with LTO. Led by the farmers concerned, these technical organisations often contribute to the implementation of educational, research and extension programmes. The readiness of groups of entrepreneurs to work together to improve production, save costs and increase production has also led to the establishment of so-called study clubs, in which farmers with the same interest convene regularly to discuss their problems. These groups get support from LTO.

5.4.2 Statutory Industry Organisations

In order to foster the economic development the Dutch government created the means for the industry and trade to establish bodies with legislative powers under government supervision. After World War II, there was a political consensus that the social-economic interest would be best promoted by the establishment of public authorities in which all major stakeholders in the different sectors were represented. There are two kinds of statutory industry organisation: sectoral boards and commodity boards. Sectoral boards are formed at a specific link in an industrial chain. They are organised horizontally and cover all of the companies that are active in that particular link. The commodity boards, on the other hand, are vertically organised, which means that they include all the enterprises involved in producing, processing and marketing of the commodities concerned. Practising a certain profession or pursuing a certain trade in a sector where a commodity board exists makes one subject to the rules of that particular board by law. The members of a commodity board are nominated by the organisations of both employers and employees. In

¹ While writing this report, the organisational structure of LTO is again in motion due to conflicting interests of different sub-sectors in the agricultural industry.

principle, they have an equal number of seats in the board. The meetings of the board are attended by the representatives of the government (the ministries), who have a voice but not a vote. Except for the payment for special assignments, the Government does not finance the commodity boards. Their activities are financed with levies and surtaxes paid by the stakeholders in the sector. The authority of the commodity boards is defined in decrees. In general, their mission is to promote the economic interests of the sector concerned.

The supreme body of the system is the Social and Economic Council (SER). The SER supervises the horizontal and vertical industrial organisations, as well as advising the government on socio-economic issues. The Dutch statutory system is a unique in the world, combining private business interests with public power.

The statutory system was particularly successful in the agricultural sector. In 1954, the Agricultural Board (Landbouwschap) was established, representing the entire agricultural industry. In addition, several agricultural commodity boards were established. All stakeholders in a sector, primary producers, processing industry, traders, exporters and retailers, fall within the sphere of operations of the commodity boards. The boards aim at promoting co-operation in the supply chain and they are engaged in active marketing. To improve the food quality and to contribute to the solution of environmental problems, great importance is attached to the development of integrated chain management. Besides independent (autonomous) activities, the commodity boards carry out administrative tasks at the request and expense of the Dutch government. This includes the implementation of the Common Agricultural Policy, such as the granting of restitutions and the collection of levies.

The co-ordinating role of the commodity boards in marketing is diminishing because the processing and marketing industry is not as fragmented anymore as it was some decades ago and the stakeholders in the production chains are improving chain management. That is one of the reasons for the commodity boards to merge. Currently, the most important commodity boards are those for Livestock, Meat and Eggs, for Dairy Products, for Arable products, for Horticulture and for Fish and Fish products.

5.4.3 Co-operative enterprises

At the end of the nineteenth century, farmers started to establish co-operatives, in order to improve the supply of goods and services to their farms and the processing and marketing of their produce. The private enterprises did not meet their demand in a proper way. The first purchasing co-operative was founded in 1877, the first dairy co-operative in 1886, the first co-operative auction in 1887 and the first co-operative credit bank in 1896. This approach appeared to be successful and in the middle of this century, the Netherlands was covered with a network of co-operatives. Local and regional dignitaries, including the clergy, have often played an important role in the establishment of co-operatives.

The Dutch co-operatives are almost exclusively of the 'single' type, meaning that they are engaged in the processing and marketing of only one product. They were established by those farmers who had a direct interest in these products. This implies that almost all the farmers and growers in the Netherlands are affiliated to at least three of four co-operatives. The following types of co-operatives can be distinguished:

- a. *Credit co-operatives*
For the required modernisation of the holdings the farmers needed more credit than the private banks were willing to provide or only at an exceptional high interest. For that reason, they started co-operative farmers' savings and credit banks.
- b. *Purchasing co-operatives*
The first purchasing co-operatives have been established for the purchase of fertilisers and feed grains. Nowadays they provide a broad range of products, covering almost all the supplies the farmers need.
- c. *Processing and marketing co-operatives*
In almost all the sectors, the farmers established co-operatives for processing and marketing, like the co-operative dairies, the co-operative beet-sugar industry, the co-operatives for the production of potato starch, co-operative slaughterhouses, co-operatives for egg marketing and co-operatives for wool processing and marketing.
- d. *Co-operative auction markets*
In order to get the market functioning more efficiently and more transparently Dutch market gardeners started to organise special market places where they introduced the so-called Dutch auction clock. At the end of the last century almost all the Dutch production of fruit vegetables and flowers was marketed via co-operative auctions, but since then the role of trade companies is increasing.
- e. *Co-operative service providers*
These are co-operative to provide the entrepreneurs in the sector with the services they need for a proper functioning of their business. Examples are co-operative machine stations, mutual farm help organisations, mutual insurance companies, and co-operative accountancy offices.

Already at an early stage, the co-operatives within the same sector started to form partnerships in order to increase their efficiency and to strengthen their competitive power. Central co-operatives were established in order to perform certain economic functions on behalf of local or regional farmers' co-operatives. At a latter stage a process of amalgamations and mergers of local and regional co-operatives started. While at the start a co-operative was not more or less than one factory or one bank, currently most co-operatives own several processing plants or branches. This is an ongoing process, though coming to an end, because in some sectors only one or two large nation-wide working co-operative are left. The major reason behind these mergers is the fierce competition on both the domestic and international markets. The Dutch co-operatives have to compete with strong national and multinational companies, which makes it necessary for them to improve continuously their performance through modernisation and enlargement of their businesses. Due to their adequate response to the developments in the market, the farmers' co-operatives have a large share in most of the important sectors of Dutch agriculture. In the dairy sector, the co-operatives control the whole market. Until the end of the last centuries, this was also the case in the horticultural sector but private trading companies are increasing their market share. The local co-operative farmers' banks, all member of the central co-operative bank 'Rabobank Netherlands', provide more than three-quarters of all loans to Dutch agriculture.

In the seed sector, large private specialised seed breeding and trading companies prevail, particularly for vegetable seeds. Seed potatoes and flower bulbs, however are grown mainly by individual farmers. For marketing purposes, the potato growers set up Agrico, a co-operative in the field of potato breeding, collecting, processing and trading (see box 1 and figure 5.5).

Trading in the flower bulb sector is mainly done by private trading companies. Many of them are member of the Royal Dutch Wholesalers Association for Flowerbulbs and Nurserystock (KBGBB), a merger of two associations, which were established in the beginning of the last century. KBGBB is representing the interests of the flowerbulb sector in many organisation, such as the Product Board for Horticulture. Flower bulb growers and traders jointly established the International Flower Bulb Centre with the task of promoting the use of flower bulbs worldwide (see box 2).

The Agrico group is a co-operative company of potato growers, which operates in the field of growing, breeding, collection, processing and marketing potatoes. Around 1,300 specialised potato growers are member of this co-operative. About 1 million tonnes of seed and consumption potatoes is marketed by Agrico. For that purpose, Agrico has modern cooling stores and sorting stations in the major production regions and trading offices in all major importing countries. For breeding purposes, Agrico has its own breeding and research station and many experimental fields in the Netherlands and abroad. The organisational structure of Agrico is presented in figure 5.3 and is similar to that of most co-operatives in the Netherlands.

Box 1 Agrico, a co-operative enterprise of potato growers

The International Flower Bulb Centre (IFBC) provides Dutch flower bulb growers and traders with international promotion for their flower bulbs and bulb flowers. These collective promotional activities were initiated when growers and traders, working co-operatively, founded the Central Flower Bulb Committee in 1925. Since 1986, this group's activities have been carried out by the IFBC. The Dutch growers are involved mainly in the bulb growing and bulb flower production businesses, while traders are involved in flower bulb wholesaling and export businesses. The IFBC concentrates its activities in Europe, North America and Asia.

Box 2 IFBC, the International Flower Bulb Centre

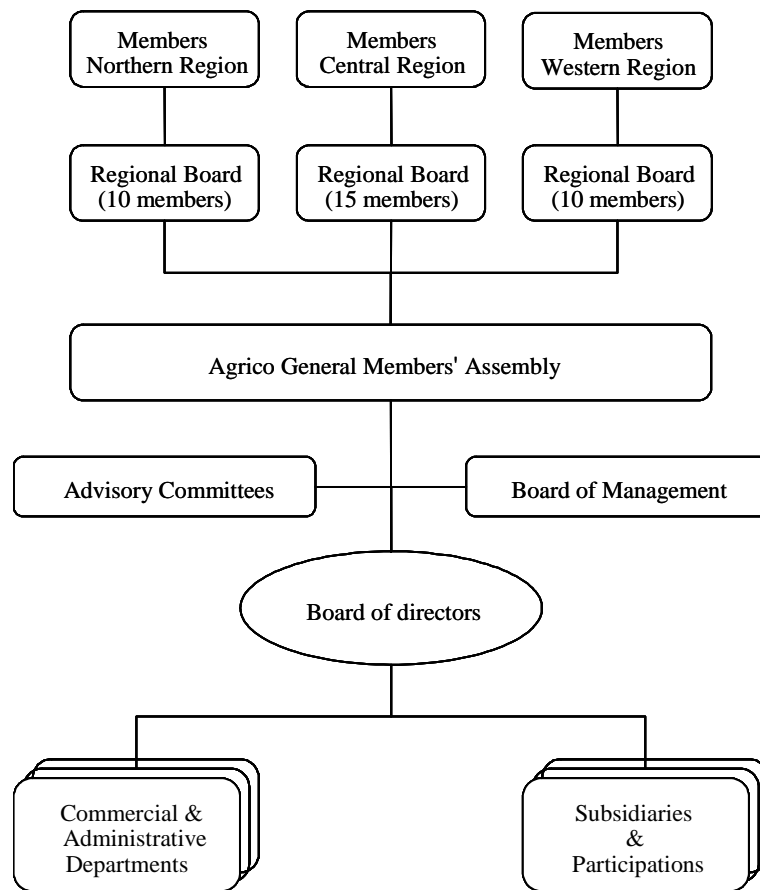


Figure 5.5 Organisational diagram of Agrico

6. The Agricultural Knowledge System

The prosperous development of the agricultural sector in the Netherlands is partly due to the agricultural knowledge system, in which education, research, extension work together closely with the farmers' unions. In numerous bodies, representatives of these institutions met each other, exchanged information and opinions. In this way, problems observed by the extension services at the farms were submitted to the research institutions for investigation, vice versa, research results could easily be introduced in practice via education and extension. In the following sections some features of the system will be described.

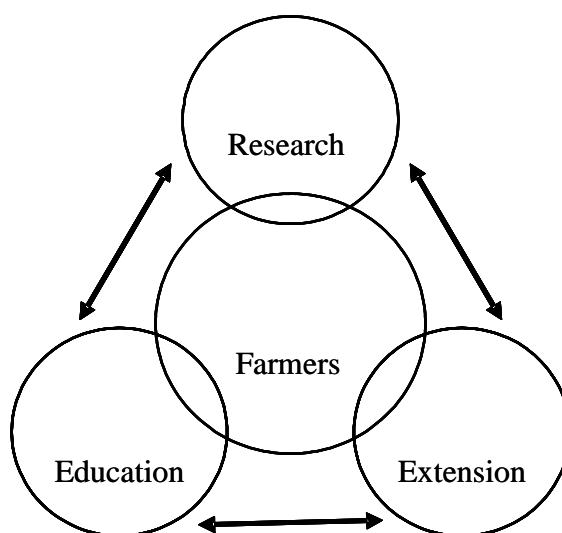


Figure 6.1 The agricultural knowledge system

6.1 The Agricultural Education System

The educational system in the Netherlands consists of public and private schools. The private schools make up more than 75% of the total. Most of them are denominational, representing a wide variety of religions and philosophical approaches. Private schools are subsidised according to the same rules as the public system on condition that they conform to certain standards determined by law. Almost the entire educational system is the responsibility of the Ministry of Education except for the agricultural education, which is part of the Ministry of Agriculture. This exceptional situation is due to the historically close relations between the agricultural educational system and the agricultural community in the country. In the agricultural educational system, four levels can be distinguished:

- *Lower agricultural education*
In the Netherlands, education is compulsory for children between 5 and 16 years old. After having attended the primary school for about 8 years, the children can choose among several types of secondary education. Agricultural education for children of age 12-16 is provided by the twelve Agricultural Education Centres (AOC), which have schools all around the country. The centres provide both lower and intermediate agricultural education. The first phase focuses on orientation at the professional practice and some basic knowledge and skills in the green domain, but for most pupils this is not the end of their study. Rather it is a preparation for further professional education and training;
- *Intermediate/Professional education*
Intermediate agricultural education takes two to four years, (age 16-20) depending on the level of certificate. In general, the educational programs at the Agricultural Education Centres are geared to the type of agriculture in the local area. However, the intermediate agricultural education is not only meant for preparing students for the profession of farmer or grower, but for a variety of jobs in sectors connected with agriculture and the rural area. Students are free in choosing the specialisation they want. Most young farmers in the Netherlands have at least a professional education;
- *Higher education*
Some of the farmers (high-tech, large scale, export oriented) have followed even higher agricultural education but the programmes of the six colleges of higher agricultural education in the Netherlands are largely focussed on training for executive functions in agriculture and food industry, research institutions and public and private organisations involved in the agricultural sector. For instance, most agricultural consultants (also agricultural banking, farm supplying companies, trade companies, processing industry etc.) in the Netherlands have studied at one of the higher agricultural colleges. The curriculum, which takes four years (age 18-22), covers all aspects of importance for the development of the agricultural sector and the rural area. The students can choose out of several subjects, which makes it possible for them to concentrate their study on those subjects needed for their future functions in the society. Most of the students take a job, after having finished the higher agricultural education, but there are also a number of possibilities for further education, such as the one-year agricultural teachers' training course, and higher management and economic training courses. They can also start a study program at the Wageningen Agricultural University and the Faculty of Veterinary Medicine of Utrecht University;
- *University education*
The Netherlands has 12 universities. One of them is the Wageningen University with about 4,700 students. During the agricultural crisis in the late decades of the 19th century, the Dutch government founded the State Agricultural School in Wageningen in 1876, which grew to become the Wageningen Agricultural University. The university has always focused on its own unique domain: the agricultural sciences. Through the years, this field has become significantly deeper and broader and as a result, the university now includes plant and animal sciences, food and technology science, environmental sciences and social science. Recently, the Netherlands

introduced the Bachelor-Masters system. As the other institutions for agricultural education, the students have the possibilities to combine education and training in different subjects, allowing them to adapt their study to their capacities, interests and expected future functions in the society. Veterinary sciences can be studied at the Utrecht University.

Special courses and training facilities

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 students at the higher agricultural colleges and the university receive, as part of their course instruction at one of the practical training centres. The students are taught to deal with the real situation in the sector, with modern machines and business systems. These centres do not only provide support to the main-stream education institutions, but they offer also a broad range of special training courses for farmers and others involved in the agriculture and food sector. They give special courses in a number of subjects and they enable teachers, consultants, farmers, industry businessmen and researchers to meet and exchange information. This type of additional training and refresher courses are also given by agricultural experimental stations and extension organisations. They play an important role in the 'long-life education', which is necessary for everyone who wants to keep up with the dynamic developments in the agricultural sector.

6.2 The Agricultural Research System

Wageningen University and Research Centre

Since the year 2000, a major part of the agricultural research activities in the Netherlands is concentrated in Wageningen University and Research Centre; an alliance between Wageningen University, the agricultural research institutes of the Dutch Agricultural Research Department (DLO), and the applied research centres in the Netherlands. Recently one of the largest agricultural colleges joined this group. Wageningen UR is divided into five expertise groups: (1) Plant Sciences, (2) Animal Sciences, (3) Food and Technology Sciences, (4) Environmental Sciences and (5) Social Sciences, in which the different departments and institutions co-operate under one management board. In addition Wageningen-UR has a unit with institutes that have statutory tasks (e.g. with respect to veterinary control), a unit that provides (post-academic) courses and trainings and the agricultural college. Research in the field of veterinary sciences is carried out at the Utrecht University.

The DLO research institutes are largely engaged in applied and strategic research, while Wageningen University undertakes primarily fundamental research. The research that is closest to the day-to-day practice of the farmers and growers is the practical research at the experimental stations and the regional research centres. They concentrate on synthesising the available knowledge within and around agricultural research and

translating it for use at farm level and their research programming is achieved in close consultation with the major stakeholders in the respective branch of the industry.

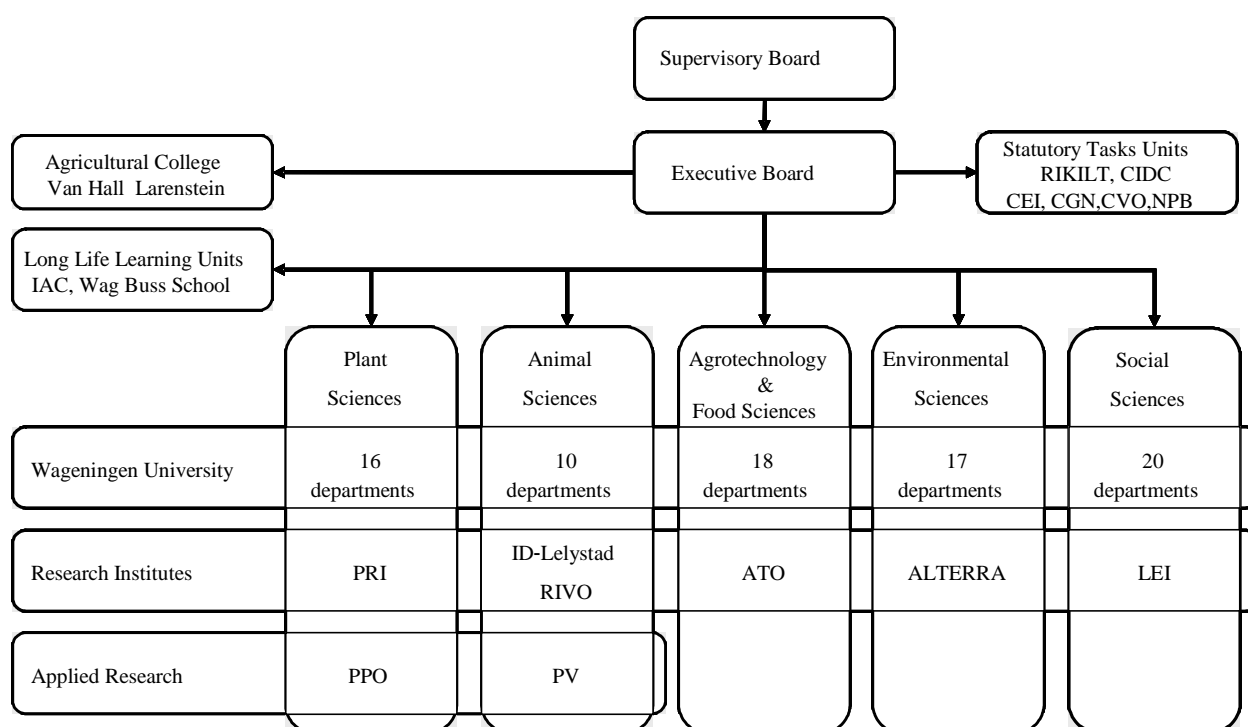


Figure 6.2 Organisational diagram of Wageningen University and Research Centre

The research activities of Wageningen UR are based on contracts. A major part of the research is still commissioned by the Ministry, amounting to about two-thirds of the total budget of Wageningen University and Research Centre. The rest is funded by other clients as the agro-food industry and multi-national institutions like the European Union and the World Bank. The applied research centres are mainly financed by the respective sectors.

Total staff at Wageningen UR was about 6,500 at the end of 2004, of which 3,000 are with the research institutes. The number of staff, however, will decrease significantly in the coming years because of government budget cuts. Further reorganisations and streamlining of the organisation are expected.

Other research centres

In addition to the institutions mentioned above, many private and co-operative companies carry out applied and strategic research in their own field of interest, often in close co-operation with Wageningen University and Research Centre. Some of them are co-financed by different organisations like the Netherlands Institute for Dairy Research

(NIZO), the Sugar Beet Research Institute (IRS), the Netherlands Fertiliser Institute (NMI) and the research institute of the feeding stuffs industry. Also the Institutes for Applied Scientific Research (TNO) and the National Institute of Public Health and Environmental Hygiene (RIVM) undertake research in field of agricultural and rural development. A major part of the research with respect to the seed sector is carried out by the seed companies, in particular in the vegetables sector. Plant Research International, one of the research institutes of Wageningen UR is also involved in seed research activities, in particular the Centre of Genetic Resources Netherlands. Research with respect to flowerbulbs and vegetables is also carried out by the Experimental Garden Zwaagdijk, a former governmental institution that was privatised in 1986 when the government cut the budget for applied field research.

6.3 The agricultural extension system

At the beginning of the 20th century, farming in the Netherlands was rather traditional, without many changes in technology or management. Farmers learned how to farm from their parents and neighbours, following the usual farming systems in the region. The agricultural crises and the dynamic developments since then, in particular after World War II, forced them to look out for new opportunities. In order to support them in this respect the Dutch government established the Agricultural Advisory Service (DLV). Beginning with a few itinerant consultants, the service developed in due time into a large organisation with branch offices all over the country and experts in all fields.

The experts of DLV used to visit farms, organise group meetings, guide farmers' and growers' study clubs, give courses and write articles for farmers' magazines, draft special brochures, etc. The experts did not only provide technical advice on the daily running of the farm but also economic advice on long-term business developments. In order to attune its activities to the needs of the sector, DLV was supported by an extensive network of committees at national and international level, in which the most important stakeholders were represented.

Until the 1980s, the Agricultural Advisory Service was a governmental organisation, fully financed by the government, but today, DLV is a private expert organisation, whose services must be paid by the farmers themselves. Aside from DLV, farmers in the Netherlands can call on a wide range of consultants and experts, employed by the farmers' organisations, the supply, processing and marketing co-operatives, accountancy offices, breeding associations, the animal health service, and private enterprises covering all relevant aspects of farming. In addition to personal advice from these organisations, the farmers can also make use of a number of other sources of information, such as magazines for every branch of the sector, radio, television, and the Internet. As a result of the decreasing number of farmers in the Netherlands, the education level of the farmers and competition with other information sources, the staff of DLV was reduced significantly over the last 15 years. More information on DLV can be found on the website www.dlv.nl.

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Brochures and websites of referred institutions (see Appendix 2 for the websites).

Appendix 1. Table of Abbreviations

APSA	Asian and Pacific Seed Association
AFSTA	African Seed Trade Association
BBH	Flower Board of Holland
BKD	Dutch Inspection Service for Flower bulbs
BSPB	British Society of Plant Breeders
CBD	Convention on Biological Diversity
CIOPORA	International Community of Breeders of Asexually Reproduced Ornamental and Fruit-Tree Varieties
DPA	Dutch Produce Association
DUS	Distinctness, Uniformity and Stability
ECP/GR	European Cooperative Programme for Crop Genetic Resources Networks
ESA	European Seed Association
EU	European Union
EZ	Dutch Ministry of Economic Affairs
FAO	Food and Agricultural Organisation
Frugi Venta	Fruittrade Association Netherlands
GATT	General Agreement on Tariffs and Trade
GMO	Genetically Modified Organisms
GZP	Dutch Commodity Board for Grains, Seeds and Pulses
HBAG	Dutch Agricultural Wholesale Board / Flowers and Plants
IPR	Intellectual Property Rights
ISF	International Seed Federation
IT - PGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
KBGBB	Royal Dutch Wholesalers Association for Flowerbulbs and Nurserystock
LEI	Agricultural Economics Research Institute, Wageningen UR
LNV	Dutch Ministry of Agriculture, Nature and Food Quality
LTO	Dutch Federation of Agricultural and Horticultural Organisations
NAK,	Netherlands General Inspection Service for Agricultural Seeds and Seed potatoes
Naktuinbouw	Netherlands Inspection Service for Horticulture
NIABA	Netherlands Biotechnology Association
OECD	Organisation for Economic Co-operation and Development
PBR	Plant Breeders' Rights
PD	Plant Protection Service of the Netherlands
PPO	Wageningen UR, Applied Plant Research
PT	Dutch Commodity Board of Horticulture

PVP	Plant Variety Protection
R & D	Research and Development
TRIPs	Trade Related Aspects of Intellectual Property Rights
UPOV	International Union for the Protection of New Varieties of Plants
VCU	Value for Cultivation and Use
VIGEF	Association of Dutch Vegetables and Fruit Processing Industries
WTO	World Trade Organisation
WUR	Wageningen University and Research Centre

Appendix 2. Websites related to the seed sector

a. Plant Variety Protection and quality control in the Netherlands

- Board for Plant Breeders' Rights: www.kwekersrecht.nl
- CGN Plant Variety Research: www.cgn.wur.nl/rassenonderzoek
- Inspection Service for Horticulture (Naktuinbouw): www.naktuinbouw.nl
- General Inspection Service for Agricultural Seeds and Seed Potatoes (NAK): www.nak.nl
- Flowerbulbs Inspection Service (BKD): www.bloembollenkeuringsdienst.nl
- Plant Variety Release Committee: www.rassenlijstlandbouw.nl

b. International seedsector

- International Union for the Protection of New Varieties of Plants, Geneva, Switzerland (UPOV): www.upov.int
- European Community Plant Variety Office, Angers, France (CPVO): www.cpvo.eu.int
- Germany: Bundessortenamt: www.bundessortenamt.de
- France: Groupe d'Etude et de Contrôle des Variétés et des Semences: www.geves.fr
- United Kingdom: National Institute of Agricultural Botany: www.niab.com
- United Kingdom: UK Plant Variety Rights Office & Seeds, Division of DEFRA: www.defra.gov.uk/planth/pvs

c. Plant Genetic Resources

- CGN Plant Genetic Resources: www.genebank.nl
- CBD Convention on Biological Diversity (Rio de Janeiro, 1992): www.biodiv.org
- FAO: www.fao.org/ag/cgrfa/itpgr.htm
- IPGRI: www.ipgri.cgiar.org

d. Associations of breeders

- Dutch Association of Breeding and Propagation Companies: www.plantum.nl
- European Seed Association (ESA): www.euroseeds.org/
- International Seed Federation (ISF): www.worldseed.org
- CIOPORA International Community of Breeders of Asexually Reproduced Ornamental and Fruit Tree Varieties: www.ciopora.org