Tomatoes - Cost of production

An Island Horticulture

Economic Aspects of Tomato-growing in Guernsey

This survey was commissioned by the States of Guernsey and was written by Mr. R. R. W. Folley, Ph.D., B.Sc., B.Com., of the Department of Agricultural Economics, Wye College (University of London).

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Terms of Reference

In a Resolution dated 20th September, 1961, the States European Free Trade Area and Economic Community Committee commissioned Wye College (University of London) to undertake a survey having the following terms of reference:

> "To survey the structure and economic aspects of the Island's horticultural industry in its present state, the survey to form a basis for the consideration of possible improvements in the efficiency of the industry".

The present report is based upon a survey of the records of a 10 per cent sample of those producers having more than 400 ft. run of either heated or cold glasshouses of 30-ft. span. The sample of producers is known to be representative of the whole number of *full-time producers* in at least three respects:—

(*a*) in size of vineries,

(*b*) in geographical location of vineries on the island, and

(*c*) in type of production (i.e. whether specialized or mixed).

By eliminating the producers having less than 400 ft. of glass, half the suppliers of tomatoes were left outside the survey; this group of producers is estimated to supply 15 per cent of the island's crop, usually as a part-time occupation.

A 93 per cent success was realised in recruiting records from producers: a minimum of 147 records was required; 164 producers were approached, and 152 completed records obtained within the allotted time—representing 10.8 per cent of all eligible producers.

Guernsey's commercial horticulture consists almost entirely of heated glasshouse crops, with at least 80 per cent of their area occupied, in summer, by tomatoes. Accordingly, the survey took the form of a five-fold examination of tomato-growing vineries in order to discover:

(1) the layout and general suitability of the premises for early tomato production,

(2) the efficiency of the heating system,

(3) the incidence of disease among tomato crops,

(4) levels of performance (yields, and management ability) realised, and

(5) the costs, returns, profits and indebtedness of tomato producers.

In four of the five items the results have been expressed in the form of percentage achievement of set standards; these standards may be arbitrary (where no scientific knowledge exists) or developed from a scientific basis, or may simply consist of the actual results attained by the top 10 per cent of producers.

As a further useful elaboration of the position, the vineries were classified into four groups, according to their cropping practice, and in all the five features for which the vineries have been examined separate results for each group have been obtained. The purpose of this classification was to see whether differences in cropping practice were related to the growers' personal leanings, or to some physical feature of the vinery, such as small houses or an inefficient boiler. Where the results for single groups appear to be meaningfully different from the average, the group results are published; otherwise, only results for all groups together.

The four groups were:—

Group 1. Specialized early tomato growing.

Group 2. Early tomato growing incorporating a partial catch crop of winter flowers but without delaying the planting-out of the early tomato crop in some houses.

Group 3. Delayed early tomato growing including a winter flower crop on an almost full scale; and early tomato growing on vineries having other crops in other houses.

Group 4. Cold-house tomatoes or crops other than early tomatoes.

No hard and fast rules differentiate the groups; they are best thought of as variations on the theme of tomato-growing. The vineries in the specialized group were, on the whole, larger than those in all other groups. Group 3 had a higher average size (i.e. area of glass) than Group 2, and Group 2 than Group 4. Producers in Groups 1, 2 and 3 all aimed to plant an early crop. A minority of the specialists (Group 1) were planting-out in the houses before January 10th, the majority during the period January 15th—24th. Producers in Group 2 were not less than one week behind the specialists with most of their earliest planting. Group 3 comprises producers who, by accident or design, were growing tomatoes in a rotation and planting not later than February 12th, as well as producers of tomatoes in combination with other crops who were generally as free to plant early as the specialists. Group 4 is too mixed a group to be significant; it includes economic exiles from

early-tomato practice, some of whom have made a positive switch from tomatoes to other heated but less intensive crops, while others have found their escape in adopting cold-house growing.

About 85 per cent of vineries fell into the first two groups, thus supplying for examination more than 100 comparable records of early tomato crops on single vineries. This wealth of data provides an unusually good opportunity for testing whether or not the findings applicable to crops on experimental stations also occur in general practice. Wye College Economics Department will proceed with the statistical analysis of these records as an independent project. Only some first conclusions have been incorporated in this report.

As a result of the encroachment of analytical work on what is largely a descriptive report, attention must be drawn to the different way in which the groups of producers are handled in descriptive and in analytical work. A descriptive account—of the number of glass-houses on a vinery, for example—must include all vineries, because all qualify for inclusion. An analytical account, however, must be selective. When analysing how the average output per £100 fuel is affected by the amount of fuel used, for example, vineries having cold-glass as well as heated glass cannot rightly be included in the analysis (unless the sales from the heated houses only are shown). This requirement explains why, in most of the analytical tables, the number of vineries concerned is less than the number available.

The field work and interviewing of producers was undertaken by Dr. David Arthey under the supervision of Mr. R. R. W. Folley of the Economics Department, who is also responsible for this report.

Fullest co-operation in the conduct of the survey was given both by the States officers and their staffs, and by the accounting and banking professions; without their ready and material help the survey could not have been carried out as successfully as it was; any shortcomings lie in its conception and direction.

ECONOMIC AND SOCIAL ASPECTS OF TOMATO-GROWING IN GUERNSEY

CONTENTS

1. The present generation of Guernseymen has reason to be grateful to the prescient pioneers who touched-off the island's predilection to tomato-growing. In all probability, no other form of praedial endeavour would have made such good economic use of the indifferent agricultural land on the island. By adopting intensive horticulture on the island a small surface area has been converted into a valuable national asset—albeit at a relatively high cost in capital, and at the equivocal advantage of having a relatively large proportion of the community engaged in a primary occupation. References to the economic gains and losses of this type of industry occur from time to time in the report.

I. *ENVIRONMENTAL FEATURES*

Climate and soil

(2) In view of the known dependence of early tomato production upon winter sunshine and artificial heating it is apparent that Guernsey has distinct, but limited, advantages over other West European centres of production. In short, the island's location ensures that the crop gets as much sunshine in the winter months as the Worthing area (and more than South Holland), whilst the heating load should be less than in either Worthing or South Holland.

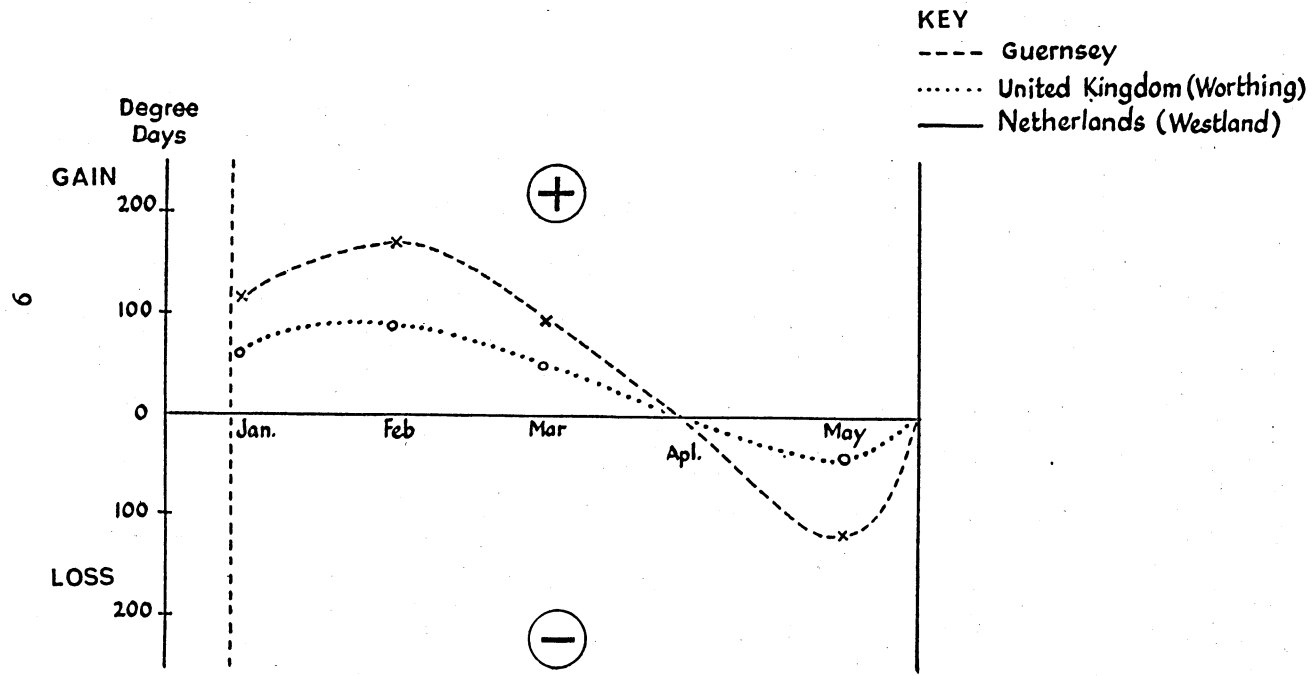
(3) As the following sketch shows, Guernsey has a substantial advantage in outdoor mean daily temperature over South Holland from January to March; during April, continental influences begin to favour the land masses and give a lesser advantage to both Worthing and South Holland during the early summer.

Figure 1. *Calculated Saving in Degree-days Heating Load, Guernsey, Worthing and South Holland.* (See next page.)

The measure of Guernsey's cumulative advantage during the period of heating the cropped glasshouses (allowing ten days' heating prior to planting beginning on January 24th) is:—

109 degree-days over Worthing.
249 „ „ South Holland.

Fig. 1


KEY
Guernsey
United Kingdom (Worthing)
Netherlands (Westland)
Degree Days
GAIN
200
100
0
100
LOSS
200
Jan.
Feb
Mar
Apl.
May
+
−

(4) Guernsey's net advantage over South Holland of 249 degree-days is a daily average of almost 1½°F. This should entail a saving of 20-30 tons of coal (or its equivalent) per acre, unless the prevailing wind strength is higher in Guernsey—in which case the advantage could be nullified. On the other hand, it may well be said that soils are not so suitable—and some frankly more difficult—in Guernsey than elsewhere; that water and organic manure are not so easily come by; and that scarcity of land has compelled many producers to adapt the lay-out of their holding to the land area available. If £200 an acre be allowed for the purchase of pots as a means of improving the rooting medium, and an additional £40 an acre for piped water, these additional costs of £240 an acre would cancel out the prospective saving in fuel, and Guernsey and South Holland would compete on equal terms as regards provision of basic raw materials.

(5) As regards hours of sunshine, thirty years' records indicate that the December-May total has averaged—

777 hours in Guernsey,
771 hours in Worthing, and
693 hours in the Westland of South Holland.

Generally speaking, December, January and February have been sunnier in Worthing than in Guernsey, with the advantage transferred to Guernsey for the period March to May.

Sources. H.M. Meteorological Office; Tuinbouwgids, 1954.

Type of vinery

(6) The distinguishing features of the Guernsey tomato-growing vineries are (i) predominantly small size, and (ii) production in single houses. As the individual tomato businesses have grown, new units of house and boiler have been added to supplement existing houses, in preference to extending the existing houses and increasing boiler capacity. Confinement to a small area has often led to an irregular juxtaposition of houses, with some sacrifice thereby of the principles of wise siting of houses. The "average" vinery surveyed had 840 feet-run (3/5th of an acre) of glass, and consisted of five or six separate houses and three or four boilers.

(7) The size-structure of the glasshouse industry of Guernsey is closer to that of the United Kingdom than to the Netherlands, as the comparison below will indicate.

Figure 2. Distribution of Tomato Acreage by Size of Vinery in Guernsey, the United Kingdom and the Netherlands. (See next page.)

Note: The small Guernsey vineries, omitted from the Survey, have been included in the above distribution.

Guernsey has more small vineries and fewer large vineries than the United Kingdom, and similarly, middle-sized vineries are relatively infrequent.

(8) The Guernsey grower, however, does produce an early tomato. The average yield from Guernsey's 1,000 acres of heated glass is certainly higher than that of the heated crop in either Britain or the Netherlands. And the Guernsey crop "bulks" earlier than its rivals. Comparative rates of development of the crop can be traced from the volume of sales per heated acre, which, for 1960 were:—

Development of Sales of Tomatoes, 1960; Guernsey, United Kingdom and the Netherlands.

Proportion of January/July tonnage delivered by—

April 30th	Guernsey	2.91 per cent
	U.K.	0.49 „
	Netherlands	0.75 „
May 31st	Guernsey	31.8 per cent
	U.K.	17.5 „
	Netherlands	27.5 „
June 30th	Guernsey	72.8 per cent
	U.K.	45.5 „
	Netherlands	62.5 „

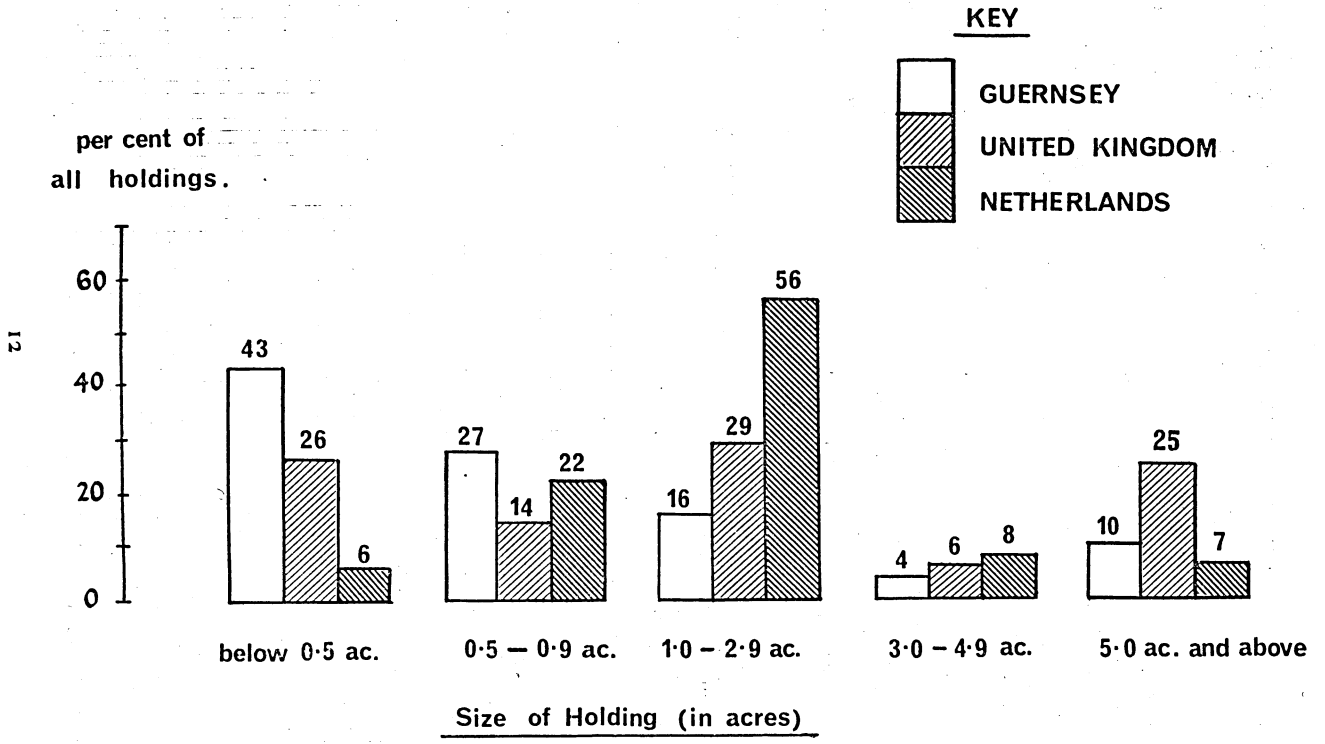
Sources:

Guernsey: States Committee for Horticulture; Tomato Marketing Board.

United Kingdom: Ministry of Agriculture, Fisheries and Food; Tomato and Cucumber Marketing Board.

Netherlands: Centraal Bureau van de Tuinbouwveilingen.

Fig. 2


KEY
GUERNSEY
UNITED KINGDOM
NETHERLANDS
per cent of all holdings.
60
40
20
0
43
26
6
27
14
22
16
29
56
4
6
8
10
25
7
below 0·5 ac.
0·5 — 0·9 ac.
1·0 – 2·9 ac.
3·0 – 4·9 ac.
5·0 ac. and above
Size of Holding (in acres)

II. *SUITABILITY AND CONDITION OF THE VINERIES*

(9) The lay-out of, and fixed equipment on the vineries has been appraised with one requirement in mind—the economic production of early tomatoes. In practical terms, this entailed a subjective judgment as to whether tomatoes will begin to ripen early in April and continue to crop well thereafter without the necessity for excessive expenditure on materials and labour (i.e. more expenditure than is strictly necessary to provide the artificial complements to the good light intensity and relatively mild winter prevailing in Guernsey) occasioned by particular features of the vinery.

(10) According to the arbiters selected,* 59 per cent of the vineries qualified at or above the 75 per cent level (see the table below) and can be considered well-adapted for continuing economic early tomato production; that is, able to meet assumed future requirements as well as the present requirements. About 20 per cent may be regarded as producing under significant handicap. The nature of the handicaps will not preclude profitable early tomatoes, but it will tend to inflate costs, or reduce yields, or both.

Efficiency Rating of Lay-out and Equipment

Rating	below 33 per cent	34-50 per cent	51-75 per cent	over 75 per cent
Number of vineries	nil	30	32	90
Percentage of all recorded vineries	nil	20	21	59

(11) The most frequently-occurring handicap was the design of glasshouse—narrow panes and low eaves. There were many growers who showed good results with the prevailing type of house, but

* These are: (i) some land available to allow for expansion; (ii) handy lay out; (iii) adequate ventilation of houses; (iv) minima of 16" width for panes of glass and of 5 ft. height for "fronts"; (v) some mechanisation of operations and reasonable general condition of the vinery.

the supposition is that they would have been better with superior houses.† On the other hand, glasshouses were uniformly well-ventilated; but, in general, were barely adequately provided with heating pipes—at least by English standards. One third of the vineries were found in exemplary condition, one third in good condition, and one third were not being adequately maintained. When assessing the level of mechanization on the vinery attention was paid to the extent to which operations in the houses and on the boilers were mechanized. Here the picture was less bright. Comparatively few vineries—about 7 per cent—could boast mechanical aids to combustion as well as, say, trickle irrigation and mechanical cultivation. Almost one third of the vineries recorded no mechanical aids whatsoever. The proportion of vineries meeting the assumed requirements (i.e. a rating of 67 per cent or more) under each heading was:—

(*a*) spare land—65 per cent.
(*b*) layout (juxtaposition of houses; sizes of houses; number and position of boilers)—66 per cent.
(*c*) ventilation—95.5 per cent.
(*d*) design of houses (panes and "fronts")—38 per cent.
(*e*) (i) general condition—82 per cent.
(ii) mechanization—25 per cent.

The implication here is that vineries have not grown, nor has labour left the industry, on a scale large enough to make labour a scarce factor. Possibly, the specialists were taking a little more pride in the appearance of their vineries than the other producers; but in general the distribution of the five factors enumerated among the four groups was uniform.

(12) Early tomato production having been the original use of the Guernsey glasshouses, it is not surprising that this practice lingers on several vineries ill-qualified to grow early tomatoes. In recent years more producers have turned to growing flower crops, and there is every indication that this trend is likely to continue. There was a lower proportion of well-qualified vineries within the group of specialized tomato vineries in the sample than within the group of mixed-cropping vineries, thus:—

† The most modern vineries showed a conspicuously high level of financial success, but not all of this would arise from new houses *per se*; new land, and a new boiler would have an effect, too.

Level of Qualification of Tomato Vineries

	80 per cent *or over*	50 per cent *or below*
Specialized	49.5 per cent	19.5 per cent
Non-specialized	57.5 per cent	18.0 per cent

III. *GLASSHOUSE HEATING SYSTEMS*

(13) Statistically, there were 57 separate houses on each ten vineries; the average size of house was 150 ft. (x 30 ft.); and there were three separate boilers for every 5 houses. The average vinery would have either 3 or 4 boilers, and each boiler, therefore, would heat an average area of 255 ft. x 30 ft. (7,650 sq. ft.), spread over $1\frac{2}{3}$ houses. This is predominantly a small-scale pattern and 64 per cent of boilers had rated capacities of less than 600,000 BTUs./hr. The distribution of boilers in use, according to their rated capacity, was:—

Rated Capacity of Boilers (in B.T.U.s/hr.)

	Under 300,000	300,000 to 400,000	400,000 to 500,000	500,000 to 600,000	600,000 to 750,000	750,000 to 1 M	1 M to 1.5 M	1.5 M to 2 M	Over 2 M
Per cent of all boilers	9.5	21	13	20	14	10.5	6.0	3.0	3.0

(14) It is not possible to evaluate the above characteristics of the heating of the Guernsey tomato houses from present knowledge. On the one hand, it is known—as has been acknowledged earlier in the report—that Guernsey growers obtain higher yields per acre for the season, and deliver more early tomatoes per acre, than any comparable group of producers. This success is certainly bound up with production in single houses, but whether every two houses need heating separately, or whether the average producer gains from having three or four separate boilers, is an open question. It seems likely that, on technical grounds, it will be difficult to keep a larger number of small boilers highly efficient, and that greater dependence upon fewer boilers (although it may not affect the efficiency of heat production or supply)

would improve boiler practice. On economic grounds, it can only be assumed that there is waste of time, and effort, and some disregard of the potentialities of fuel economisers in the present set-up.

(15) Conversion to oil heating has taken place on a significant scale. At the time of the survey half the larger vineries were fully or partly relying on oil heating of boilers having much larger capacity (800,000 to 2,800,000 BTUs/hr) than those they replaced. The switch to oil has gone further on the tomato and flower vineries than on the specialized tomato vineries. Overall, 17 per cent of vineries had fully converted to oil heating, and a further 17 per cent used both oil and solid fuel. Users of heavy oil were three times as numerous as users of light oil. Of the two-thirds still relying wholly on solid fuel, 80 per cent burned only anthracite, and 20 per cent softer coal. On the oil-burning vineries, an average expenditure on fuel of £1 5s. a foot was associated with an average yield of 2.2 baskets a foot by May 30th.

(16) Some mainland tomato growers who perhaps look with envy on the Guernsey growers' yields may consider that these yields are higher by 10 per cent because of the single-house system of growing. The Guernsey men, however, should not rely too much upon this assumed superiority; while it may be true that the Guernsey crop is 10 per cent better than the English grown under the same restrictions (narrow panes, low eaves, etc.) it is not true that yields obtained from the modern well-sited and perhaps large, heated blocks in southern England must be 10 per cent lower than the average in Guernsey. In any case, the "single house" could probably be abandoned in favour of a unit twice as large* (for tomatoes) with advantage. The assumed 10 per cent greater yield—say 5 tons an acre at an average price of £125 a ton—making for £625 an acre in additional revenue—could be 70% dissipated in additional heat losses and stoking time, leaving a much reduced net financial advantage.

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* In the opinion of the Glasshouse Crops Research Institute, a structure 90′ x 120′ would be a good compromise between cost and performance (contributed by Mr. G. F. Sheard).

(17) On the other hand, single houses may have advantages of another sort. So little is at present known about the relationship between work-requirement, heating regime and tomato crop development for it to be said categorically that it is advantageous for a grower to have the crop in large houses, and *all* houses developing uniformity; there may be a slight gain in having some houses a little later than others. It could be also borne in mind that single houses could be advantageous to the smaller growers if and when they are required for different crops.

(18) The actual *efficiency* of a glasshouse heating system cannot be obtained from a field survey unless there is careful recording, in the houses, of the temperatures maintained. Failing this, the best alternative data are the *results* of boiler operation; in this case, however, it must be realised that management of the crop also affects results, and the boiler's sole effect cannot be isolated.

(19) In this part of the report, comment upon the heating systems of the Guernsey glasshouses is entirely factual and descriptive. The "efficiency ratings" shown below, which were obtained by appraising existing systems on the vineries, should not be confused with the more usual concept of efficiency of thermal conversion. Many vineries performed well in spite of low rating for their heating equipment—but it goes without saying that more work or more skill were applied on such vineries to get the same performance as on vineries where the heating system had a higher rating. In effect, the appraisal detailed below shows the extent to which heating systems on the vineries fulfilled a set of arbitrary requirements, some of which may be out of place in the present small-scale, small-proprietor condition of the Guernsey tomato industry.* All, however, conduce to efficient production of early tomatoes. The specialised tomato vineries were not significantly better boilered than other types of vinery but the worst examples of multi-boilering were on the larger, specialised vineries.

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* The requirements are: (i) an average capacity of 2,750 B.T.U.s per foot of heated house; (ii) adequate pipe for 62°F to be maintained economically (at least seven 4" pipes for a 30-foot house); (iii) a minimum and not a maximum of boilers; (iv) incorporation of aids to labour economy or to combustion efficiency.

Efficiency Rating of Glasshouse Heating Systems

Rating	below 33 per cent	34–50 per cent	51–75 per cent	over 75 per cent
No. of Vineries	14	47	35	38
% of all recorded vineries	10	35	26	29
Distribution by type of cropping				
Group 1	11	33	27	29
Group 2	10	40	26	24
Groups 3 & 4	17	32	19	32

(20) Some 10 per cent of all vineries must be considered handicapped by their heating installation, and there is scope for improvement on two out of every three vineries. Again, it should be stressed that some growers have made a satisfactory living, in spite of an inferior heating installation, by withdrawing from early-tomato production and turning to crops requiring lower temperatures than tomatoes. It is clear, looking at the records, that successful early tomato production calls for effective use of a great deal of heat; the most successful tomato producers in the survey are specialists, but the general run of producers gains by adding other crops to tomatoes and to some extent adjusting their cropping programme to their boilers' performance, rather than *vice-versa.*

(21) Only 18 per cent of vineries were equipped at a rate of 2,750 B.T.U.s gross (i.e. rated capacity of boiler) per foot of house; and the "score" under each separate requirement was as follows:

Proportion of vineries:—

	per cent
(*a*) having under 2,000 B.T.U.s per foot	20
„ „ 2,000-2,250 B.T.U.s per foot	24
„ „ 2,250-2,500 B.T.U.s per foot	19
„ „ 2,250-2,500 B.T.U.s per foot	19
„ over 2,750 B.T.U.s per foot	18
(*b*) having 7 or more heating pipes per 30-ft. span	6
(*c*) having the minimum number of separate boilers	43
(*d*) having mechanical aids	39

IV. *THE INCIDENCE OF DISEASE*

(22) No direct observations of the health of tomato plants were possible, and the following results were obtained from word-of-mouth reports by growers, who may well have judged by different standards; what one called a "medium attack" another perhaps called "slight". Within these limitations, it emerges that only 53 per cent of growers reported "no trouble". The positive answers were composed of:

26 per cent reporting slight outbreaks
6 per cent reporting medium outbreaks
15 per cent reporting severe outbreaks.

It is difficult to say whether this situation is a vindication or an indictment of the method prevalent in Guernsey of strip-sterilising, as there are no comparative statistics for other areas. It is not, however, the outcome of a failure to attempt (steam) sterilization. As the financial picture will reveal, it was the custom to undertake steam sterilization (done by contractor) each season.

(23) The 31 medium and severe attacks were reported to consist of:

	Medium	Severe	Total
Verticillium ...	6 ...	10 ...	16
Fusarium ...	2 ...	4 ...	6
Root-Knot eelworm ...	1 ...	3 ...	4
Didymella ...	– ...	2 ...	2
Compound infection ...	– ...	2 ...	2
Mosaic ...	– ...	1 ...	1
	9 ...	22 ...	31

However, only twelve of the growers reported persistent trouble: and only four had been influenced to change to other crops than tomatoes because of the difficulty of growing a "clean" tomato crop.

(24) *Varieties.* The variety Potentate, including its variants or derivatives, was the overwhelming choice of the Guernsey tomato producers, either by itself or in conjunction with other subsidiary varieties. Virtually half the producers (48 per cent) grew only one

variety, and of these 59 per cent relied on *Potentate* and 16 per cent on *Potential*. The choice of variety among producers growing only one variety was:

Potentate on 44 vineries.	*Grower's Pride* on 3 vineries.
Potential on 12 vineries.	*Meadow Pride* on 2 vineries.
Moneymaker on 5 vineries.	*Freedom* on 2 vineries.
Discovery on 3 vineries.	*Felcomb* on 1 vinery.
Superlative on 3 vineries.	*Ware Cross* on 1 vinery.

On a further 24 vineries *Potentate* was the main of two or more varieties, *Potential* on a further twelve. Broadly, then, *Potentate* was predominant on half the vineries. The 52 per cent of producers who grew more than one variety could be arranged as follows:

Growing two varieties	38	per cent (of all producers)
Growing three varieties	8	,, ,,
Growing four varieties	5	,, ,,
Growing five varieties	1	,, ,,

V. *STANDARDS OF PERFORMANCE*

(25) A knowledge of the results "the other man" is getting is one of the best incentives to self-improvement in any industry composed largely of small businesses under the control of private individuals. In the aggregate, too, the spread and range of results can indicate the relative size and importance of the tasks of (*a*) improving the average results by initiating a *general* movement upwards, and (*b*) by initiating action on the sub-average vineries.

(26) As regards their performance, the varieties have been examined for their actual success in producing economically an early tomato crop or some good alternative. Here, however, it is not the observed features of the vinery but the skill and accomplishment of the grower (manager or proprietor) which is under review. Actual expenditure and revenue figures on the vineries will be given in the following section of the report which covers solely the financial aspects of production.

(27) For the present, both physical and financial items are involved, but, because the results need to be valid for vineries producing tomatoes and other crops equally with vineries producing

only tomatoes, certain standards of general application* have been set. These set standards are the actual calculated average performance of the ten most successful specialised vineries. A less-successful tomato specialist, of course, will be "marked down"; but a grower who has found a combination of crops giving overall performance equal to the "best" in specialised practice (at possibly less cost) will be shown to have managerial ability equal to the best, although his skill in producing first-class tomatoes may be inferior to the specialist's.

(28) Two of the standards relate to the producer's skill as a grower (planting-picking interval, and grading); two to his skill in using his main resources (output per unit of fuel, and of labour); and one combines his skill as grower and business man (gross output per foot of heated house). On the whole, the average standard of performance is closest to the best in item (*b*) (planting-picking interval), and farthest from the best in item (*e*) (sales per £100 labour).

(29) Here is evidence enough that the Guernsey producers have reached a high standard as growers of tomatoes, but have not attained anything like the same level of success in organizing their businesses—a matter which involves the wise use and productive combination of fuel and labour. For example, two-thirds of the growers were as good as the best in "bringing-on" the young tomato plant, but only one-third shared the same high rate of sales value per foot of house. Reading from the table on p. 23, it is clear that, in the economic sphere, it was the use of labour, possibly in association with low rates of output, which was the industry's weakest feature—and, possibly surprisingly, the poor average grading of the crop was another source of lost revenue.

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* The general standards set are applicable to 90 per cent of the growers who have early tomatoes as their major enterprise, and are:—

(*a*) £600 sales per 100 feet of house,
(*b*) a planting-picking interval of 11½ weeks,
(*c*) 50 per cent of crop in "pink and white" grade,
(*d*) 175 baskets of tomatoes produced by June 1st per £100 fuel and
(*e*) £400 sales per £100 labour (paid and unpaid).

Management Rating of Vineries

Rating	below 40 per cent	41–60 per cent	61–80 per cent	over 80 per cent
No. of vineries	9	27	70	51
% of all vineries	6	17	45	32

Distribution by type of cropping

Group 1	3	18	56	23
Group 2	2	20	40	38
Groups 3 & 4	24	16	36	24

(30) Two features stand out in the analysis above. First, that the management rating is highest for the growers who have incorporated a winter flower crop into their cropping schedule (it is not yet proven, however, that this works out as higher profit!) This situation may mean that, with equal skills, good performance comes more easily in mixed cropping than in specialization. The disposition of the results for groups 3 and 4 arises from putting together the cold-glass vineries which are "weak" as a class and augment the proportion of poor performances, and the tomato-and-separate flower holdings, which are a "strong" class and constitute most of the good performances. Incidentally, grading results from the tomato and flower vineries were superior to those of specialized vineries, although the rate of development of the crop was slower. (Round varieties were preferred to *Potentate* on these vineries.)

(31) Which is the more difficult: to grow an early tomato crop, or to organize a small business? The layman cannot easily decide. On one hand, early tomato-growing requires great skill: on the other, thousands of people succeed with small businesses! Are the two very different? Both depend upon control—control, in the first instance, of the plant's environment, and in the second instance of the amount and quality of resources used. The big difference between the technical side and the economic side of tomato growing is really the more complete technical knowledge available to, and required by the producer. There is no reason, however, for expecting that producers' business performance will not equal their technical performance when the business aspects of production become equally well documented and as well understood.

(32) The difference between levels of success in growing tomatoes and in using economic resources can be traced in the figures below, which are a complete break-down of the overall position. Producers as a whole are far less adept at securing high sales value per foot or high labour productivity than at operating boilers, thus:—

Rating	*Performance Rating of Vineries*		
	less than 50 per cent	51–75 per cent	over 75 per cent
	per cent of vineries		
Value of sales ...	21	46	33
Interval ...	9	24	67
Grading ...	19	38	43
Fuel output ...	14	24	62
Labour output ...	39	33	28

To close this chapter, the distribution of two single factors influencing profits is shown below. These are:

(*a*) yield of tomatoes, and

(*b*) labour cost per foot of house.

Notice how, in the yield distribution, 30 per cent of producers realised a yield that was within 10 per cent of the average. In the labour distribution the comparable proportion was 17 per cent, and 19 per cent had extremes of cost, compared to 7 per cent for yield.

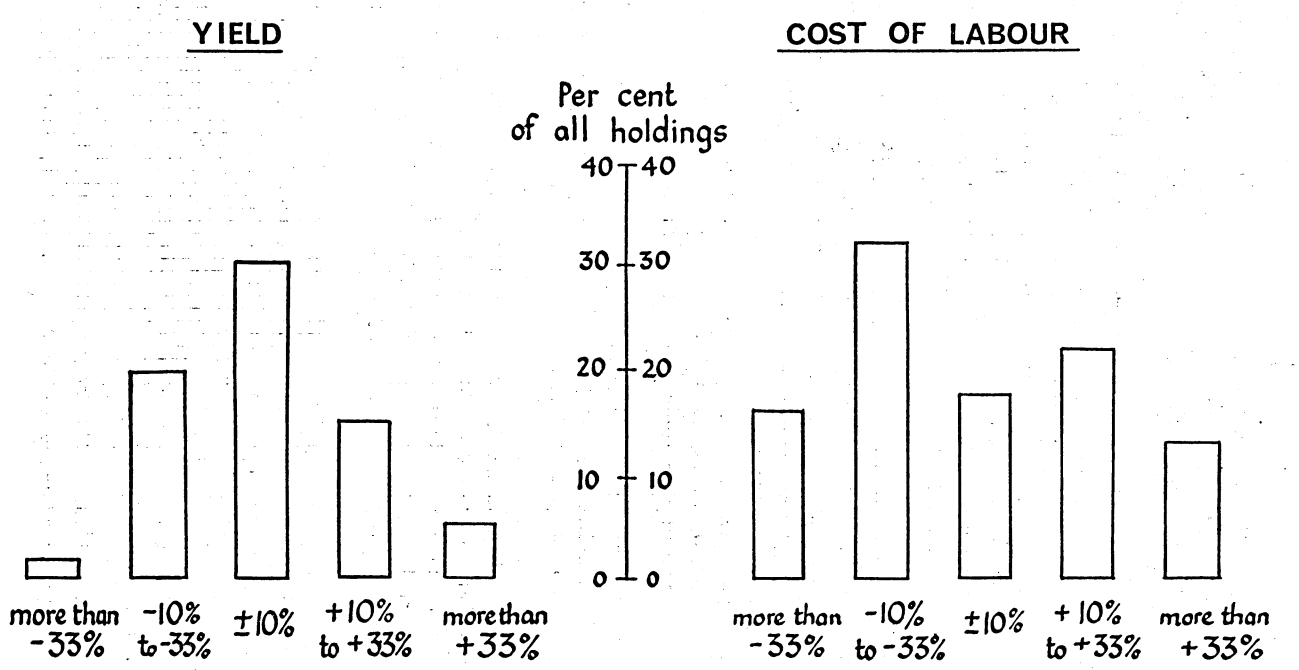
Figure 3. *Distribution of* (*a*) *yield per foot, and* (*b*) *labour cost per foot* (*relation to mean value*). (See next page.)

VI. *FINANCIAL FEATURES; COSTS, RETURNS AND PROFITABILITY.*

(33) In making the assessments of profitability, certain changes have been made to the actual financial data presented in the form of the commercial accountants' annual year-end statements. These are as follows:—

(1) £450 has been charged for every full-time working proprietor on a vinery although there may not be the work on

Fig. 3


YIELD
COST OF LABOUR
Per cent of all holdings
40
30
20
10
0
more than -33%
-10% to -33%
±10%
+10% to +33%
more than +33%

the vinery to justify full-time work for him, if it was known that the vinery was his sole means of support. Where a vinery proprietor had other interests a due proportion of his nominal wage was charged to the vinery. The unpaid work of the proprietor's wife has also been rewarded at the rate of £375 a year; no charges have been made for management unless there were paid managers on the vinery. A total of 109 proprietors received the full wage entitlement, and the work of the wife was charged in 26 cases at rates varying between one-quarter and the full annual wage.

(2) Where vineries were wholly or partly rented, the full amount of rent paid has been included in the costs; for those parts of a vinery which were owned, an interest charge has been substituted to take the place of a rental charge. Interest has been allowed at the rate of 6% on the value of assets in the glasshouse business, the houses themselves being valued at £3, £5 or £8 per ft. run according to their type and condition.

(3) Actual repair and renewal charges for houses or boilers have been replaced by a standard annual charge at the rate of £400 per acre.

(34) The financial results, therefore, depart somewhat from reality, but are designed to test the ability of the vineries (more correctly, the size of business generated thereon) to recompense a grower for his own work and the capital he uses; this is the standard economic test of small private businesses.

(35) *Assessment of cost of production.* There are technical difficulties preventing an easy or precise assessment of costs of production of one horticultural product when produced jointly with other crops on the vinery. To incorporate winter flowers with tomatoes, for example, complicates the costing of tomatoes. A scheme of financial analysis has been devised to set aside these difficulties, as follows:—

(1) To calculate tomato production costs only on vineries:
(*a*) specialising in tomatoes, or

(*b*) where tomatoes provide 85 per cent of the revenue.

This is justifiable as long as the additional crops are genuinely subsidiary;

(2) To deduct the revenue produced by a subsidiary crop from the total costs of growing both tomatoes and the subsidiary crop, so as to obtain, in this case, a *net* cost of the tomatoes.

Actually, many specialised vineries were also selling flowers from their outside land; since these were produced jointly by all the labour on the vinery, and there was no way of separating them, the value of the flowers had to be deducted from total costs. The difference in cost between Groups 1 and 2, therefore, is one of degree rather than of principle.

(3) To abandon cost-of-production attempts for mixed cropping systems and concentrate instead on their profitability. The relative advantages of all distinct types of production, including specialised production, can be compared only on this basis; cost of production is not important in this connection. If the subsidiary crop is profitable, the costs ascribed to the tomatoes are thereby reduced; in this way tomato-growing, where there is a subsidiary crop, may be shown to be more profitable than it actually is, but the financial result on the whole vinery is not falsified, and the point is established, indirectly, that a catch crop of flowers *does* cheapen tomato production—or does not, as the case may be.

In presenting the financial data, overall figures are given first, subsequently being broken down, and refined, into statements applicable to different groups of producers.

Early Tomatoes.

(36) An itemized cost of production of early tomatoes obtained by the method outlined above is given on page 28. The salient features of the overall figures are:—

I. *Cost per foot.* An average cost per vinery (i.e. expenditure plus value lost in depreciation) amounted to £4 2s. 3d. per foot of house, equivalent to £5,963 an acre. This sum financed a gross output of £4 11s. 3d. a foot, including non-tomato crops amounting to a value of 6s. 1½d. a foot; deducting this sum from the average cost per foot results in a net cost of the tomatoes produced amounting to £3 16s. 1½d. a foot, or £5,524 an acre.

II. *Cost per basket.* Repeating the above calculation for net cost per unit of 12lbs. and utilizing the average production rate of 6.39 12-lb. baskets per foot of house, the net cost per basket amounted to 11s. 11d. equivalent to £111 6s. 6d. a ton.

III. *Revenue.* Average revenue amounted to £4 5s. 1½d. a foot, or 13s. 4d. a basket, equivalent to £6,176 10s. 0d. an acre, or £124 9s. 5d. a ton.

IV. *Profit.* Average profit was thus 1s. 4¾d. a basket, or 9s. 0d. a foot, equivalent to £13 2s. 11d. a ton or £652 10s. 0d. an acre, respectively.

(37) There was considerable "spread" in average net costs per foot; only some 39 per cent of vineries were being worked at a cost of 10 per cent greater or 10 per cent less cost per foot than the average cost per foot. The distribution of average net cost per foot was:

Distribution of Net Cost per Linear Foot of House

	under £3 a foot	£3–£4 a foot	£4–£5 a foot	over £5 a foot
Percentage of vineries	23	42	30	5

(38) More important, perhaps, from the industry's standpoint is the distribution of cost per basket. Given a knowledge of this distribution, the proportion of supply produced at a profit can be determined, and the effect upon profits of any fall in price of tomatoes can be estimated. Part A of Figure 4 shows how 78 per cent of the supply *from vineries growing mainly tomatoes* was produced at a cost less than the selling price when due reward for the manual work and full allowance for maintenance of the houses and heating system were included in the costs. (See page 30.)

Itemized Cost of Production of Early Tomatoes, 1960 crop.

Average Cost per linear foot of 30 ft.-span house.

	Group 1 81 Vineries (99,097 x 30 ft.)			*Group 2* 46 Vineries (36,209 x 30 ft)			*Groups 3 & 4* 22 Vineries (18,481 x 30 ft.)		
	£	s.	d.	£	s.	d.	£	s.	d.
Labour (paid and unpaid)	1	11	1½*	1	9	8	1	10	4
Fuel	1	2	1 †	1	1	1½		16	1
Soil sterilisation ...		1	7		1	8		1	9
Manures : pest control ...		5	6		6	9		5	11
Plants, seeds, sundries ...		4	10½		7	9½		9	0
Water			7		1	1		1	2
Electricity and power ...			7		1	0			10½
Cartage			11		1	0		1	3
Business expenses ...		2	9		3	8½		4	0
Rent or interest on capital (6%)		6	2		6	5		7	0
Upkeep of houses ...		5	2		4	4½		4	3½
Total ...	4	1	4	4	4	7	4	1	8
Credit revenue from other crops		1	1½‡		19	10	2	4	11
Net cost of Tomatoes ...	4	0	2½	3	4	9	1	16	9
Revenue from Tomatoes	4	7	7½	3	18	0	2	12	0
Margin ...		7	5		13	3		15	3
No. of baskets per foot		6.56			5.93				
Average price for 12 lbs.		13s. 5d.			13s. 4d.				
Average net cost for 12 lbs.		12s. 2½d.			10s. 8d.				
Average margin for 12 lbs.		1s. 2½d.			2s. 6d.				

* A small amount of paid management is included in this total.

† 3.6 per cent of the glasshouse area in this group was "cold"; the expenditure *per foot of heated house* was likely to be nearer £1 3s. 6d.

‡ Crops on outside land.

(39) Part B of Figure 4 (see next page) shows how on the same vineries, in the aggregate, 47 per cent of the output was produced at a normal rate of profit. It also shows how, if the average price received by producers were to fall 1d. a lb., without any change in production costs, this proportion would fall to 28.5 per cent. At the present level of spending and costs, a fall of 2d. a lb. would reduce the proportion of supply produced at the same profit as in 1960 to 16.5 per cent. In this event, many specialized producers would be most affected, the effect on numbers of producers, rather than on supply, is discussed later.

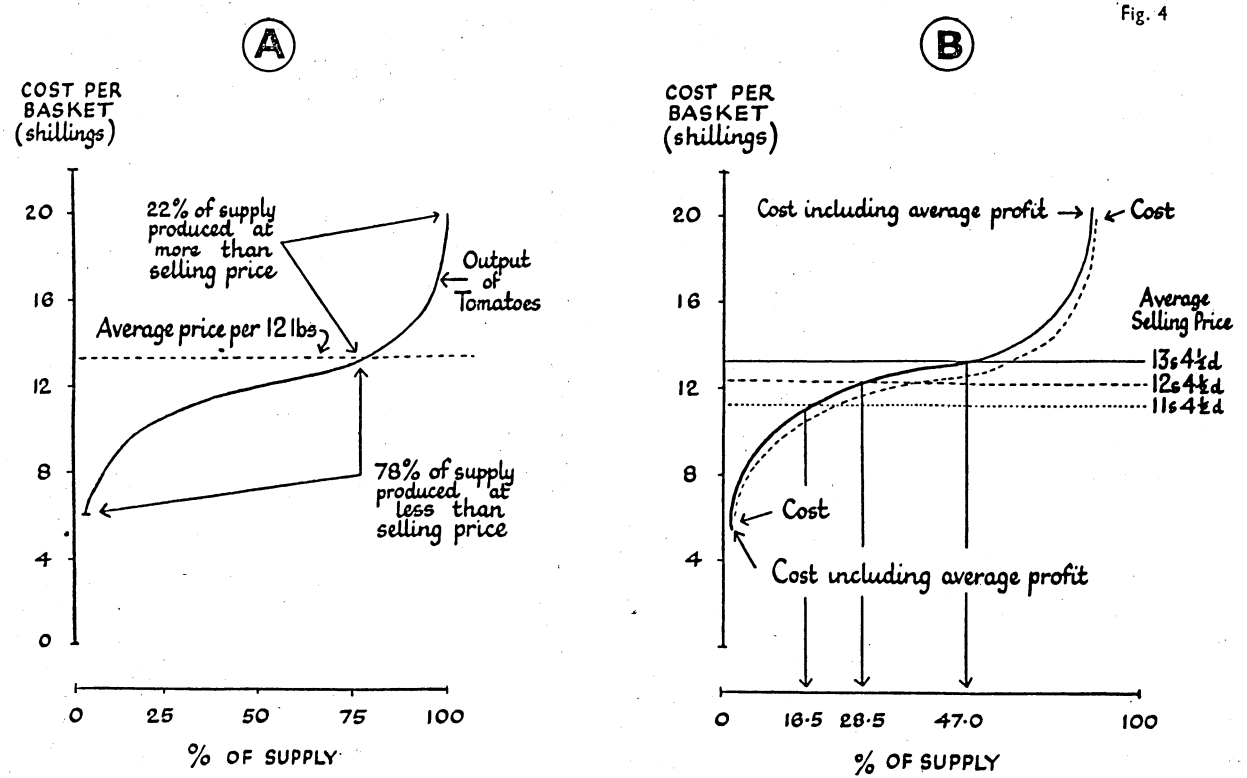
(40) As is to be expected, the results for the different cropping practices are affected by features not directly related to the differences, which tends to blur the real net results arising from different practices. It seems to be the case in Guernsey, for example, that specialized tomato production, if well done, is moderately profitable, but because specialised production is the most common practice, numbers of less successful producers follow this practice and tend to bring specialized production into discredit, for *average* margins from specialized practice were lower than from mixed cropping. See the re-statement below:—

Average Revenue, Cost and Margin per Foot of House

	Group 1	*Group 2*	*Groups 3 & 4*
	81 specialized vineries	46 tomato/flower vineries	22 mixed vineries
	£ s. d.	£ s. d.	£ s. d.
Revenue ...	4 8 9	4 17 10	4 16 11
Cost ...	4 1 4	4 4 7	4 1 8
Margin ...	+ 7 5	+ 13 3	+ 15 3

(41) To take a catch crop of flowers may be conceived of as a superior way of producing tomatoes, the major crop. This is, in effect, the argument for merging the costs of both specialized and de-specialized producers in one calculation. If the catch crop is profitable in itself, and does not give rise to an equivalent loss on the tomatoes, the profit on the vinery is increased, and tomatoes can be supplied by the producers concerned at a lower price than the specialists and still make the same profit as the specialists.

Fig. 4


A
COST PER BASKET (shillings)
20
16
12
8
4
0
22% of supply produced at more than selling price
Output of Tomatoes
Average price per 12 lbs.
78% of supply produced at less than selling price
0
25
50
75
100
% OF SUPPLY
B
COST PER BASKET (shillings)
20
16
12
8
4
Cost including average profit
Cost
Average Selling Price
13s 4½d
12s 4½d
11s 4½d
Cost
Cost including average profit
0
16·5
28·5
47·0
100
% OF SUPPLY

(42) There is no record of what the tomato revenue on the de-specialized vineries was before the conversion, but obviously the catch crop has entailed a diminution of revenue from the tomatoes themselves, which can be traced to the slightly lower yield and price resulting from the delays in planting. No pattern or principles could be detected in the use of the winter flower crop. On the average, growers in Group 2 had 34 per cent of their tomato area previously cropped with flowers, but on any single holding the flowers may have occupied a small area for a long time or a large area for a short time. The percentage use of tomato houses for a previous flower crop was:

Less than 20 per cent of the tomato area	31	per cent
Between 20 per cent and 39 per cent area	38	,,
Between 40 per cent and 59 per cent area	19	,,
60 per cent or more of the tomato area	12	,,

(43) It would appear that producers have taken care to avoid any cropping programme which will increase the demand for labour above that set by the early tomato crop. There is little consistency in labour cost on vineries of the same size, but in the aggregate the labour cost per foot of house for specialists and non-specialists was almost identical (see below).

Labour cost(£) per foot of house

All vineries	Group 1	Group 2	Groups 3 & 4
1.40	1.39	1.40	1.41

(44) Average figures, however, obscure a great deal of important detail. The proportion of specialized growers making satisfactory incomes was higher than for the other two groups, but this was largely due to their being larger.* Groups 1 and 2 had 80 per

---

* Average size of vinery by type of production, was:—

Group 1	1,071 ft. (x 30 ft.)
Group 2	787 ft. (x 30 ft.)
Groups 3 and 4†	948 ft. (x 30 ft.)
Non-tomatoes	442 ft. (x 30 ft.)

† Excluding non-tomato vineries.

cent and 76 per cent of profitable vineries respectively (see the top part of the following table). In terms of margin per foot of house, which pays no respect to size as such, the distribution of results shows that a high margin was more frequent among mixed producers than among specialists, but that there were no fewer unprofitable vineries. In other words, undistinguished financial results were just as common among mixed producers as among specialists (see the lower part of the table).

Distribution of Margin, Three Types of Production.

Size of Margin	£500 or over	£499 to £250	£249 to £0	£0 to −£249	−£250 and below
			per cent		
All vineries ...	49	13	14	15	9
Group 1 ...	54	11	15	15	5
Group 2 ...	43	18	15	9	15
Groups 3 & 4 ...	45	11	5	28	11

Distribution of Margin per foot

Margin per ft.	£1 or over	£1 to 10s.	10s. to 0	0 to −10s.	−10s. and over
			per cent		
Group 1 ...	20	25	29	8	18
Group 2 ...	25	20	25	17	13

Apparently, 24 (15 + 9) per cent of growers were unable to make a true profit at present ruling prices; whereas half the growers experienced a margin exceeding £500. A margin of this size would be satisfactory for a small business, but possibly inadequate for a large business. Whether or not the producer's income was large in relation to his investment, or to the amount of resources he used, is more properly a matter of efficiency of production; some elements of efficiency are discussed in the next section.

(45) From the known present distribution of margins it can be calculated that 49 per cent of producers, 25 per cent more than

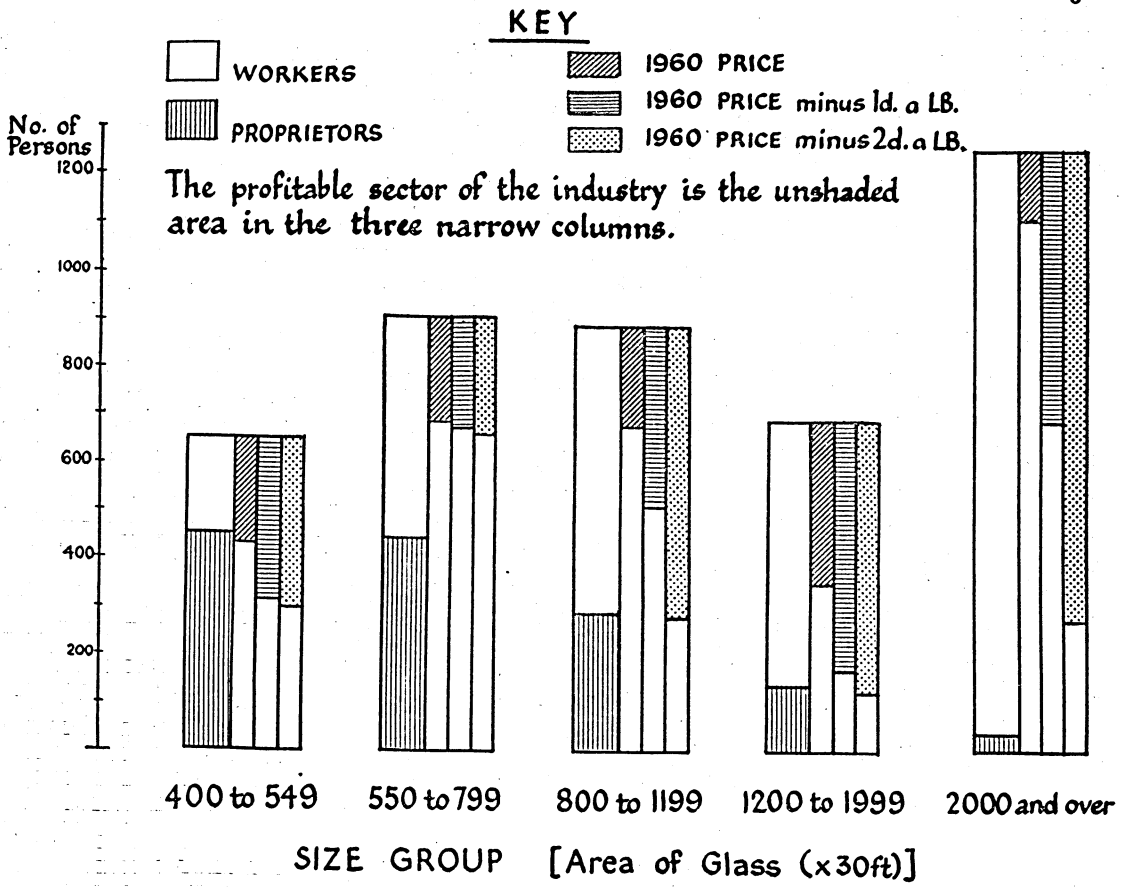
at present, would make no profit if the average returns at the vinery were reduced by 1d. a lb. and 58 per cent would make no profit if returns fell by 2d. a lb. A graphical intimation of how two successive "waves" of a 1d. a lb. reduction in returns at the vinery would erode the present state of profitability of tomato-growing is added below.

Figure 5. Diagrammatic Incidence of Price Falls on the Guernsey Tomato Industry. (See next page.)

After a fall in net return of 2d. a lb. for example, about 80 per cent of the employed workers and about 35 per cent of the proprietors would be engaged on vineries that could not show a profit; there are, of course, many steps in retrenchment that could be made, and it is not implied that in the event a large part of the industry would suffer an early demise—only a somewhat accelerated malaise.

(46) Two observations on the disposition of profits are merited. In the first place, there are more unprofitable small vineries (i.e. those with less than 800 ft.) in relation to their numbers, than large vineries. Secondly, where profits are made, the rate of profit per foot is higher on small nurseries than on large. It is this situation that explains the relatively slight incidence on the *number* of profitable vineries of a twopenny fall in price; the effect of the first penny would be mainly felt on the larger vineries; the second penny would be "carried" by quite a large proportion of the smaller holdings. In sum, the Guernsey tomato industry as a whole, because of the predominance in it of small producers, has the Jekyll and Hyde character of being invulnerable to falling revenue on one account (the many excellent small vineries) and vulnerable on another account (the overwhelming paid employment occurring on large vineries). Somewhat similarly, the industry has the features of being relatively invulnerable to falling prices in the short term (because there is a large number of profitable small businesses), but susceptible to the long-term pressure of costs on prices (because there will be numbers of small vineries which, together with the large vineries, cannot be expected to afford continuous modernization).

Fig. 5


KEY
WORKERS
PROPRIETORS
1960 PRICE
1960 PRICE minus 1d. a LB.
1960 PRICE minus 2d. a LB.
No. of Persons
1200
1000
800
600
400
200
The profitable sector of the industry is the unshaded area in the three narrow columns.
400 to 549
550 to 799
800 to 1199
1200 to 1999
2000 and over
SIZE GROUP [Area of Glass (x 30ft)]

(47) The results obtained constitute a qualified vindication of the small tomato-growing unit in the island's circumstances: economically, small family units are tough (not so much "strong", as "tough" (i.e. resistant to economic forces)), but where wealth is in primary producers' hands, or depends upon them—as in Denmark, the Netherlands and Japan—something has been added to toughness, and that something is efficiency. In this form, efficiency takes the form of uniformly high standards of production and management. The Guernsey tomato industry cannot really be labelled "strong" so long as an admixture of growers showing poor results deflates the average performance of the small vineries.

Cold House Tomatoes

(48) Cold house practice did not commend itself, on its financial results, as a good alternative to heated house practice. One third only of the "cold" vineries were profitable. As regards the remaining two-thirds, it is worth bearing in mind, first, that standards of skill may be generally lower than in heated house practice, and secondly, that on economic grounds, some heat may be essential to make the labour and material and equipment which even the cold house grower has to buy, profitably productive. Mixed production was more common than specialized production on "cold" vineries, so a cost of production of cold house tomatoes has been calculated on the "net cost" basis previously outlined. On the evidence presented, to precede a cold tomato crop with flowers is a less successful type of practice than specialising and producing 5 lbs. or more of tomatoes per foot of house.

Cost per foot amounted to £2 1s. 9½d., equivalent to £3,030 an acre; after deducting the value of other crops produced, there remained a net cost of tomatoes amounting to £1 9s. 10d. a foot or £2,163 an acre.

Cost per unit of 12 lbs. was 8s. 7d. against a net return of 8s. 0d. per 12 lbs. (£1 7s. 10d. a foot or £2,018 an acre), leaving a loss of 7d. a basket, 2s. 0d. a foot, or £145 an acre.

Itemized Cost of Production of Cold Tomatoes, 1960 Crop.

Average Cost per linear foot of 30 ft. span house
(6 vineries, 3109 x 30 ft.).

	£	s.	d.
Labour (paid and unpaid)		19	4
Soil sterilization		1	1
Manures: pest control		3	7
Plants, seeds and sundries		5	4
Water			9½
Electricity and power			2
Cartage and business expenses		2	7
Rent or interest on capital (6%)		6	3
Upkeep of houses		2	8
Total	2	1	9½
Credit revenue from other crops		11	11½
Net cost of tomatoes	£1	9	10
Revenue from tomatoes	£1	7	10
Margin (—)		2	0

Number of baskets per foot	3·47
Average price for 12 lbs.	8s. 0d.
Average net cost for 12 lbs.	8s. 7d.
Average margin for 12 lbs.	(—) 7d.

Size of business, and credit potential

(49) First thoughts about economic vulnerability lead on to questions whether the size-structure of the industry conduces to its economic progress and facilitates the use of credit in advancing progress. If experience elsewhere is a good guide, the single-owner small horticultural business needs a (sales) turnover of not less than £2,500 a year before it can generate by itself—and after paying a normal profit to the grower—adequate funds for the re-investment needed to keep the business both expanding and profitable. Viewed in this light of the desirability of growth of single businesses, 39 per cent of the full-time Guernsey tomato businesses must be considered either on or below the margin of continued prosperity. (See the table below.)

Distribution of size of business (revenue)

	£2,499 or below	£2,500 to £4,999	£5,000 to £9,999	£10,000 to £19,999	£20.000 and over
All vineries ...	39	38	15	6	2
Group 1 ...	36	43	15	4	2
Group 2 ...	38	44	15	3	–
Group 3 † ...	75	—	25	–	–
Group 4 † ...	30	20	—	50	–
Non-tomatoes	—	100	—	—	–

† Excluding non-tomatoes.

(50) *Credit potential.* Linked up with single business growth is the credit-worthiness of the producers. Actual credit-worthiness for sole traders is compounded of personal characteristics and private means, and neither requirement can be publicly assayed. As a matter of custom, however, a producer's annual accounts include statements of the book value of the fixed assets of the business concerned, and also its current liabilities. The difference between the values of fixed assets and of current liabilities measures, approximately, the long-term fund of value which could serve as a basis for long-term borrowing. The size of this fund on any holding is not quite the same thing as creditworthiness, and as arbitrarily determined in the survey, has been called "credit potential". The following analysis is an attempt to measure the extent to which, supposing that commercial finance houses were "interested", the Guernsey producers could finance new developments on their vineries using their glasshouses as collateral security.

(51) Agricultural producers in different countries differ greatly in their national attitude to mortgaging their holdings. The Dutch or Danish farmers, for example, will gladly accept a lifetime mortgage on their holdings: British growers, as a rule, prefer to be free of indebtedness. It is realised, of course, that having mortgagable glasshouses does not mean that the Guernsey growers would be prepared to pledge, or creditors to accept, their glasshouses as security: but the "business assets minus current liabilities" figure, when market value of the assets has been substituted for their book value,* will indicate the extent to which the industry could re-develop under either private or public credit.

* Adopted values per foot are given on p. 23 (para. 33).

(52) According to the results obtained, at least 20 per cent of the vineries could not obtain further credit, from either public or private sources; while rather more than half were in a position to obtain substantial credit on the security of their vinery, having at least two-thirds of their business assets intact (see the fifth column of the table below). In respect of indebtedness the Guernsey growers are probably as fortunate a group as any in Western Europe, with specialised producers and those with the larger businesses in a significantly more secure position than the other groups.

Distribution of vineries by credit potential: Percentage of market value of business assets uncommitted to present creditors.

A. Distribution by Type of Practice

Per cent:—	−100 to −50	−50 to 0	0 to 33	33 to 66	67 to 100
All vineries ...	8	12	13	13	54
Group 1 ...	3	8	12	15	62
Group 2 ...	20	13	13	10	44
Groups 3 & 4	14	42	29	–	15

B. Distribution by Size

Per Cent:	−100 to −50	−50 to 0	0 to 33	33 to 66	67 to 100
Feet (x 30 ft.)					
400 - 549 ...	14	19	11	14	42
550 - 799 ...	3	7	20	17	53
800 - 1199 ...	7	–	16	23	54
1200 - 1999 ...	–	7	13	13	67
2000 and over...	–	7	7	6	80

VII. *SOME ASPECTS OF EFFICIENCY IN TOMATO GROWING*

(53) Under this heading come matters like size of vinery, cropping policy and cultivation practices, which condition results on single vineries and hence affect the aggregate performance of producers. Such matters will, if trending in the proper direction, lead to continued improvements in the industry's efficiency (meaning its capacity to provide social income from a given volume of

resources—land, labour and capital). These attempted scientific conclusions need corroboration before they can be accepted as reliable knowledge.

(54) *The benefits of moderate-sized businesses and large vineries.* Results for the large number of Group 1 (specialized) producers confirm what has previously been established in economic analysis of English tomato-growing; that is, that most small tomato businesses are too small to give efficient utilisation of labour, and that the largest businesses make the highest profits; but that neither large nor small businesses equal middle-sized businesses in economic efficiency—in converting money spent on raw materials and labour into revenue from tomatoes. See below:

Average Margin in Relation to Size of Business (Group 1)

Turnover (sales)	£2,499 or below	£2,500 to £4,999	£5,000 to £9,999	£10,000 to £19,999	£20,000 and over
Average margin per vinery (£) ...	-42	424	546	2,721	3,618
Percentage of vineries showing a profit	50	83	77	100	50
Average margin as per cent of average revenue	-2	11	11	18	10

(55) Somewhat conflicting conclusions will be drawn from a size-analysis using area of glass instead of sales turnover, as the arbiter of business size, as follows:—

Average Margin in Relation to Area of Glass (Group 1)

Glass area (x 30 ft.)	400–549	550–799	800–1,199	1,200–1,999	2,000 and over
Av. margin per ft. (£)	0.292	0.766	0.375	0.093	0.477
Percentage of vineries showing a profit ...	65	77	78	50	89

The discrepancy between the distributions obtained using the money-basis of size in the previous tables and the glass area basis in the table above, consisting of a swing away from upper-middle

superiority, is explained by the number of successful smaller producers who, on a money-basis, pass into a group higher than that to which they belong on the glass-area basis.

(56) A general movement towards constituting enlarged vineries out of the smallest vineries would, therefore, be one way of improving the industry's efficiency—and a possible alternative to improving overall results by getting greater proportional success on the small vineries.

(57) Perhaps the final word on size of vinery and its economic effects is this: that where a given type of business is fundamental to the economy of a community, it is the *social output* (wages, interest, payments, rents and profits) which is of prime importance. High profits obtained at the expense of low wages may be a less desirable specific for increasing national wealth than high wages and lower profits. There will be little question but that at Guernsey's present advanced state of economic development, wealth should be broadly shared. A spread of wealth is in part already achieved (at the price of "independence" of individuals) by the large number of successful small proprietors in the tomato industry, but the number of paid workers exceeds the number of full-time proprietors, so the level of wages is important, too.

(58) Further analysis showed that there was only 25 per cent difference in social output per foot of house between the weakest group and the strongest. Would it be fair to conclude that, ideally, vineries should be large *of their type*—with little to choose between a good family vinery and a good commercial one? Compare the second and fifth columns of the table below.

Social Output per Foot of House, according to Size of Vinery (Group 1)

Glass area (x 30 ft.)	400–549	550–799	800–1,199	1,200–1,999	2,000 and over
Av. social output per ft. (£) ...	1.99	2.37	2.17	1.93	2.38
Index (1.93 = 100)	103	123	113	100	124

(59) *The benefits of mixed cropping.* The gist of the presentation of tomato production costs on p. 28 is, that on vineries operated at much the same level as regards staffing and fuel consumption, the growers who incorporated a catch crop of flowers spent some

3s. a foot more on materials than the tomato specialists; and, though the flower-grower sacrificed 9s. 7½d. a foot in tomato revenue they gained 18s. 8½d. a foot in flower revenue.

(60) For growers who may be considering a flower crop for the first time, it can be said that many specialists had margins higher than the average for the non-specialists, and there may be little incentive for these successful growers to change. Actually, in 1960, the tomato crops grown in rotation with winter flowers averaged 5.93 baskets a foot of house (46.0 tons an acre) and would have shown an average margin (profit) of 13s. 3d. a foot. Thirty-seven per cent of the growers specialising in tomatoes had a higher rate of profit than this. In brief, with the aid of the flower crop, growers were able to reach the same (average) margin per foot with a tomato crop of 5.93 baskets a foot as tomato specialists reached with a crop of 6.66 baskets a foot* (51.7 tons an acre)—12 per cent less than the specialists. As previously noted (para. 44) the proportion of unsuccessful vineries was no lower than in specialized practice.

(61) In the chapter on costs, returns and profitability (para. 42) it was noted that, on average, about one-third of the glasshouse area on mixed cropping vineries was given up to flowers. For reasons that are not yet fully clear, it emerges that growers who kept their winter flower area within the range of 20 per cent and 40 per cent of their total area were notably more successful than growers having either more or less flowers than this. For instance, although there was no other big apparent difference between the groups, the best group averaged more than 15s. a foot margin, and no other group could exceed 8s. The details are as follows:

Margin per foot in Relation to Proportion of Flowers to Tomatoes

Per cent occupancy of houses by flowers	less than 20%	21% to 40%	41% to 60%	Over 60%
Number of vineries ...	13	16	8	5
Average size (x 30 ft.) ...	798	753	865	539
Average margin per ft. (sh.)	7	15	7	8

* A specialist often had some cold glass as well as heated glass: this average figure was the yield averaged over *all* glass: however the average yield on 71 specialised holdings having only heated glass was also 51.7 tons an acre.

(62) *The benefits of early planting-out.* Isolation of the effect on profitability of the date of planting-out in the houses deserves special study, because, for any given planting date, the interval before the first picking may vary between nine and thirteen weeks, which will affect the final outcome considerably. There is reason for thinking, therefore, that *time of picking* is the more important determinant—at any rate, better correlation was evident between time of picking and the margin per foot than between planting time and the margin per foot. In these circumstances, comment at this stage about early planting must be restricted to simplified statements which are unlikely to be misleading. Actual experiences of producers in this connection may be summarized as follows:—

Production and Profit Data—76 Specialised Heated House Vineries.

	Gross output per ft. (£)	Av. price per 12 lbs. (£)	Crop per ft. to May 31 (12 lbs.)	Total crop per ft. (12 lbs.)	Margin per ft. (£)
Planting out date: before Jan 15th					
a. less than 12 weeks to first picking — 2 vineries...	6.55	16s. 4d.	2.91	7.73	1.630
b. more than 12 weeks to first picking — 14 vineries...	4.22	13s. 7d.	2.02	6.01	0.545
Planting date Jan. 16th - 31st					
a. less than 12 weeks to first picking — 20 vineries...	4.77	14s. 2½d.	2.05	6.88	0.487
b. more than 12 weeks to first picking — 20 vineries...	4.18	12s. 10½d.	1.84	6.43	0.511
Planting date Feb. 1st - 14th					
a. less than 12 weeks to first picking — 9 vineries...	3.88	12s. 8½d.	1.47	6.46	0.294
b. more than 12 weeks to first picking — 9 vineries ...	3.74	13s. od.	1.47	5.99	0.269
Planting date Feb 15th - 28th					
less than 12 weeks to first picking — 2 vineries ...	4.26	15s. 4d.	2.30	5.55	0.310

(63) There is sufficient "spread" of experience expressed through the table above to allow of three pertinent statements:

1. Growers who planted early got higher profits than those planting later. (This is a well-known condition, but what may be novel is the *extent* of the higher profit—does it constitute an incentive to the less successful growers . . . or a disincentive? What is another £100 a year income (4s. a foot x 500 ft.) worth, in terms of greater effort and risk, to the small proprietor?)

2. Excepting a narrow top stratum of the best growers, average financial results from quite a wide range of planting-out dates and picking dates were very similar. This situation suggests that *radical* changes in specialised practice may be necessary to improve significantly the average profit of the bulk of growers.

3. As planting-out time was delayed, so the yield picked by May 30th, and the total yield picked, tended to diminish. (Again, it is the *extent* of the movement which is possibly new knowledge).

VIII. SUMMING-UP

(64) In review, it may be pertinent to add a short comment upon what the survey has shown to be the position of the Guernsey tomato industry in two respects: first, its economic strength; secondly, the means to further progress.

(65) In its present form the Guernsey industry is better placed to meet deflationary conditions in the tomato market than inflationary conditions—it will withstand price falls relatively more successfully than it will respond to price increases: falling returns would induce growers to economize, rising returns would not encourage them to modernize to the same extent. On the more cogent question of the industry's competitive position *in the early market,* output and employment would be more seriously affected in Guernsey than in, say, Holland if tomato prices fell. Were the Guernsey growers' price to fall to the anticipated level of the Dutch, some savings in cash expenditure on wages could be made, and revenue maintained by growing more crops during the year.

Guernsey uses only 26% per cent of family labour, as against about 50 per cent in South Holland, and, the Dutch industry will thus be able to "hang on" longer than can Guernsey, apart from any additional benefits of lower marketing deductions and less dependence on tomatoes in South Holland. Unless horticulture as a whole is depressed, lower market prices for tomatoes will effect Dutch growers for only six months, compared with nine months in Guernsey. It is not at all improbable that costs of tomatoes per ton, on the vinery, are little different in Guernsey and South Holland, but that Dutch growers can work to a lower *price* at the vinery because of their larger turnover and supplementary income from other crops.

(66) The survey has also shown that there are numerous avenues along which progress to greater efficiency might be initiated (i.e. new glass, larger small vineries, fewer boilers). In assessing the worth of these alternatives, the prevailing small-scale organization and its social consequences become of paramount importance. The most enduring feature of the Guernsey industry will doubtless be its small family vineries, because the obstacles to enlarging the size of the vineries are, from many angles, likely to persist. Whilst small businesses may often be family businesses, it does not always follow that family businesses must be small businesses. The Dutch tomato businesses, for example, carry an average investment of not less than £15,000 (written-down value) at the present time. Small-scale organization will constitute a natural handicap vis-à-vis the future automated larger nursery, but family vineries, whether large or small can be successful, and it would seem that extension of advisory services would offer much the best sort of investment in the Guernsey tomato industry in the short term. In the long term, all vineries may be physically improved: preceding that stage, and from the standpoint of public well-being, the grower himself seems to offer the best means to ordered progress.

R. R. W. FOLLEY.

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