Fresh tomato production in North-Western Europe

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Résumé. Circuits de commercialisation de tomates fraîches dans l'Europe du Nord-Ouest. *L'Europe du Nord-Ouest a développé une culture horticole sous serre dont les superficies atteignent 17 000 ha et dont le chiffre d'affaires est de l'ordre de 2 milliards ECU. La tomate tient une place fondamentale dans cet « agribusiness complex », notamment aux Pays-Bas (produit standard) et en Belgique (produits haut de gamme). Jusqu'à présent, la production sous serre a pu renforcer sa position en Europe, au détriment des productions de plein air méridionales, grâce à des progrès dans les techniques de production, de commercialisation et d'organisation.*

Abstract. In northwestern Europe, horticultural crops have developed into a glasshouse industry which currently covers an area of 17 000 ha and has a turnover of 2 billion ECU. Tomato holds an important position in this agribusiness complex, mainly in The Netherlands (mass products) and Belgium (top-quality products). Until now, glasshouse crops have been able to strengthen their position in Europe in relation to open-air crops in southern Europe because of progress in production, marketing, and organization techniques.

Key words. Tomato – Marketing – Auctions – Greenhouse (glasshouse) – The Netherlands – Belgium.

I. – Economy of glasshouse crops in The Netherlands

The importance of the agricultural sector to the national economy is relatively low in northwestern Europe. In The Netherlands the share of agriculture in GDP does not exceed 4%. Nevertheless the agricultural sector contributes to the diversity of economic activities in the various countries. To The Netherlands the economic importance of the sector lies mainly in its stable and appreciable contribution to the balance of trade. Agricultural exports account for 20% of total exports despite the low share of agriculture in GDP.

The glasshouse industry plays a prominent part in agricultural activities. The total area of glasshouses in northwestern Europe amounts to 17 000 ha *(Table 1)*. The Netherlands is a leading producer in this sector.

Table 1. Area of glasshouse and tomato crops in northwestern Europe

Country	Glasshouse crops (ha)	Tomato (ha)	% of tomato in glasshouse crops
Netherlands	8 554	1 990	23
FRG	3 000	180	6
UK	2 360	620	26
Belgium	1 800	1 000	56
Denmark	520	100	19
Sweden	300	70	23
Norway	225	–	–

Tomato is the most important glasshouse crop in Belgium. About one-quarter of the total glasshouse area in the UK and The Netherlands is occupied by tomato crops.

The Netherlands and Belgium are net tomato exporters. In The Netherlands 90% of the production is exported. The entire tomato output of the UK and the Scandinavian countries is used for domestic consumption.

The value of glasshouse output in The Netherlands is 0.8% of the total value of GDP. Total employment in this sector is estimated at 42 000 year units *(Table 2)*.

The turnover at auction prices from tomato output in The Netherlands is about FL1 billion (US$550 million). Net value added (sector income) represents 45% of total turnover or approximately US$250 million.

Table 2. Significance of tomato in the Dutch glasshouse sector (in million guilders) in 1987 (figures in parentheses indicate percentages of the glasshouse industry)

	Glasshouse industry		Vegetables		Tomato	
Value of output	6 475	(100)	2 355	(36)	980	(15)
Net value added	2 575	(100)	1 030	(40)	440	(17)
Turnover at auction prices	5 530	(100)	1 950	(35)	979	(16)
Value of exports[a]	6 240	(100)	2 300	(36)	1 220	(20)
Total number of workers:	41 800					
Family labor	18 500					
Hired labor	23 300					
Area (ha)	8 554	(100)	4 451	(52)	1 990	(23)
Number of holdings	12 400	(100)	6 492	(52)	2 000	(16)

a. Including re-exports.

Horticulture in The Netherlands is export-oriented with close links to other economic sectors. The agribusiness complex is made up of vertically integrated and interdependent economic activities related to agriculture (supply and services, processing, trade and distribution). Demand for horticultural products generates income for all those involved in the agribusiness complex.

The share of primary production in the total glasshouse vegetable complex is 60%; this excludes distribution and production of capital goods. The value added for the complex is 1.7 times that of the primary sector. The total value added of the tomato industry amounts to approximately FL770 million, (US$425 million), of which approximately 75% is generated through exports.

In the Netherlands, glasshouse crops represent a dynamic sector that is not subject to specific regulations and does not receive any special subsidies. The main objective of the national agricultural policy is to support research and development, advisory organizations, and educational institutions. Originally these were entirely funded by the government. The intention is to decrease the share of public funding. Direct financial contribution by the growers has increased during the 1980s and will continue to do so in the next decade.

II. – International trade

The Netherlands has been strengthening its position as a leader in the horticulture sector right from the turn of the century. It has now become the hub of international trade.

The rise of multiple stores radically altered the market structure. Concentration of buyers led to an increase in the scale of purchasing. As the auction price is the result of competition between buyers, a decrease in the number of buyers owing to concentration could lead to distortion of the price formation mechanism. The answer was a further concentration of supply through a merging of auction markets. The aim was to focus all sales of a commodity at a single location (the "clock") in The Netherlands and to

separate price formation from the physical presence of the product by means of telecommunication. The willingness of Dutch growers to cooperate in the organization of auction markets enabled exporters to meet the needs of mass distribution, through timely and regular delivery of standardized, uniform products and efficient management of complaints.

The exporting countries of northwestern Europe—Belgium and The Netherlands—were able to strenghten their respective positions in the European Community (EC) in the 1980s *(Table 3)*. Belgian exports rose remarkably. The Dutch share in imports stabilized in the second half of the 1980s. The Dutch tomato industry focused on a standardized mass product of good quality, whereas Belgium specialized in top-quality beef tomato.

Table 3. Share of individual countries in tomato imports in the EC

Exporting country	1980 (%)	1984 (%)	1988 (%)
Netherlands	41.9	44.8	44.5
Belgium	4.3	6.1	9.6
Spain	19.7	18.0	16.8
Canary Islands	15.9	16.8	15.3
Morocco	11.4	8.3	7.2
France	1.1	0.6	2.2
Italy	1.5	1.4	1.9
Eastern Europe	2.4	1.8	0.6
Other countries	1.5	2.2	2.2
Total	100.0	100.0	100.0
Tons (in thousands)	785	953	1 128

Dutch exports to non-EC countries amount to only 9% of its exports to EC countries. However, exports to EC and non-EC countries are growing at the same rate.

The main competitors of the Dutch tomato industry are glasshouse tomato producers in the other countries of northwestern Europe as they have the same growing seasons, type of produce, and markets.

Supply patterns changed slightly during the last decade as production in spring increased at a higher rate than in summer and autumn *(Table 4)*. The significance of early production becomes more obvious when the seasonal pattern of the turnover is considered. One-third of the turnover is realized in March and April *(Table 5)*.

Table 4. Seasonal pattern (%) of the auction supply of tomatoes in The Netherlands

Year	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Annual total
1980	1	7	20	21	16	15	10	8	2	100
1984	–	8	18	20	16	18	10	7	–	100
1988	3	9	21	18	16	14	9	8	–	100
1989	4	9	19	18	16	14	8	8	2	100

Table 5. Changes in the pattern of seasonal turnover (%) by the Dutch tomato sector

Year	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Annual total
1980	3	15	29	14	13	12	7	6	2	100
1984	3	16	25	15	17	12	5	5	1	100
1988	9	21	24	15	10	7	6	6	2	100
1989	11	20	27	12	9	6	7	7	2	100

Export markets for Dutch tomato were diversified during the 1980s. Although the Federal Republic of Germany (FRG) remains the biggest market, its share decreased, whereas those of the UK and France increased *(Table 6)*. There were no changes in the relative significance of the other markets (Western and Central Europe). Italy and Spain appear for the first time as export destinations in 1988 and 1989, each with 1–2%. These countries mainly import in summer. These changes are linked to higher concentration of multiple stores and increasing buying power of consumers.

Table 6. Destination of Dutch tomato exports (in % of total exports)

Destination	1980	1984	1988	1989
FRG	65	53	48	45
UK	17	22	23	24
France	7	14	15	15
Sweden	6	4	4	4
Switzerland	2	2	2	2
Italy	–	–	2	2
Austria	1	1	1	2
Ireland	1	1	1	1
Denmark	1	1	1	1
Spain	–	–	–	1
Others	1	2	3	3
Total	100	100	100	100
Tons (in thousands)	334	412	484	504
Annual growth (%)	5.1	4.2	4.1	–

Growers in northwestern Europe face competition from the Mediterranean countries in spring and autumn. Until now, glasshouse produce could maintain or even strengthen its position during these overlapping periods *(Table 7)*.

Table 7. Share (%) of Dutch tomato in total tomato consumption

Period	FRG	UK	France
March			
1985	28	3	4
1986	16	2	2
1987	35	6	4
1988	32	11	4
1989	33	13	6
April			
1985	74	21	17
1986	67	22	13
1987	73	28	22
1988	77	34	16
1989	68	42	12
October			
1985	41	28	9
1986	48	30	10
1987	38	20	12
1988	44	36	9
1989	–	29	13
November			
1985	13	6	4
1986	16	6	10
1987	10	2	2
1988	14	5	3
1989	–	8	–

III. – Development of consumption

Tomato consumption in Western Europe is rather stable *(Table 8)*, with an annual growth rate of less than 1.5%.

The demand for Dutch tomato is most sensitive to changes in the price of the Dutch product. A decrease in price by 1% causes an increase in demand by 0.4% (with a variation of 0.24 for FRG and 0.90 for France). Dutch tomato is firmly placed in relation to competition; a change in the price of competitive products has little effect on its demand.

Income elasticity of the demand for Dutch tomato is positive, with 0.3 for FRG and 1.5 for the UK.

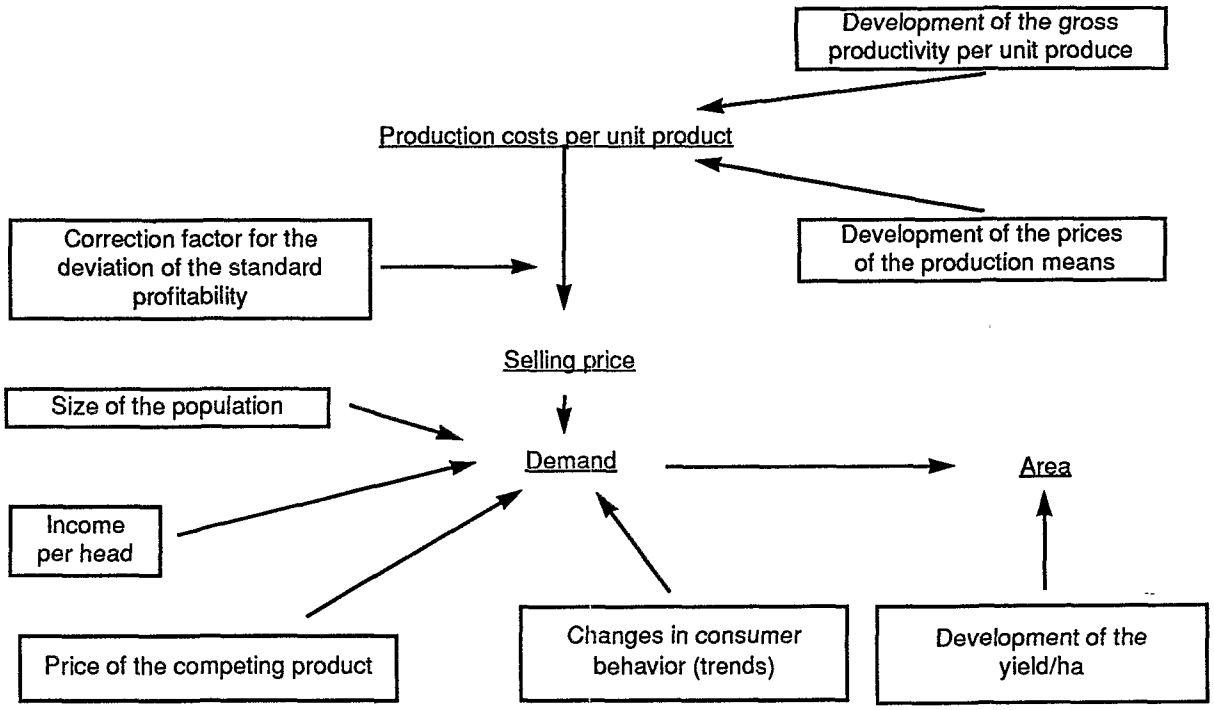
Table 8. Tomato consumption (in million kg) in selected EC countries

Year	Belgium	FRG	France	UK	Netherlands	Total
1981	–	330	474	297	49	–
1985	96	354	567	314	45	1 377
1986	95	362	540	308	44	1 404
1987	88	377	556	317	46	1 444
1988	103	376	582	329	46	1 436
1989	–	–	597	335	45	–

Until now glasshouse tomatoes have maintained their share of the global tomato market. There are signals, however, that German consumers are objecting to the artificial methods used for growing glasshouse crops. Those applied to tomato, in particular, could affect its taste. Efforts are under way to develop less polluting production methods.

The Agricultural Economics Research Institute has developed an econometric forecasting model for the glasshouse industry *(Figure 1)*.

Figure 1. Forecasting model for the vegetable sector



Distribution of annual increase or decrease (in %)

– gross productivity per unit product	+ 2.00
– real prices of production means	+ 0.25
– real costs of production per unit	– 1.75
– correction factor for profitability sector	– 0.25
– real selling price per unit	– 2.00
– yield/m²	+ 0.25
– price of competing products	– 1.50
– size of the population	– 0.2 + 0.3
– income per head	1.50 – 2.00

The forecasting model is based on the assumption that the completion of the common market will not affect Dutch tomato production seriously as its main export markets are located within the European Community. The general indicators in the model are the development of population size and increase in consumers' income in the relevant countries. The economic and technical premises are: unit production cost in The Netherlands and its main competitors, and unit yields (kg/m²).

The most likely variant of the forecasting model indicates that for 2005 the area of glasshouse vegetables will expand by only 5%, whereas total glasshouse output will increase substantially by more than 50%.

IV. – Product quality

Consumers are paying increasing attention to the quality, health, and environmental aspects of food products. They also seek a wider range to vary their daily diet.

The Dutch vegetable sector is continuously looking for new products. Round, beef, and red and yellow cherry tomatoes were developed to diversify supply. Production of round tomato is constant (420 million kg). Production of beef tomato increased from 85 million kg in 1985 to 150 million kg in 1989. Supply of cherry tomato is still limited (4 million kg).

Quality trials are undertaken to measure the shelf life of the product. The guarantee period is currently defined and applied for grades "1" and "Super."

V. – Production techniques and economic results

New production techniques have introduced radical changes in tomato cultivation. Most growers substituted rock wool for soil as a medium for growing crops and succeeded in increasing unit yields by 15%. The introduction of substrate as the growing medium leads to further specialization in a single crop throughout the year and increased heating of the glasshouses, which in turn raise the yield per square meter even higher.

In 1989, 90% of the tomatoes planted before 1 February (1340 ha) and 30% of those planted later (240 ha) were grown on substrate. The effect of the switch on productivity has now been almost stabilized and output has increased considerably *(Table 9)*.

Table 9. Area and production of glasshouse tomato in northwestern Europe

Country	1985	1986	1987	1988	1989
Area (ha)					
Netherlands	2 039	1 906	1 822	1 715	1 687
UK	698	608	623	636	648
FRG	188	193	182	172	–
Belgium	1 100	1 176	1 260	855	–
Yield (kg/m²)					
Netherlands	24.7	27.6	28.8	31.3	33.9
UK	16.5	18.2	19.6	20.2	20.9
FRG	9.6	9.4	8.6	8.9	–
Belgium	14.5	14.8	13.9	23.9	–

The area of glasshouse tomato crops in The Netherlands decreased by 18% but yields increased by 13%. The same trends were observed in Belgium.

Further yield increases are expected. Old glasshouses are replaced by modern types that allow a better use of light and higher concentration of CO_2. The introduction of new varieties will also enhance output. An annual increase of 2–3% in unit yields is expected over the next decade.

VI. – Environmental problems

The main environmental problems caused by glasshouse crops are: fertilizers leaching, pesticide dispersal, emission of CO_2 and NO_2 into the atmosphere by the heating units, and waste disposal.

Stricter environmental regulations are expected to curb these problems. The National Environmental Plan in The Netherlands has set a number of concrete objectives.

In the year 2000 crops will be grown in almost close circuit cultivation systems. To prevent dispersal of nutrients 30% of vegetable crops must, by 1994, be grown on substrates using a close water recirculation system with a tank for the remainder of the nutrient solution. By 2000 all glasshouses must be provided with such a system.

Pesticide pollution should also be checked. By 2000 pesticide use must be reduced to 50% of the current active ingredient level. Biological and integrated control, more efficient equipment, and better management can enable further savings.

Energy-use efficiency also needs to be improved. By 2000 energy input per kilogram of product must be improved by 50% in comparison with the situation in 1980.

The waste products are mainly rock wool, plastics, and organic material, which should be completely recycled.

Additional public funding is provided for research and development. The producers will also need to increase their investment to purchase new and additional equipment.

These environment protection measures will raise production costs, especially capital and labor costs per unit product. The annual rise in the cost per unit product until 2000 is estimated at 0.6%, which will make the sector less competitive. Cropped area is also expected to decline by 2%. Once consumers are made aware of these efforts they may increase their demand for these environment-friendly products.

VII. – Marketing techniques

Nearly 100% of the Dutch and 85% of the Belgian produce is sold by auction. The prices are determined by the auction "clock". Dutch growers demand a transparent system for price determination.

With the trend toward concentration in the retailing sector, exporters are expected to expand to meet the requirements of the big retailers. Retailers are dictating the terms of delivery (price, profit margin, packaging, and transport). The production method will soon become one of the terms of delivery. One of the big retailers in The Netherlands with a 20-percent market share in vegetables plans to supplement traditionally cultivated vegetables with environment-friendly products. For this the vegetables should be grown under conditions stipulated by the retailer, including restricted use of fertilizers, insecticides, and in some cases fungicides.

These developments lead to an increasing segmentation of the market for tomato. The solution is to concentrate supply at a limited number of selling points. At these auctions the supply is split into blocks according to product properties (size, quality, color). The properties have been standardized so that products from identical blocks across auctions are exactly the same. Beef and round tomatoes have 28 different blocks each.

This system will probably not meet the requirements of retailers. In future, extensive segmentation of the market will lead to greater specialization of the auctions. The sales procedure will also need to be adjusted. New systems are being tested. In the "order and push system," the buyer places an order in advance, specifying the options (size, weight, shape, style of arrangement), which are charged separately. But the retailer is obliged to purchase on the scheduled day. In the "foreward sale" system, the transaction is made through the auction clock on the scheduled day. The aim is to ensure price stability and availability of goods. These new systems still need to be evaluated and adjusted, if necessary.