

ECONOMIC ASPECTS OF CUCUMBER GROWING IN THE NETHERLANDS

A.J. de Visser
Agricultural Economic Research Institute,
The Hague,
The Netherlands

Introduction

The auction supply increased from 242 000 tons in 1970 to over 300 000 tons in 1978 and 1979, an increase of more than 25% (Table 1). The auction turn-over increased from 125 million guilders in 1970 to 241 million guilders in 1979. In 1980 it is expected that the cucumber will reach the fourth place in the row of protected crops, headed by tomatoes with a turn-over of 550 million guilders, followed by roses (375 million guilders) and chrysanthemums (270 million guilders); the turn-over of cucumber will go beyond 250 million guilders. The cucumber crop is good for 20% of the turn-over for vegetables under glass, tomatoes take 45%, lettuce 15% and other crops 20% (sweet peppers 6%, radishes 3% and gherkins 3%).

Table 1 - Cucumber production and export

Year	1979	1978	1975	1970
Auction supply x 1 000 ton	301	314	286	242
Auction turn-over x 1 million guilders	241	234	198	125
Export x 1 000 ton	227	236	219	176
Export value x 1 million guilders	298	278	253	148

The export has increased from 176 000 tons in 1970 to 227 000 tons in 1979, a growth of nearly 30%. 85% of the Dutch cucumber export goes to West-Germany. The Dutch share of the West-German market lies between 90 and 95% from May till September, 80 and 90% in April and October, 70 and 80% in March and only between 15 and 20% in February and November.

Figures on the area planted in different seasons are given in table 2. The area at March 1 is rather stable, only in 1979 planting was postponed until March due to the severe winter. The area planted in May/June has decreased since 1975 as the total area of unheated glass is decreasing every year.

The autumn crop, planted from July to September, has grown fast from 1970 to 1975 with more than 100 hectares, in 1979 the area was again at the 1970 level. The autumn crop is practically always planted after early tomatoes planted in December/January; in 1979 the tomato crop was kept until September on many holdings, therefore the area of autumn cucumbers decreased drastically.

Table 2 - Cucumber area in The Netherlands in ha

Year	1980	1979	1978	1975	1970
Area at March 1	539	511	555	524	541
Planted in March/April	163	201	159	140	180
Planted in May/June	<u>114</u>	<u>131</u>	<u>152</u>	<u>174</u>	<u>173</u>
Planted until July 1	816	843	866	838	894
Planted in July/September		<u>318</u>	<u>441</u>	<u>434</u>	<u>307</u>
Total area		1161	1307	1272	1201

Yield development

The development of the cucumber yield is shown in Table 3. The total yield increased up to 1976 until July 1 and to 1977 until August 1, as the yield in July 1976 was rather low. Monthly yields increased to 1976 in April and May, in June 1975 the highest yield was obtained. In July yields were rather high in 1977 and 1979 and rather low in 1976 and 1980.

Table 3 - Cucumber yield in fruits per 100 m² planted December 25

Year	1980	1979	1978	1977	1976	1975	1974
in April	101	102	110	107	115	100 (= 1292)	102
in May	105	97	98	99	104	100 (= 1455)	81
in June	97	95	97	93	97	100 (= 1225)	81
until July 1	103	98	104	105	105	100 (= 5471)	89
in July	100	121	96	107	88	100 (= 860)	79
until August 1	103	102	104	106	103	100 (= 6331)	87

From yield administration kept by the AERI it is known that a change from mixed flowering varieties to mainly female flowering varieties took place in the years 1973 to 1976. In 1973 and 1974 the mixed flowering varieties took still 90% and 68%, in 1975 only 26% were mixed flowering varieties and in 1976 there were 100% mainly female flowering varieties. In 1974 and 1975 the two types were compared, the mainly female flowering varieties gave in 1974 8% more kg and in 1975 9% more kg than the mixed flowering varieties; the number of fruits was in 1974 6% higher and in 1975 8% higher for the mainly female flowering varieties, according to Goudswaard (not yet published).

The yield in fruits and in kg as well as the monetary return until April 1 are given in Table 4 for the planting date December 26.

The yield, both in fruits and in kg, is highest in 1977. From Table 3 we have seen that the yield in fruits per month was highest in 1976 in April and in May.

Apparently there is a relation between yield of cucumber and radiation. For tomatoes Verhaegh found that 1% radiation corresponds with 1,2% yield in kg. For cucumber the statistical work has not been completed yet, however it seems that from May onward radiation has hardly an effect on yield of cucumber.

Table 4 - Cucumber yield per 100 m2 until April 1, planted December 26

Year	1980	1979	1978	1977	1976	1975	1974
In fruits	101	92	106	114	104	100 (=1476)	91
in kg	98	91	105	116	108	100 (= 638)	96
in guilders	144	109	106	105	93	100 (=1029)	77

For other reasons - it could be too high temperatures - the cucumber yield has been on quite a low level in years with a high radiation in June - yield was low in July 1976 and July 1978.

In Table 5 examples are given to show that higher yields correspond with high radiation figures. It is quite obvious that radiation is not the only factor which is responsible for yield differences from year to year.

Table 5 - Relation between yield and radiation

Year	1980	1979	1978	1977	1976
Yield from 15-31/3	88	83	99	100(=679 [⌘])	97
Radiation 31/1-11/3	82	84	94	100	99
Yield from 1-16/4	92	92	97	100(=716 [⌘])	106
Radiation 2-26/3	92	94	103	100	114

⌘ in fruits per 100 m2

Productivity

For comparison with other vegetable crops it was found adequate to compare yield in kg per 100 m2 per day of cultivation. For the planting period January 16 - 31 the AERI published average figures of 16,3 kg in 1975 and 20,3 kg per 100 m2 per day of cultivation in 1978, an increase of 25% over the 1975 figure. The highest data available from individual holdings were in 1975 20,3 kg (125% of average) and in 1978 23,1 kg (114% of average) per 100 m2 per day of cultivation.

Figure 1 gives information how the productivity developed from 1973 to 1978 and how productivity changes according to month of planting. Only three different seasons are available: December/January, April/May, for the unheated crop and July/August for the autumn crop.

In order to compare yields in kg with other vegetable crops it might be better to do this on the basis of dry matter instead of fresh weight. In figure 2 dry matter production in g per 100 m2 per day of cultivation is given for several vegetable crops, expressed against fruit weight. The cucumber has quite a different position, the dry matter yield is about 600 g, which is twice the dry matter yield of all other vegetables, as the other vegetables reach only 300 - 350 g dry matter per 100 m2 per day of cultivation.

Table 6

Vegetable crop	dry matter yield in g/100 m ² /day of cultivation	
	average	highest
Cucumber	700	900
Tomato	300	625
Gherkin	330	525
Aubergine	360	530
Sweet pepper	280	455

The highest data are different, tomato reaches 625 grams, which is only about 30% lower than the highest for cucumber, 900 grams drymatter per 100 m² per day of cultivation.

For the average data it is clear that cucumber has a dry matter yield twice as high as all other vegetables. Fruit set is not taking energy for cucumber, this might be one reason for the big difference. Fruit weight is not a reason for the difference as tomato and aubergine have practically the same dry matter yield, the fruit weight for aubergine is 5 times that for tomato.

Total costs

Total costs for a cucumber crop, planted between December 1 and January 15, in the 1977 season with harvest until September 1, are given in table 7.

Table 7 - Costs for hothouse cucumber per 1000 m² in guilders

Planted 1/12 - 15/1 1977		
Harvest until September 1		
Labour costs	9760	- 630 hrs
Gas	9760	- 73.900 m ³
Marketing costs	3000	
Other direct costs	3040	
General costs	3500	
Capital costs	<u>10000</u>	
Total costs	39060	
Revenue	<u>35950</u>	- 44.500 kg
Loss	<u>3110</u>	

In this case labour costs and costs of gas both have a share of 25% of the total costs. Other direct costs include plantmaterial, manure, straw, fertilizers, insecticides and wire. General costs include electricity, car maintenance, subscriptions, memberships, soil analysis and so on. In 1977 the average revenue was 8% lower than the total costs (Goudswaard).

For labour a division can be made in labour for planting, trimming, pruning and control and in labour for harvesting, grading and transport to the auction.

The first group takes one third of total labour requirements (planting + removing 7%, trimming + pruning + control of climate 26%), the second

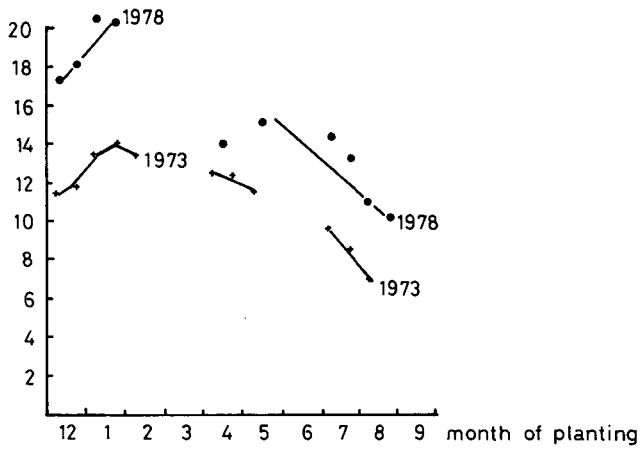


Fig.1 - Cucumber yield in kg per 100 m² per day of cultivation

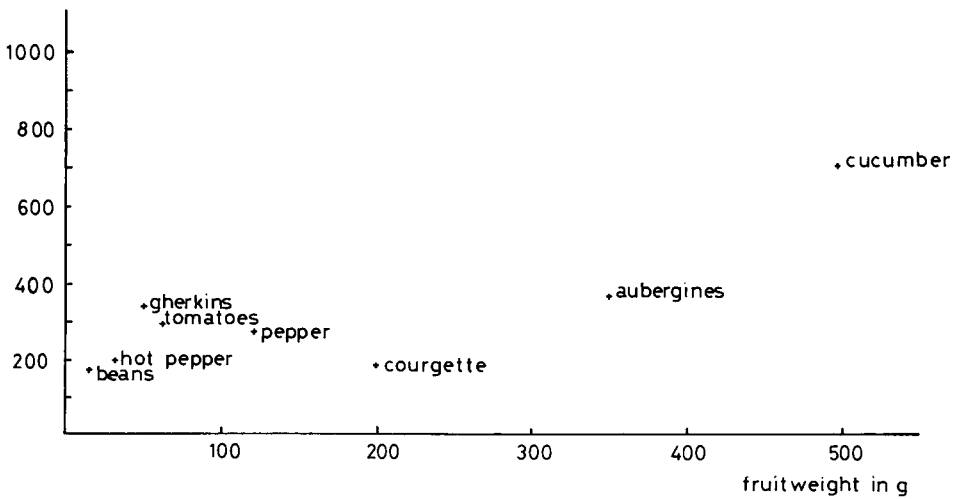


Fig.2 - Dry matter production in g per 100 m² per day of cultivation

group takes 67% of total labour; harvesting 40%, grading 24% and transport to auction 3%.

In figure 3 the variation in fuel consumption is given against yield, as found on commercial holdings. It is clear that there is no relation between yield and fuel consumption. This means that on many holdings energy can be saved without an influence on yield.

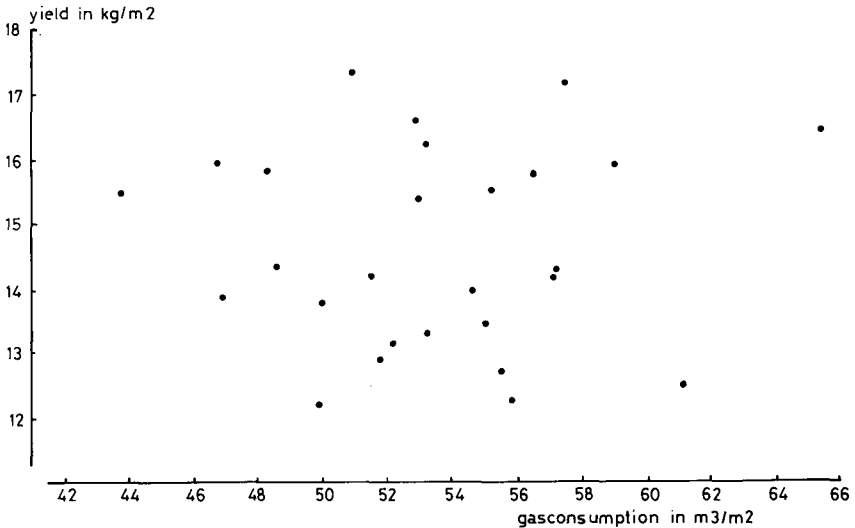


Figure 3 - Relation between gasconsumption and yield at May 1 in 1978

In Table 8 an estimate is given of direct costs for different gasprices. The table shows that at present with a gasprice of f 0,20 per m3 the margin is already quite small, only 35 guilders per week per 100 m2, at a revenue of 120 guilders per week per 100 m2. The revenue for one week earlier planting has remained unchanged since 1975 at a level of 120 guilders per 100 m2 until 1980. In 1980 the revenue was higher, reached 140 guilders per 100 m2 due to higher prices.

With higher gasprices there are two possibilities to get higher margins: higher prices for cucumbers or higher yields; for higher yields there is little chance as radiation restricts the early yield. Possibilities for higher prices are limited as the demand will decrease when prices get higher.

Table 8 - Direct costs in guilders per 100 m2 per week in December/January

	0,20	0,24	0,30
Gasprice per m3	0,20	0,24	0,30
Gas, 350 m3	70	84	105
Other direct costs	<u>15</u>	<u>15</u>	<u>15</u>
	85	99	120
Yield earlier planting	<u>120</u>	<u>120</u>	<u>120</u>
Margin	35	21	0