AN ECONOMIC SURVEY

OF

CITRUS FARMING IN THE UNION OF SOUTH AFRICA

during the period 1948 - 1950 with special
reference to

The Organisation and Management of 67 Farms in
the Eastern Cape Coastal Area.

By

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CHAPTER I.

INTRODUCTION.

The Citrus Industry, as a major
agricultural enterprise, did not assume any
particular significance in the agricultural
economic structure of the Union until the early
years of the present century.   Although it was
noted, historically, that the first citrus trees
were introduced into South Africa during 1654, it
has been determined that no citrus fruit was
exported from the Union prior to 1907.   Pro-
duction and marketing of citrus fruit in South
Africa during the first two and a half centuries
of our development were confined to the local
market only.   During the period 1907 - 1918
exports were undertaken for the first time, on
a relatively small scale.   The end of World War
I, however, marked the initiation of large-
scale development in the Citrus Industry in
South Africa.

Improved refrigerated transport
facilities and high prices on the overseas market /

i. W. J. S. Allwright - The Controlled Marketing
of Citrus Fruit in South Africa - P.1.

supplied the stimulus which caused a sudden and very rapid change in the nature of citrus production in the Union. It may be stated in fact that the foundation of commercial citrus production in the Union, was laid in, and is still being maintained by, the export market.

In Table 1 and the accompanying Figure 1, the rapid increase in the quantity of citrus fruit exported by the Union since 1919, is shown. Ten years after the end of the first World War, exports had increased by over 1 million cases. During the next ten years expansion was effected at an even faster rate and total exports during 1939 exceeded exports during 1929 by $3\frac{1}{2}$ million cases. Unfortunately statistics are not available in respect of the quantity of citrus fruit sold on the South African market prior to 1937.

In Table 2 a summary is presented of the quantity of South African citrus fruit exported and sold on the local market during the period 1937 - 1950. It will be noted that during the immediate pre-war years, the Industry exported between 70 - 75% of the citrus crop. The set-back experienced by the Industry during World War II when, owing to unavailability of shipping facilities, exports came to a virtual stand-still, may be realised. The position deteriorated rapidly and to such an extent that during 1944, 81.7 percent of the total citrus fruit crop of $12\frac{1}{2}$ million pockets had to be disposed of on the local market. Whereas local market prices for citrus fruit had never been satisfactory to growers during pre-war years, the emergency caused by the war resulted in a dumping/

TABLE 1:

Export of citrus fruit from South Africa during the period 1919–1950.

Year	Quantity in Export Cases
1919	54,856
1920	132,415
1921	260,460
1922	332,461
1923	413,621
1924	525,827
1925	765,135
1926	624,170
1927	938,400
1928	879,700
1929	1,202,658
1930	2,007,663
1931	1,785,140
1932	1,985,295
1933	2,331,254
1934	2,666,034
1935	2,372,725
1936	2,750,421
1937	4,208,999
1938	3,586,929
1939	4,758,631
1940	3,942,857
1941	2,049,857
1942	2,326,285
1943	1,247,142
1944	987,857
1945	2,766,857
1946	2,409,000
1947	3,334,714
1948	3,475,286
1949	3,866,571
1950	4,629,857

Note: Figures for 1919–1939 obtained from "The Controlled Marketing of Citrus Fruit in South Africa" – W.J.S. Allwright P.176. Figures for 1939–1946 obtained from U.G. 27–'47 – Report of the National Marketing Council on Boards of Control P.104. Figures for 1946–1950 obtained from Official Reports of the Citrus Board.

Fig 1: Export of Citrus Fruit from the Union of South Africa during the period 1919 – 1950.
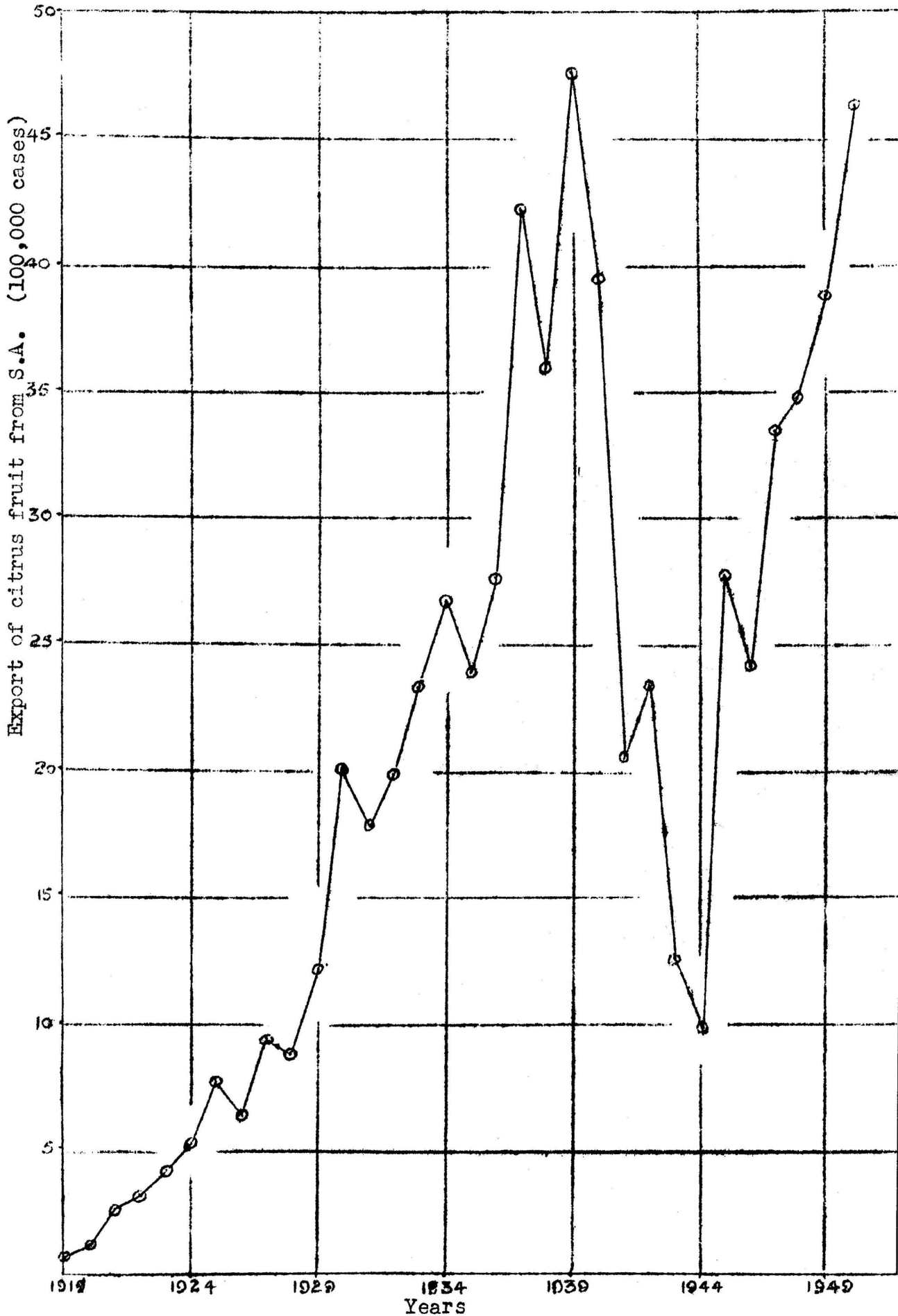
price-level in spite of Government assistance during these years to the extent of approximately £350,000.

Table 2. Analysis of disposal of South African Citrus fruit in quantities on the export and local markets respectively - (1937-1950)

Year.	Quantity in 1,000 pockets.			Percentages.		
	Exports.	Local Market.	Total Production.	Exports.	Local Market.	Total Production.
				%	%	%
1937	9,800	3,500	13,300	73.7	26.3	100
1938	8,350	3,300	11,650	71.7	28.3	100
1939	10,900	3,750	14,650	74.4	25.6	100
1940	9,200	4,550	13,750	66.9	33.1	100
1941	4,783	7,401	12,184	39.2	60.8	100
1942	5,428	7,548	12,976	41.8	58.2	100
1943	2,910	9,361	12,271	23.7	76.3	100
1944	2,305	10,288	12,593	18.3	81.7	100
1945	6,456	7,896	14,352	45.0	55.0	100
1946	5,621	5,800	11,421	49.2	50.8	100
1947	7,781	6,053	13,834	56.2	43.8	100
1948	8,109	6,039	14,148	57.3	42.7	100
1949	9,022	5,891	14,913	60.5	39.5	100
1950	10,803	6,517	17,320	62.4	37.6	100

Note: Figures for 1937-1946 extracted from U. G. 27-
'47 Report of the National Marketing Council
on Boards of Control - P.104 .
Figures for 1947-1950 obtained from the Citrus
Board.

Anticipation of the disruption that would be caused by the war in the export of citrus fruit, necessitated the institution of centralised authoritative control of the Citrus Industry. The South African Co-operative Citrus Exchange, although functioning as the co-ordinating body between the various citrus co-operatives and having voluntary control over approximately 80 percent of the Union's export crop during 1939, did not represent the entire industry and could therefore not enforce the many regulations required to meet the war-time emergency. In view of this position,

and at the request of the Citrus Industry, the
Citrus Board came into being on the 15th December,
1939, with powers, under the Marketing Act of
1937, as set out in the Citrus Scheme.[i]

The functioning of the Board and the
controlled marketing of citrus fruit in the Union
during the early years of the war, have been fully
described in an earlier study.[ii]   For the purpose
of this investigation it should be mentioned
though, that during 1943 the Board, on being
delegated with full authority over all citrus fruit
i.e. of exporters as well as non-exporters, fixed
the maximum wholesale and retail prices of citrus
fruit on the local market for the first time.
Prior to this date, local market prices were
determined mainly by auction and to a small extent
by private treaty.

When prices were fixed for the first
time during 1943, the Citrus Board and the Market-
ing Council, in its advisory capacity to the
Minister of Agriculture, had to look for guidance
to a cost of production survey, executed by the
Division of Economics and Markets during 1938.[iii]
The following quotation from the previously quoted
report by the Marketing Council, summarises the
financial aspect of citrus production for the local
market during the period 1941 to 1946.[iv]

i. Government Notice No. 323 of 15th December, 1939,
   as amended.
ii. W. J. S. Allwright - Op. Cit.
iii. An Economic Survey of Citrus growing in the
   Union - 1938 by A. L. Prinsloo -
   Dept. of Agriculture and Forestry, Economic Series
   No. 30.   Bulletin No. 221.
iv. U.G. 27 - '47.   Op. Cit. P.106.

Season.	Average cost of production and marketing including interest. (per pocket)		Average gross price per pocket of oranges in the Union.	
	s.	d.	s.	d.
1941	2	4	1	10
1942	2	4	2	4
1943	2	5	2	3
1944	2	6	2	1
1945	2	6	2	4
1946	2	6	2	6

The above cost figures are qualified by the statement that the citrus estates were not included in the 1938 cost survey and that the given costs might have been lowered by the inclusion of the estates in the survey.   Taking this possible shortcoming of the survey into consideration, it is still obvious that the industry in South Africa could not have been maintained at the local market price level.   This is admitted by the Marketing Council in its report.

The state of affairs ruling on the local market for South African citrus fruit naturally caused the Industry grave concern.   Not only was the livelihood of a large number of non-exporter growers jeopardised by their inability to obtain remunerative prices for their product but also did it cause loss to exporters who were compelled by the Government to retain 25% of their exportable quality fruit for distribution on the local market.   The Industry itself has vital interests in the local market and indeed has saved no effort in the past to develop the distribution machinery which serves the Union with citrus fruit.   The Industry is fully conscious of the risk of being reliant on an overseas market .

for the disposal of over 60 percent[i.] of its crop without having a potential and fully developed home market to depend on in times of crises. The war-time experiences of the Citrus Board have proved of what tremendous importance the local market can be to the Industry.

The Citrus Board is, however, equally strongly of opinion that citrus growers are entitled to receive a remunerative price for their product on the local market. In its endeavour to convince the central authority of the justification for increased local market prices, the Board approached the Department of Agriculture during 1948 with the object of introducing a further investigation into the cost of production of citrus fruit in the Union. The Department agreed to the proposal but owing to shortage of staff, it could only undertake the supervision of the survey, the actual field work being executed by the field officers of the Citrus Exchange. During 1949 a continuation of the survey was carried out by the Exchange field officers in conjunction with two professional officers of the Division of Economics and Markets. The survey was continued during 1950 without any assistance from the Department of Agriculture.

In order to prepare the mind for the reception of the analysis which follows later on, it may be worthwhile, at the outset, to consider all the facts which have a bearing on the issue which lies topmost in the mind of each grower viz. the/

i. During 1950 62.4 percent of the total crop produced in the Union, was exported.

payability of his orchards. As the "economic" factor forms the main theme of the discussions which follow later, reference need here be made only to other factors which, more often than not, are given little thought by growers when surveying the factors which influenced the financial result of their undertakings during any particular period. An agriculturally sound and economically stable industry can only be developed by observing every possible factor which is known to have a beneficial influence on the farming operation from a long-term point of view. Economic security to the grower and his family will be achieved only if he succeeds in organising and managing his farm in the manner which will provide him with the highest <u>continuous</u> profit.

It may be said that the financial prospects of a citrus farm are to a great extent already determined at the time when the orchard is planted. Citrus trees, like most other agricultural ventures, have very definite requirements as regards soil and climate. Trees bear more prolifically on soil of good depth, high fertility and permeable structure. Trees planted on soil, deficient in any of these respects, which cannot be improved by cultural care and fertilizers, will be a permanent handicap to the grower. The suitability of the soil for citrus production should be determined before planting.

Likewise there are certain optimum climatic conditions which are required for citrus production. Hail, frost and wind-storms are detrimental to the crop and where these elements occur regularly, crop damage will be severe. /

The availability of sufficient irrigation water or a relatively high and stable rainfall, accompanied by a high rate of sunshine days and a relatively high temperature, are the ideal climatic conditions for citrus production. Land which is marginal or submarginal in any of the above respects without any possibility of improvement, can only yield low crops at high cost and will prove a drain on the resources of the grower.

It has been proved in the Union that certain species of citrus trees have greater affinity to the natural conditions ruling in any particular area than others. In certain localities of the Eastern Transvaal for instance, growers had to uproot Navels at great cost to plant Valencias. It is therefore not only the responsibility of the prospective **grower to decide where and how** to plant, but also which varieties should be planted. In addition, consideration should be given to the root-stock to be used as, here again, wide differences in results have been observed. Citrus growing is a long-term process. No farmer can well afford to find after 10 - 15 years that a mistake had been made in the establishment of the orchard.

The human element in citrus production is one of the most important factors causing variations in financial results between orchards. The grower who studies his trees and attends to their requirements in a rational way, usually reaps rich rewards for his labour. Cultural practices, pest and disease control, sanitation and fertilizing are orchard activities which only the grower can /

control.   The grower who studies cause and effect
in his orchard, who determines the results of costs
incurred and who continually adjusts his management
with the object of higher efficiency, is the man
who will achieve the highest continuous profit on
his undertaking.

Final reference should also be made
to what may best be termed the social aspect of
citrus production.   Many growers find it impossible
to realize a reasonable income from their orchards
because their undertakings are too small or their
capital resources too limited.   It is obvious that,
even with a high degree of efficiency in production
and a high rate of profit per unit of product, the
total farm profit will be small if the crop is
small.   Such growers are to be pitied but it will
be unreasonable of them to expect, as is often
experienced, that higher prices should be fixed
in order to provide them with a reasonable standard
of living.   In fixing prices for the Industry as
a whole, it is impossible to make allowances for
uneconomical farming units both in respect of size
and cost structure.

The three universal factors influenc-
ing nett income are:-

(a) yield per unit of area;
(b) price per unit of product;
(c) cost per unit of area.

These factors, as applied in the citrus industry,
will be discussed in detail in the analysis which
follows.   All other factors are related through
these to the financial results achieved on citrus
farms.

CHAPTER II.

AN OUTLINE OF THE COST INVESTIGATIONS.

OBJECT OF THE INVESTIGATIONS.

Although the S. A. Co-operative Citrus Exchange assisted with the surveys during 1948 and 1949, the investigations were undertaken under Departmental supervision and as such had to conform to the issued instructions. These were viz. to calculate the average cost of production of citrus fruit in the Union <u>to the stage when the fruit on the tree was ready for harvesting</u>. The Department relied on the Co-operative Citrus Packhouses and the Citrus Exchange to supply the additional costs as regards picking, transport to packhouse, packing, railage, selling charges and levies. During these two years then, the object with the surveys was only to investigate cost of production in the citrus enterprise. No complete farm data were obtained from the 152 farms included in the survey during 1948 and the 180 farms surveyed during 1949.

During 1950, when the S. A. Co-operative Citrus Exchange undertook a further continuation of the investigation on its own, it was decided to conduct the survey along the lines of a complete farm study. In addition to obtaining all the information required for the calculation of the cost of production of citrus, complete data were enumerated to enable the Exchange to calculate the farmers' own cost of picking, transport to the /

packhouse and packing as well as operators' earnings
on each of the farms included in the survey.

METHOD FOLLOWED IN CONDUCTING THE INVESTIGATIONS.

The survey was conducted during the
period October - November of each year and covered
farm costs incurred during the income tax financial
year, July to June, immediately preceding, the invest-
igations. The survey covered the in-season crop
produced during the year in which the investigation
was undertaken as well as the out-of-season crop
preceding the mentioned in-season crop.   By charging
production costs incurred during the period say,
July 1947 - June 1948 to the crop produced during
the period December 1947 to November 1948, it was
found possible to allocate costs to the actual crop
resulting from such costs.   During each year,
however, picking, packing and transport costs were
calculated on the actual crop concerned.

For the purpose of the investigation,
a previously prepared questionnaire was completed
for each grower visited by the enumerators.   The
questionnaire consisted of a series of systematically
arranged questions which were put to each grower.
The answers to these questions were tabulated and
the calculations completed at office.

Various problems were encountered
during the course of the investigation..   In the
interest of clarity as to the method followed in
the execution of the investigation, the main problems
and the procedure adopted to overcome these problems
will be briefly stated./

The valuation of citrus orchard land proved to be the most difficult aspect of the entire investigation. In the absence of any basis for the calculation of land value, enumerators had to rely on the estimates of growers. Where possible, guidance was taken from the level of recent sales of land in each area but even that was of little assistance as so many factors caused variations in land value between farms. The location of the farm in respect of the nearest town or railway station, the condition and maturity of orchards, quality of soil, availability of water, orchard improvements as well as the human element in placing a value on own property, are some of the many factors which had to be considered. In each instance, however, it was explained to the grower that conservative agricultural values were required for the purpose of the investigation. Each grower was asked whether he would have been prepared to pay the amount suggested by him as the value of his orchard, bearing in mind that a decline in citrus prices would eventually occur. In practically every instance enumerators were told by growers that they would not have sold their land at the values submitted by them. From the grower's point of view, the average land values arrived at by the survey may be regarded as conservative.

In order to determine the cost of production of citrus fruit only to the stage when the fruit is ready to be harvested, several alloc-ations of costs had to be made. It is obvious that with each successive allocation, the margin of error in the final figure which is required, may widen. /

In the case of farms where citrus was the only
enterprise, only one allocation was required to
determine the portion of each individual cost item
which was applicable to citrus production.   In
the case of mixed farms, however, cost items had
firstly to be allocated between citrus and other
enterprises and a second allocation had to be made
to determine the percentage of the balance of each
cost item which had to be charged to citrus pro-
duction.   The allocations were done by growers
themselves and enumerators had to rely on the
growers' knowledge of their farming operations.
The fact that growers may have been biased in making
these allocations has to be faced although it is
accepted as a general principle in surveys of this
nature, that over- and under- estimates tend to
neutralise the error of estimate, provided that the
sample is large enough.

Another major problem which had to be
dealt with was the difficult question of what to
allow a grower for his own manual labour on the
farm.   As the farmer is not allowed any remuneration
for his managerial function and most farmers found
it impossible to allocate their own time between
managing and doing manual labour, it was decided to
omit the item of farmers own remuneration altogether
except in those cases where it was obvious that the
farmer toiled with his labourers in all respects.
In the latter case his work was valued at the rate
of hired labour of the same quality in that area.
The problem extended even further in the case of
absentee owners who hired highly paid farm managers /

and in the case of citrus companies with two or three
paid directors as well as highly paid farm managers.
In the case of absentee-owners, the farm manager
was treated as if he were the owner and his salary was
not included as a cost item if he functioned ex-
clusively as a manager.   Company directors were
allowed no remuneration as they were in all cases the
owners of the orchards.   On these large scale citrus
farms it was considered, however, that the managerial
responsibility could not have shouldered by the owner
without assistance and in these instances the
manager's salary was included as a cost item.

It should be evident that once again it
was endeavoured to determine a true although conserva-
tive reflection of the cost of production of citrus
fruit.   It was realised at the time of the invest-
igations that the profit margin which was to be
allowed to growers for their entrepreneurial function,
was a highly contentious matter.   It was considered
more appropriate to leave the entire matter to the
authorities concerned in fixing the ultimate prices
to the Industry.   It cannot now be argued that some
allowance had already been made to growers in this
respect.

DEFINITION OF TERMS USED IN THE TEXT.

"Cost of production", unless explained otherwise,
denotes costs incurred in producing citrus fruit to
the stage when the fruit is ready to be harvested.
"Land value" of orchards denotes the estimated agricul-
tural value of orchards including the land and trees.
"Value of improvements" denotes the capital value /

of all fixed improvements required for essential
farming operations.   The value of the owner's
dwelling was not included under this heading.
The values given, represent an estimated value
based on original construction cost less previous
depreciation.

"Value of equipment" denotes the estimated value of
orchard implements and tools, excluding packing
equipment.   These values were based on original
purchase price less depreciation in accordance with
the estimated life of each article.

"Depreciation on fixed improvements" was calculated
throughout at a rate of 2% on the estimated value.
It was considered that this rate, which allowed
durable improvements a life-time of 50 years, was
reasonable in as much that it was sufficiently high
to cover the grower for any risks of destruction or
damage to improvements.

"Depreciation of equipment" was calculated on the
straight-line basis on purchase price in accordance
with the estimated life of each item of equipment.
The amount of depreciation charged as a cost on each
item annually, would be such that the purchase price
of each item would have been covered by the time it
had worn out to such an extent that it had to be
replaced.

"Repairs" to improvements and equipment denotes the
cost of maintenance which has to be incurred
annually to keep these capital items in sound con-
dition and good running order.   Care was exercised
not to include repairs which actually amounted to
capital addition, under this heading.

"Running cost of mechanical power equipment"
includes fuel, oil, servicing, insurance, license,

tyres and tubes for all power driven equipment used in production.

"Cost of draught animals" denotes all expenses incurred in feeding and caring for draught animals. Farm produced feed was valued at farm values and grazing at an estimated rate per head per month depending on the type of grazing.

"Cost of labour" denotes payment to staff and labourers in cash and kind but excludes cost of housing. The latter cost was included under the cost of fixed improvements.

"Cash expenses" includes costs incurred for manure and fertilizers purchased, farm produced manure at the rate of 10/- per estimated ton, insecticides and fungicides, water rates, Divisional Council rates, trees purchased, telephone and stationery, railage on production requirements and various un-classified farming requisites purchased.

"Services by packhouse" denotes the charges by citrus co-operatives for various production services i.e. fumigation and spraying. This item does not include transport of fruit and packing by the co-operative societies. Where the co-op. supplied the material for fumigation and spraying, the cost of these materials was included under the above head-ing.

"Interest on Capital" was calculated at the rate of 5% on the total capital investment for citrus production, irrespective of whether the grower had a bond on his farm or not. Interest on bonds was therefore not included as an additional cost item. Under the system followed in the surveys,

growers with no bonds would be able to consider the 5%
interest on capital as profit from a personal
accounting point of view.   Growers with bonds
would still have interest on borrowed capital included
as a cost item.   The rate of 5% interest appears
reasonable as it conforms approximately to both the
average rate of interest charged on borrowed capital
as well as to the rate of interest realised on
investments in commercial undertakings.

LOCATION OF FARMS INCLUDED IN THE SURVEY.

Citrus production in the Union occurs
in more or less localised groups in seven main
citrus areas in the Union.   In order to present a
weighted average cost of production figure for the
seven areas combined, it was essential that a
representative sample of the crop of each area
should have been covered by the survey during each
year.   Enumerators were issued with instructions
to confine the survey to a total number of growers
producing approximately 40% of the estimated total
crop in each area.   The Citrus Estates were
treated separately from small growers and the 40%
of the crop required, had to be spread over a number
of small and large growers, selected at random.

In each of the areas mentioned in the
text, the investigations were confined to the
following localities:

Western Transvaal : Mainly Rustenburg.   A few
records were taken in the Boshoek and Marico areas;

North Eastern Cape: Mainly in the Kat River area -
Fort Beaufort to Balfour.   A few records were taken
in the areas Alice, Adelaide, Fish River, /

Grahamstown and Langholm;

Eastern Cape Coastal Area: Sundays River Valley, Gamtoos Valley;

Natal: Muden. A few records were taken in the areas Pietermaritzburg, Richmond and Zululand;

Northern Transvaal: Tzaneen, Letaba, Politsi and Duivelskloof;

Western Province: Mainly Citrusdal. A few records were taken in the areas Piquetberg and Swellendam;

Eastern Transvaal: White River, Plaston, Karino, Nelspruit, Elands Valley and Barberton.

During the three years of the investigation 514 cost records were obtained from 260 different farms, spread over the seven areas. Of these farms 83 were included in all three surveys, a further 91 were included in two of the three surveys and an additional 86 were included in only one of the surveys. The 260 farms were selected as follows from the various areas:-

Area.	Number of farms included in:-			Total number of farms surveyed.
	3 Surveys.	2 Surveys.	1 Survey.	
Eastern Cape.	24	35	30	89
North-Eastern Cape.	10	13	17	40
Eastern Transvaal.	12	11	21	44
Western Transvaal.	14	15	5	34
Northern Transvaal.	7	7	4	18
Natal.	5	8	6	19
Western Cape Province.	11	2	3	16
Total	83	91	86	260

REPRESENTATIVE NATURE OF THE SAMPLE COVERED BY THE INVESTIGATION.

It is desirable, prior to proceeding to the calculation of the over-all average cost of production of citrus fruit in the Union, to present the weights applied to each group and sub-group of citrus producing unit into which the Industry was broken down for the purpose of the investigation. In Table 3 a comparative analysis is presented of the percentage of the total sample crop which was covered by the survey of farms in each of the seven citrus producing areas as against the actual percentage of the total crop, produced on farms [i.] in the Union, which was produced in each of the seven areas.

During 1948, for instance, 8.1 percent of the total sample crop covered by the survey of small farms in the Union, was taken in the Western Transvaal whereas this area produced 10.0 percent of the total crop produced on small farms. Similarly, 12.7 percent of the total sample crop was covered by the survey in the North Eastern Cape as against 13.1 percent, being the percentage of the total crop of small farms in the Union produced in this area. In the five remaining areas these respective percentages were as follows:
Eastern Cape Coastal Area - 35.3% and 33.1%;
Natal - 7.9% and 5.9%; Northern Transvaal - 11.1% and 8.5%; Western Province - 6.0% and 6.7% and Eastern Transvaal - 18.9% and 22.7%. If it is borne in mind that the percentage of the total crop /

i. A distinction was made between estates and farms i.e. the relatively small-scale type of producers, in these studies.

TABLE 3.

Percentage of the total sample crop covered by the survey of farms in each of the 7 citrus areas of the Union during each of the three years 1948 - 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Total for all areas
1948								
Crop covered by survey (pks)	338,508	533,575	1,484,941	332,421	465,394	252,748	793,890	4,201,477
Total Crop of farms	963,445	1,256,706	3,170,641	563,987	816,625	644,197	2,177,218	9,592,819
% of crop covered by survey	35.1	42.5	46.8	58.9	57.0	39.2	36.5	43.8
% of total farm crop produced in area	10.0	13.1	33.1	5.9	8.5	6.7	22.7	100
% of total sample crop covered by survey in area	8.1	12.7	35.3	7.9	11.1	6.0	18.9	100
1949								
Crop covered by survey (Pockets)	395,870	315,378	1,165,844	309,849	512,745	271,353	509,420	3,480,459
Total crop of farms	997,932	709,174	2,759,167	505,663	918,570	644,096	2,049,265	8,583,867
% of crop covered by survey	39.7	44.5	42.3	61.3	55.8	42.1	24.9	40.5
% of total farm crop produced in area	11.6	8.3	32.1	5.9	10.7	7.5	23.9	100
% of total sample crop covered by survey in area	11.4	9.1	33.5	8.9	14.7	7.8	14.6	100

TABLE 3 (cont.)

Percentage of the total sample crop covered by the survey of farms in each of the 7 citrus areas of the Union during each of the three years 1948 - 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Total for all areas
1950								
Crop covered by survey (pockets)	438,241	231,648	1,510,497	346,687	502,442	299,854	1,038,243	4,367,612
Total crop of farms	1,136,128	547,047	3,206,782	582,027	1,043,177	678,907	2,685,724	9,879,792
% of crop covered by survey	38.6	42.3	47.1	59.6	48.2	44.2	38.7	44.2
% of total farm crop produced in area	11.5	5.5	32.4	5.9	10.6	6.9	27.2	100
% of total sample crop covered by survey in area	10.0	5.3	34.6	7.9	11.5	6.9	23.8	100
Three years combined								
Crop covered by survey (pockets)	1,172,619	1,080,601	4,161,282	988,957	1,480,581	823,955	2,341,553	12,049,548
Total crop of farms	3,097,505	2,512,927	9,136,590	1,651,677	2,778,372	1,967,200	6,912,207	28,056,478
% of crop covered by survey	37.9	43.0	45.5	59.9	53.3	41.9	33.9	42.9
% of total farm crop produced in area	11.0	9.0	32.6	5.9	9.9	7.0	24.6	100
% of total sample crop covered by survey in area	9.7	9.0	34.5	8.2	12.3	6.9	19.4	100

of each area which was covered by the survey during
this year, varied between 35.1% in the Western
Transvaal and 58.9% in Natal, the proportional
composition of the total sample crop by the crops
covered by the survey in each of the seven areas,
conformed remarkably closely to the actual regional
composition of the total crop produced on small
farms in the Union.

A similar balance in the sample crops
covered by the surveys during 1949 and 1950 is
shown.   The most significant disparity between the
two percentages occurred in the Eastern Transvaal
during all three surveys to the effect that the area
was under-weighted in the size of the sample taken.
The Northern Transvaal and Natal areas were, on the
other hand, over-weighted slightly in each of the
three surveys.   In the five remaining areas, the
proportion of the sample crop taken on small farms,
practically coincided with the actual percentage of
the Union's crop produced in each of these areas.

In spite of the abovementioned errors
in weighting, it is evident that the weighted average
cost of production per pocket for all the areas com-
bined, based on the weights applied in the survey,
should not deviate considerably from the average
based on the actual weights of the areas.   Whereas
the average cost of production for all areas combined,
based on the sample, will be shown in the ensuing
analyses as a matter of interest, adjustments will be
made in a final analysis to correct any erroneous
weighting which may have occurred.

It should be noted from Table 3 /

that 43.8 percent of the entire crop produced by small
growers in the Union, was covered by the survey dur-
ing 1948, 40.5 percent during 1949, 44.2 percent dur-
ing 1950 and 42.9 percent during the three-year
period 1948 - 1950 combined.   During the latter
period the percentage of the crops of the individual
areas covered by the three surveys varied between 33.9
percent in the Eastern Transvaal and 59.9 percent in
Natal.   It is evident that a higher percentage of the
crop should have been covered in the former area where-
as a smaller percentage of the crop should have been
covered in Natal as well as in the Northern Transvaal.
It was however difficult to judge these matters in
the field without **having** reliable crop figures
available.   The surveys were usually undertaken
before final crop figures for the season were avail-
able.

In Table 4 an analysis is shown of
the percentage of the entire citrus crop of the
Union produced by small growers and estates respect-
ively during each year of the period 1948 - 1950.
It is also shown which percentage of the entire
sample crop covered by the investigation during this
period was taken on farms and estates respectively.
It is clear that farms would be underweighted and
estates over-weighted if the combined cost of pro-
duction per pocket of citrus fruit should be calcul-
ated for farms and estates on the basis of the
samples taken.   For the period 1948 - 1950 combined,
only 42.9 percent of the total crop produced on
small farms, was covered by the surveys as against
80.4 percent of the total crop produced by estates.

TABLE 4.   <u>Analysis of the weights appl... combining the cost of production per pocket of farms and estates in the Union 1948-1950.</u>

Year			Farms		Estates		Farms and Estates combined	
			Crop in pockets	% of total	Crop in pockets	% of total	Crop in pockets	% of total
1948		Sample crop	4,201,477	50.9	4,057,880	49.1	8,259,357	100
		Total crop	9,592,819	65.9	4,955,630	34.1	14,548,449	100
		% sample of total crop	43.8	—	81.9	—	56.8	—
1949		Sample crop	3,480,459	36.4	6,076,195	63.6	9,556,654	100
		Total crop	8,583,867	54.5	7,174,501	45.5	15,758,368	100
		% sample of total crop	40.5	—	84.7	—	60.6	—
1950		Sample crop	4,367,612	43.0	5,782,067	57.0	10,149,679	100
		Total crop	9,879,792	56.3	7,666,451	43.7	17,546,243	100
		% sample of total crop	44.2	—	75.4	—	57.8	—
Period 1948-1950		Sample crop	12,049,548	43.1	15,916,142	56.9	27,965,690	100
		Total crop	28,056,478	58.6	19,796,582	41.4	47,853,060	100
		% sample of total crop	42.9	—	80.4	—	58.4	—

On an average, 58.4 percent of the entire citrus crop
produced in the Union during the mentioned period,
was covered by the surveys.

Whereas 58.6 percent of the total crop
produced in the Union during the period 1948 - 1950
was produced on farms and only 41.4 percent by estates,
it may be seen that the survey sample was constituted
of 43.1 percent of the crop of farms and 56.9 percent
of the crop of estates. This error in weighting
will be adjusted in calculating the combined cost of
production per pocket of citrus fruit on farms and
estates in the final analysis.

In table 5 an analysis is shown of
the total number of morgen, number of citrus trees
and number of bearing citrus trees covered by the
three surveys of farms and estates respectively.
It is evident that, if a **true** weighting of the costs
of farms and estates is to be effected, the actual
area under citrus orchards as well as the actual number
of citrus trees controlled by small growers and
estate growers will have to be employed instead of
the weights shown by the sample of farms and estates.
In the absence of statistical information in this
respect, fairly realiable bases on which cost per
morgen, per citrus tree and per bearing tree for
farms and estates may be combined, may be reduced
from the true weights in respect of crops produced
on farms and estates. A calculation of this nature
is presented at a later stage. It is of interest
to note that the findings of this report are based
on 529 records, covering a total crop of 27,965,690
pockets of citrus fruit, 27,315.1 morgen of citrus
orchards, 4,971,129 citrus trees and 4,430,923
bearing citrus trees.

TABLE 5

Analysis of the weights and them combining the cost of production per morgen, per citrus tree and per bearing tree of farms and estates in the Union during the period 1948 –1950

Year	Item	Farms		Estates		Farms and Estates combined.	
		Sample	% of total	Sample	% of total	Sample	% of total sample
1948	Morgen	3,982.6	45.3	4,804.3	54.7	8,786.9	100
	Citrus trees	719,944	44.7	888,884	55.2	1,608,828	100
	Bearing trees	622,408	42.2	852,270	57.8	1,474,678	100
1949	Morgen	4,228.2	46.8	4,811.3	53.2	9,039.5	100
	Citrus trees	734,445	44.3	921,768	55.7	1,656,213	100
	Bearing trees	618,441	42.1	850,358	57.9	1,468,799	100
1950	Morgen	4,617.1	48.6	4,871.6	51.4	9,488.7	100
	Citrus trees	788,787	46.2	917,301	53.8	1,706,088	100
	Bearing trees	636,334	42.8	851,112	57.2	1,487,446	100
Period 1948–1950	Morgen	12,827.9	47.0	14,487.2	53.0	27,315.1	100
	Citrus trees	2,243,176	45.1	2,727,953	54.9	4,971,129	100
	Bearing trees	1,877,183	42.4	2,553,740	57.6	4,430,923	100

CHAPTER III

CONCERNING THE ENTIRE
FARMING ORGANISATION

THE ORGANISATION OF FARMING IN EACH OF THE SEVEN CITRUS AREAS.

As complete farm data were enumerated only during the final survey, the organisation of citrus farms will be discussed in the light of the 1950 investigation.   It will be endeavoured to indicate the composition of the farming organisation by the various component enterprises as well as to analyse the main aspects of the organisation of the citrus enterprise in each of the seven areas.

LAND UTILISATION :   The average size and ultilisation of land on farms on which citrus is grown in the various areas of the Union, is given in Table 6. The average total farm area varied between 86.9 morgen in Natal and 1438.3 morgen in the Western Province with an average for all the areas of 371.5 morgen. The average area planted to citrus per farm varied between 11.6 morgen in the Western Transvaal and 37.5 morgen in the Eastern Transvaal with an average of 24.5 morgen for all the areas combined. It may be pointed out that the average size of all citrus orchards surveyed on 260 different farms during the course of the three investigations, was 25.0 morgen per farm.

"Other fruit" shown under the Northern and Eastern Transvaal areas comprised

TABLE 6

<u>Analysis of land utilisation on 178 citrus farms covered by the survey of farms in 7 citrus areas of the Union 1950</u>

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	21	67	12	11	14	25	178
Average Number of Morgen:	Mgn.	Mgn.	Mgn.	Mgn.	Mgn.	Mgn.	Mgn.	Mgn.
Citrus Orchards	11.6	23.0	22.1	27.7	34.8	30.6	37.5	24.5
Other Fruit	0	0	0.1	0.1	13.1	6.7	3.7	1.9
Nurseries	0	0	0.2	0	0.7	0.1	0	0.1
Vegetables	0	0	0.7	0	0.5	0.5	9.5	1.7
Irrigated Crops	2.1	20.0	13.5	3.5	5.8	0	0.6	8.4
Dry Land crops	6.8	9.3	4.1	0	0	86.8	7.4	11.6
Plantations	0	0	0	0	107.1	2.9	7.9	8.0
Planted Pasture	0.2	1.0	0.8	0.1	0.9	0.6	0	0.6
Veld	90.4	575.0	131.5	36.3	216.8	1281.5	375.8	301.0
Fallow land	2.5	3.1	2.9	17.8	51.2	0	12.8	8.0
Waste land	0.1	0.4	3.4	0.1	0.5	26.3	1.8	3.7
Farmstead	2.2	2.0	1.8	1.3	2.1	2.3	2.4	2.0
Total farm area	115.9	633.8	181.1	86.9	433.5	1438.3	459.4	371.5

+ On four of the 182 farms covered by this survey, total farm data were not enumerated owing to involved circumstances in the farming organisation.

mainly sub-tropical fruit, viz. avocados, pawpaws, mangos and litchis. In the Western Province an average of 6.7 morgen of deciduous fruit is shown per farm. "Irrigated crops" as shown in the Table comprised mainly lucerne although a small acreage of cereals was included under this heading in the North Eastern and Eastern Cape. It was difficult to distinguish between irrigated and dry land crops in these two areas as it is the practice to irrigate cereals whenever the supply of irrigation water is sufficient to do so.

The utilisation of land in the various areas may be studied more effectively in the light of the analysis presented in Table 7. The average total cultivated area on citrus farms varied between 20.5 morgen per farm in the Western Transvaal and 124.7 morgen in the Western Province with an average for all areas of 48.2 morgen per farm. The total cultivated area comprised between 8.2 percent in the North Eastern Cape and 36.0 percent in Natal of the total farm area. In the latter area, veld comprised only 41.9 percent of the total farm area as against 90.9 percent in the former area. The Western and North-Eastern Cape with an average of 1282.1 and 576.0 morgen of veld per farm respectively, offered the most extensive opportunity to farmers of maintaining a considerable number of livestock on the farms to supplement the farm income from crops. In the Northern and Eastern Transvaal areas with 217.7 and 375.8 morgen of veld per farm, respectively, the same opportunities were available to a more limited extent.

TABLE 7.

Analysis of the utilisation of land on a cultivated and uncultivated basis on 178 farms in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	21	67	12	11	14	25	178
Average number of morgen	Morgen	Morgen	Morgen	Morgen	Morgen	Morgen	Morgen	Morgen
Cultivated land	20.5	52.3	40.7	31.3	54.9	124.7	58.7	48.2
Plantations	0	0	0	0	107.1	2.9	7.9	8.0
Veld and pasture	90.6	576.0	132.3	36.4	217.7	1282.1	375.8	301.6
Fallow land waste and farmstead	4.8	5.5	8.1	19.2	53.8	28.6	17.0	13.7
Total	115.9	633.8	181.1	86.9	433.5	1438.3	459.4	371.5
	%	%	Percentages %	%		%	%	%
Cultivated land	17.7	8.2	22.5	36.0	12.7	8.7	12.8	13.0
Plantations	0	0	0	0	24.7	0.2	1.7	2.1
Veld and pasture	78.2	90.9	73.0	41.9	50.2	89.1	81.8	81.2
Fallow land, waste and farmstead	4.1	0.9	4.5	22.1	12.4	2.0	3.7	3.7
Total	100	100	100	100	100	100	100	100

TABLE 8

Analysis of the utilisation of cultivated land on 178 citrus farms covered by the survey of farms in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	21	67	12	11	14	25	178
Average number of morgen	Morgen	Morgen	Morgen	Morgen	Morgen	Morgen	Morgen	Morgen
Citrus orchards	11.6	23.0	22.1	27.7	34.8	30.6	37.5	24.5
Other fruit	0	0	0.1	0.1	13.1	6.7	3.7	1.9
Nurseries	0	0	0.2	0	0.7	0.1	0	0.1
Vegetables	0	0	0.7	0	0.5	0.5	9.5	1.7
Irrigated crops	2.1	20.0	13.5	3.5	5.8	0	0.6	8.4
Dry land crops	6.8	9.3	4.1	0	0	86.8	7.4	11.6
Total	20.5	52.3	40.7	31.3	54.9	124.7	58.7	48.2
	%	%	Percentages %	%	%	%	%	%
Citrus orchards	56.6	44.0	54.3	88.5	63.4	24.5	63.9	50.8
Other fruit	0	0	0.2	0.3	23.9	5.4	6.3	4.0
Nurseries	0	0	0.5	0	1.3	0.1	0	0.2
Vegetables	0	0	1.7	0	0.9	0.4	16.2	3.5
Irrigated crops	10.2	38.2	33.2	11.2	10.5	0	1.0	17.4
Dry land crops	33.2	17.8	10.1	0	0	69.6	12.6	24.1
Total	100	100	100	100	100	100	100	100

In Table 8 an analysis is presented to
demonstrate the utilisation of cultivated.land on the
farms included in the survey of seven areas. Citrus
orchards comprised between 24.5 percent in
the Western Province and 88.5 percent in Natal of
the total cultivated area per farm.   The percentage
of citrus orchard land in the Western Province was
low as a result of the considerable area of dry land
crops per farm (viz. 86.8 morgen) which comprised
69.6 percent of the total cultivated area per farm.

In the North-Eastern and Eastern Cape,
considerable areas were planted under lucerne which
was generally cut and used for green-manuring pur-
poses in the citrus orchards.   In the same two areas,
as well as in the Western Transvaal and Eastern
Transvaal, small, although useful, areas were planted
under dry land crops, mainly maize and wheat.   In
the Northern Transvaal 13.1 morgen or 23.9 percent
of the total cultivated area was planted to sub-
tropical fruit.   In the Eastern Transvaal 9.5 morgen
or 16.2 percent of the total cultivated area was
planted to vegetables.

In Table 9 the dispersal of farms in
each area according to the size of the total farm
area, is shown.   The analysis illustrates to which
extent the calculated average size of farms may be
regarded as representative of the individual areas.
It appears as if in the cases of the North Eastern
Cape, Northern Transvaal and Eastern Transvaal, the
arithmetic averages were considerably higher than
the total farm area of the majority of farms in the
areas.   In each of these instances the average was
considerably increased by the inclusion of a few

TABLE 9 — Dispersal of 178 farms according to total farm area in 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas	
No. of cases	28	21	67	12	11	14	25	178	of total 100
Size in morgen									
0 - 100	19	6	50	11	1	1	8	96	53.9
101 - 200	3	2	4	-	4	2	2	17	9.6
201 - 300	1	3	5	-	3	1	2	15	8.4
301 - 400	2	-	1	-	1	-	-	4	2.3
401 - 500	2	1	1	-	-	-	3	7	3.9
501 - 600	1	4	1	1	-	-	2	9	5.1
601 - 700	-	1	1	-	-	1	-	3	1.7
701 - 800	-	-	-	-	-	-	4	4	2.2
801 - 900	-	1	1	-	-	-	1	3	1.7
901 - 1000	-	-	-	-	1	1	-	2	1.1
1001 and more	-	3	3	-	1	8	3	18	10.1
Average size of farms	115.9	633.8	181.1	86.9	433.5	1438.3	459.4	371.5	

large farms which were out of proportion in size to
the majority of farms in the areas.

It is of particular significance to
note that 96 out of a total number of 178 farms, or
53.9 percent, had a total farm area of less than
100 morgen. Of the total number of farms, 128, or
71.9 percent, had a total area of less than 300 morgen.
A relatively large number of growers therefore con-
ducted their farming operations on a relatively
small farm area. In the following analysis it will
be shown that an even larger percentage of farmers
cultivated a relatively small area of land of which
citrus orchards comprised a smaller or larger percent-
age.

According to the dispersal of farms
shown in Table 10, 123 growers out of a total of 178
or 69.1 percent cultivated less than 50 morgen of
land. In the Western Transvaal 92.9 percent of
growers cultivated less than 50 morgen; in the
Eastern Cape Coastal area 77.6 percent, in Natal
75.0 percent and in the North Eastern Cape 66.7 per-
cent of growers cultivated less than this area.
In the three remaining areas, and particularly in
the Western Province and Eastern Transvaal areas, the
majority of growers cultivated an area larger than
50 morgen.

In Table 11 the dispersal of farms
according to size of citrus orchards is shown. Of
the total number of 178 growers included in the 1950
survey, 104 (58.4%) had an area of less than 20
morgen under citrus, 132 (74.2%) had less than 30
morgen of citrus orchards and 149 (83.7%) had less /

TABLE 10

Dispersal of 178 farms according to size of cultivated
area in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas	
No. of cases	28	21	67	12	11	14	25	178	% of total 100
Size of cultivated area (morgen)									
0 - 10 •	12	2	4	2	-	-	1	21	11.8
10.1 - 20	6	5	16	3	-	2	4	36	20.2
20.1 - 30	4	3	21	2	1	1	3	35	19.7
30.1 - 40	3	1	10	1	3	-	2	20	11.2
40.1 - 50	1	3	1	1	3	1	1	11	6.2
50.1 - 60	-	1	4	2	-	2	4	13	7.3
60.1 - 70	-	2	1	1	1	-	1	6	3.4
70.1 - 80	1	1	2	-	2	1	4	11	6.2
80.1 - 90	1	1	-	-	-	1	-	3	1.7
90.1 -100	-	-	2	-	-	-	1	3	1.7
100.1 and more	-	2	6	-	1	6	4	19	10.6
Average cultivated area	20.5	52.3	40.7	31.3	54.9	124.7	58.7	48.2	

TABLE 11

Dispersal of 178 farms according to size of citrus orchards in 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas	
No. of cases	28	21	67	12	11	14	25	178	% of total 100
Size of orchards (morgen)									
0 - 10	13	7	19	3	-	2	1	45	25.3
10.1 - 20	12	6	28	3	3	1	6	59	33.1
20.1 - 30	2	1	9	2	4	5	5	28	15.7
30.1 - 40	1	2	4	1	1	4	4	17	9.6
40.1 - 50	-	4	-	-	1	-	4	9	5.1
50.1 - 60	-	1	3	2	-	1	2	9	5.1
60.1 - 70	-	-	-	1	-	-	1	2	1.1
70.1 - 80	-	-	-	-	2	1	-	3	1.7
80.1 - 90	-	-	1	-	-	-	-	1	0.5
90.1 - 100	-	-	2	-	-	-	-	2	1.1
100.1 and more	-	-	1	-	-	-	2	3	1.7
Average size of orchards	11.6	23.0	22.1	27.7	34.8	30.6	37.5	24.5	

than 40 morgen. It is evident that the majority
of farmers in each of the seven areas had orchards
not exceeding 40 morgen in area. In the Western
Transvaal, North Eastern Cape and Eastern Cape
Coastal Area, considerable percentages of the total
number of farms did not exceed 10 morgen of orchard
land.

The above analysis may be broadly
summarised as follows :

Of 178 farms included in the 1950 survey of citrus
farming in the Union, 71.9 percent conducted their
farming operations on a total area of land of less
than 300 morgen; 69.1 percent cultivated less than 50
morgen of land and 74.2 percent had less than 30
morgen of citrus orchards. It may be accepted that
citrus was the main enterprise on each of the 178 farms
studied. It now remains to be proved whether the area
of land other than that used for the production of citrus
fruit, on each farm was an asset to growers or whether it
proved more advantageous to growers from a personal
accounting point of view to be confined to citrus only.

CAPITAL INVESTMENT : In any intensive farming organi-
sation and particularly in the case of fruit-farming
with a semi-permanently established product, it is
to be expected that fairly high demands would be made
as regards capital requirements. Land suitable
for citrus production would in that respect already
be valued at a premium. In addition the costs in-
curred in preparing the land for citrus production as
well as in maintaining the orchards during the period /

prior to maturity have to be regarded as capital
lay-out and will contribute towards a high level
in orchard land values.   Fixed improvements,
particularly in respect of provision for irrigation,
demand equally large capital investments on citrus
farms.   Furthermore, most growers find it essential
to mechanise farming in order to keep abreast of the
manifold activities which have to be attended to in
the face of an increasing labour problem.   Citrus
farming in South Africa. must indeed be regarded
as a, capital intensive enterprise.

In view of this inevitable aspect of
citrus production, it becomes all the more imperative
for growers to be rational in their capital expenses.
In the analyses which follow , it will be endeavoured to
illustrate various aspects of the capital require-
ments of citrus farming in South Africa.

Composition of total farm capital: In Table 12 an
analysis is presented of the average total capital in-
vestment per farm in each of the seven citrus areas
during 1950.   The average total investment per farm
varied between £12,223.3 in the Western Transvaal and
£47,245.4 in the Northern Transvaal with an average
for all the areas combined of £24,399.3 per farm.
In the North Eastern Cape, Eastern Cape Coastal Area,
Natal and the Western Province, the average total
farm values were more or less on an equal level, vary-
ing between £20,621.8 in Natal and £24,856.7 in the
North Eastern Cape. In the Eastern Transvaal the aver-
age investment per farm amounted to £36,705.8.

TABLE 12

Analysis of average total capital investment in 178 farms covered by the citrus cost of production survey in 7 citrus areas of the Union 1950

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		28	21	67	12	11	14	25	178
Land	£	9129.1	18339.7	16217.0	16753.9	41651.2	16947.5	29388.8	18867.9
Improvements	£	2075.2	3239.7	3466.0	2407.7	3301.5	4841.2	4244.1	3356.5
Citrus Equipment	£	46.5	344.5	169.3	394.6	398.3	296.8	632.0	275.0
General Farm Equipment	£	126.7	335.0	428.6	296.7	377.4	412.2	337.1	343.9
Mechanical power equipment	£	567.7	861.8	821.4	635.9	1152.9	1107.0	1352.2	891.2
Draught Animals	£	41.1	72.3	29.7	26.0	77.1	36.5	34.0	40.4
Other livestock	£	237.0	1663.2	549.0	107.0	287.0	744.4	717.6	624.4
Total	£	12223.3	24856.7	21681.0	20621.8	47245.4	24385.6	36705.8	24399.3
Percentages									
Land	%	74.7	73.8	74.8	81.3	88.2	69.5	80.0	77.3
Improvements	%	17.0	13.0	16.0	11.7	7.0	19.9	11.6	13.8
Citrus equipment	%	0.4	1.4	0.8	1.9	0.8	1.2	1.7	1.1
General farm equipment	%	1.0	1.3	2.0	1.4	0.8	1.7	0.9	1.4
Mechanical power equipment	%	4.6	3.5	3.8	3.1	2.4	4.5	3.7	3.6
Draught Animals	%	0.3	0.3	0.1	0.1	0.2	0.1	0.1	0.2
Other livestock	%	2.0	6.7	2.5	0.5	0.6	3.1	2.0	2.6
Total	%	100	100	100	100	100	100	100	100

The value of land comprised between
69.5 percent in the Western Province and 88.2
percent in the Northern Transvaal of the average total
farm capital. In the latter area, fixed im-
provements, although amounting to £3,301.5 per farm,
comprised only 7.0 percent of the average total
farm capital. The Western Province, with an
average investment per farm of £4,841.2 in fixed
improvements, had a higher percentage of its total
farm capital invested in improvements than any other
area viz. 19.9 percent.

On an average, for all the areas com-
bined, land comprised 77.3 percent of the total farm
capital, improvements 13.8 percent, equipment 6.1
percent and livestock 2.8 percent.

Composition of total land capital: In Tables 13 and 14
an analysis is shown of the average composition of the
total land value of the sample of farms covered by the
survey of seven citrus areas. Citrus orchard land com-
prised between 37.5 percent in the Northern
Transvaal and 83.0 percent in Natal of the total
capital investment in land per farm. In the former
area 32.1 percent of the total land capital was
invested in timber plantations and 11.0 percent in
fallow land yielding no income. In the North
Eastern Cape 25.9 percent of the total land capital
was invested in veld for grazing. In the Western
Province and Eastern Transvaal, 17.7 and 13.6 per-
cent, respectively, of the total land capital was
invested in veld. In each of these areas livestock ,

TABLE 13

Analysis of average composition of total land value of 178 farms covered by the survey in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	21	67	12	11	14	25	178
Average total value of land occupied by:	£	£	£	£	£	£	£	£
Citrus orchards	6897.8	10723.8	10306.9	13898.3	15604.5	11369.6	18105.2	11568.2
Other fruit	0	0	24.6	25.0	5209.1	1192.9	1161.0	589.7
Nurseries	0	0	100.0	0	145.5	26.8	0	48.7
Vegetables	0	0	133.2	0	91.0	41.1	3086.0	492.4
Irrigated Crops	513.4	1718.7	2916.2	835.4	1072.7	0	160.0	1526.3
Dry Land crops	250.1	814.0	703.7	0	0	1005.7	722.2	580.8
Plantations	0	0	0	0	13381.8	114.3	332.0	882.6
Planted Pasture	7.8	95.2	118.7	37.5	113.6	139.3	0	77.6
Veld	812.2	4744.9	1173.9	227.1	1295.6	2995.1	3992.4	2021.1
Fallow land	289.3	193.3	362.0	1362.5	4561.4	0	1689.8	815.7
Waste land	53.6	1.5	149.4	0.2	4.5	46.5	15.6	71.0
Farmstead	304.9	48.3	228.4	367.9	171.5	16.2	124.6	193.8
Total land value	9129.1	18339.7	16217.0	16753.9	41651.2	16947.5	29388.8	18867.9

TABLE 14

Percentage analysis of the average composition of total land value of 178 farms in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	21	67	12	11	14	25	178
	%	%	%	%	%	%	%	%
Citrus Orchards	75.6	58.5	63.6	83.0	37.5	67.1	61.6	61.3
Other fruit	-	-	0.2	0.1	12.5	7.0	4.0	3.1
Nurseries	-	-	0.6	-	0.3	0.2	-	0.3
Vegetables	-	-	0.8	-	0.2	0.2	10.5	2.6
Irrigated Crops	5.6	9.4	18.1	5.0	2.6	-	0.5	8.1
Dry land crops	2.7	4.4	4.3	-	-	5.9	2.5	3.1
Plantations	-	-	-	-	32.1	0.7	1.1	4.7
Planted pasture	0.1	0.5	0.7	0.2	0.3	0.8	-	0.4
Veld	8.9	25.9	7.2	1.4	3.1	17.7	13.6	10.7
Fallow land	3.2	1.0	2.2	8.1	11.0	-	5.7	4.3
Waste land	0.6	-	0.9	-	-	0.3	0.1	0.4
Farmstead	3.3	0.3	1.4	2.2	0.4	0.1	0.4	1.0
Total land value	100	100	100	100	100	100	100	100

would have been required to make a considerable
contribution towards the total farm income in order
to have covered the cost of interest on capital
invested in veld.   It is shown in Table 14 that a
total of 16.4 percent of the total investment in
land per farm for all the areas combined, was invested
in veld, fallow land, waste land and land occupied
by the farmstead i.e. in land which was either to
a certain extent unproductive or which could yield
an income only if utilised as grazing.

Composition of total value of improvements: In
Tables 15 and 16 an analysis is shown of the average
composition of the total capital investment in fixed
improvements per farm in each of the seven citrus
areas of the Union as determined during 1950.
On the basis of a sample of 178 farms.
It will be noted that in most of the
areas, the main items under this heading were :
housing for European managers and foremen, stores
and sheds for implements and supplies, and irrigation
facilities.   With the exception of the Natal area,
in which relatively low amounts were invested on an
average in pumping plant, dams, and boreholes,
irrigation facilities comprised a major percentage
of the total investment in fixed improvements per
farm in all the areas.
The average amount invested in pack-
houses per farm may be misleading in the instance
of the Western Province and Natal areas.   In both
these areas the majority of growers interviewed,
were members of co-operative packhouses.   In each
area one grower with a relatively large packhouse

TABLE 15

<u>Analysis of capital investment in fixed improvements on citrus farms in seven areas of the Union - 1950</u>

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
	£	£	£	£	£	£	£	
Managers' and Foremens houses	121.4	138.1	1029.4	779.2	727.3	528.6	1264.0	739.4
Native houses	165.2	126.0	215.3	370.4	127.8	680.7	172.5	232.5
Garages for cars and trucks	108.7	48.1	75.6	71.8	442.7	130.4	76.6	104.4
Stores and sheds	437.3	534.2	775.9	343.4	872.7	660.7	718.1	652.7
Pumping plant and engine house	469.5	570.4	168.0	19.1	142.3	1033.2	718.0	384.1
Dams, boreholes and wells	291.1	1092.8	220.5	25.0	376.0	328.6	386.0	354.9
Dairy buildings, stables and kraals	30.1	64.5	213.8	23.3	77.3	253.2	87.6	131.3
Irrigation and draining facilities, canals piping etc.	204.1	152.8	363.0	165.8	193.6	294.7	246.4	280.2
Roads and fencing	107.5	309.6	233.9	15.1	49.1	401.2	174.2	201.6
Packhouse	63.0	188.1	94.8	529.2	290.9	409.3	376.0	206.4
Other improvements +	77.3	15.1	75.8	65.4	1.8	120.7	24.7	68.9
Total improvements per farm	2075.2	3239.7	3466.0	2407.7	3301.5	4841.3	4244.1	3356.4
Number of cases	28	21	67	12	11	14	25	178

+ Comprised mostly of fowl houses

TABLE 16

Percentage analysis of capital investment in fixed improvements on farms in seven citrus areas of the Union – 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
	%	%	%	%	%	%	%	%
Managers and Foremen's houses	5.9	4.2	29.7	32.4	22.0	10.9	29.8	22.0
Native houses	8.0	3.9	6.2	15.4	3.9	14.1	4.1	6.9
Garages for cars and trucks	5.2	1.5	2.2	3.0	13.4	2.7	1.8	3.1
Stores and sheds	21.1	16.5	22.4	14.3	26.4	13.6	16.9	19.4
Pumping plant and engine house	22.6	17.6	4.8	0.8	4.3	21.3	16.9	11.5
Dams, boreholes and wells	14.0	33.7	6.4	1.0	11.4	6.8	9.1	10.6
Dairy buildings, kraals and stables	1.5	2.0	6.2	1.0	2.3	5.2	2.1	3.9
Irrigations and drainage facilities	9.8	4.7	10.5	6.9	5.9	6.1	5.8	8.3
Roads and fencing	5.2	9.6	6.7	0.6	1.5	8.3	4.1	6.0
Packhouse	3.0	5.8	2.7	22.0	8.8	8.5	8.9	6.2
Other improvements	3.7	0.5	2.2	2.7	0.1	2.5	0.5	2.1
Total improvements per farm	100	100	100	100	100	100	100	100
Number of cases	28	21	67	12	11	14	25	178

was included in the sample and as the number of
growers in the sample taken in these two areas was
small, the average value shown for packhouses per
farm is considerably higher than in the five re-
maining areas.

Composition of capital investment in mechanical power
equipment: In Table 17 an analysis is given of
the average composition of the total investment
in mechanical power equipment per farm in each of
the seven citrus areas.   With the exception of the
Northern Transvaal, tractors comprised the highest
individual percentage of the total investment in
mechanical power equipment of all the items under
this heading.   In the Northern Transvaal however,
lorries comprised 43.3 percent of the total invest-
ment in mechanical power equipment as against 35.0
percent in the case of tractors.   It will be seen
that the average investment in lorries, tractors
and engines respectively, per farm was relatively
low.   This was due to the fact that all these
implements were not always found on all the farms.
In order to present a more effective reflection of
the degree of mechanisation on citrus farms, an
analysis is presented below, of the percentage
of farms in each area, on which each of the indiv-
idual items under this heading was found.

     According to Table 18, 78.1 percent
of the 178 growers included in the survey during
1950, owned tractors whereas 55.0 percent of
growers owned lorries.   It has been determined by/

TABLE 17

Analysis of capital investment in mechanical power equipment on farms in seven citrus areas of the Union - 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
Motor Car +	£ 107.6	39.4	60.9	64.5	64.6	91.5	80.1	71.3
Lorries	£ 109.4	183.4	215.0	179.1	499.4	211.6	428.5	239.4
Tractors	£ 118.3	337.1	463.1	247.8	403.3	571.9	504.8	390.2
Power sprayer	£ 33.2	62.9	13.2	67.3	127.6	53.9	136.2	53.4
Power duster	£ --	-	-	2.2	1.5	1.3	32.2	4.9
Engines	£ 176.0	239.0	69.1	46.5	54.7	176.8	166.8	125.8
Rotary hoe	£ 23.2	-	-	28.5	1.8	-	3.6	6.2
Total	£ 567.7	861.8	821.3	635.9	1152.9	1107.0	1352.2	891.2
				Percentages				
Motor Car	% 19.0	4.6	7.4	10.1	5.6	8.2	5.9	8.0
Lorries	% 19.3	21.3	26.2	28.2	43.3	19.1	31.7	26.9
Tractors	% 20.8	39.1	56.4	39.0	35.0	51.7	37.3	43.8
Power Sprayer	% 5.8	7.3	1.6	10.6	11.1	4.9	10.1	6.0
Power duster	% -	--	--	0.3	0.1	0.1	2.4	0.5
Engines	% 31.0	27.7	8.4	7.2	4.7	16.0	12.3	14.1
Rotary hoe	% 4.1	-	-	4.5	0.2	-	0.3	0.7
Total	% 100	100	100	100	100	100	100	100

+ Only portion of car allocated to farm business.

TABLE 18. Analysis of occurrence of each under the heading of mechanical power equipment on farms in each of the seven citrus areas of the Union during 1950.

Item.	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	All areas combined
Number of farms on which item occurred.								
Motor Car	25	14	43	6	5	9	17	119
Lorries	10	12	32	5	10	9	20	98
Tractors	13	18	58	8	9	12	21	139
Power sprayer	11	6	12	3	6	4	16	58
Power duster	0	0	0	1	1	1	7	10
Engines	26	16	23	6	3	5	8	87
Rotary hoe	4	0	0	3	0	0	1	8
Number of farms	28	21	67	12	11	14	25	178
Percentage of farms.								
	%	%	%	%	%	%	%	%
Motor car	89.3	66.7	64.2	50.0	45.4	64.3	68.0	66.8
Lorries	35.7	57.1	47.8	41.7	90.9	64.3	80.0	55.0
Tractors	46.4	85.7	86.6	66.7	81.8	85.7	84.0	78.1
Power Sprayer	39.3	28.6	17.9	25.0	54.5	28.6	64.0	32.6
Power duster	-	-	-	8.3	9.1	7.1	28.0	5.6
Engines	92.9	76.2	34.3	50.0	27.3	35.7	32.0	48.9
Rotary hoe	14.3	-	-	25.0	-	-	4.0	4.5

separate analysis that 49.4 percent of the 178
growers owned both lorries and tractors.   The
lowest occurrence of lorries and tractors was found
in the Western Transvaal and Natal areas where
Railway motor transport facilities were available.
In the Northern and Eastern Transvaal areas the
majority of growers interviewed, had both lorries
and tractors on their farms.   It will be noted that
fairly high percentages of the growers in each area
used their motor cars in connection with the farm
business.   Motor cars were allocated to the farm
business on a mileage basis at a conservative rate.

INDEBTEDNESS ON CITRUS FARMS :   In the ensuing three
tables, an analysis is presented of the average bonded
indebtedness of growers in each of the seven citrus
areas of the Union during 1950.   According to Table
19, the average size of bonds per farm varied between
£133.9 in the Western Transvaal and £4,082.4 in the
North Eastern Cape with an average for all the areas
of £1,523.1.   It is also shown that the average
amount of bonds, expressed as a percentage of the
total amount of capital invested per farm, varied
between 1.1 percent in the Western Transvaal and
16.6 percent in the North Eastern Cape with an
average of 6.2 percent for all the areas combined.
As bonds are generally incurred on fixed capital
rather than on floating capital, it is of interest
to note that the average amount of bonded indebtedness
as a percentage of the total amount of fixed cap-
ital per farm, varied between 1.2 percent in the /

TABLE 19.   <u>Analysis of average farm mortgage on citrus farms in seven citrus areas of the Union 1950</u>

Area	Number of cases	Av. bond on farms	Av. total capital per farm	Av. fixed capital per farm	Bond as % of total capital	Bond as % of fixed capital
		£.	£.	£.	%	%
Western Transvaal	28	133.9	12,223.3	11,204.3	1.1	1.2
North Eastern Cape	19	4082.4	24,544.6	21,312.9	16.6	19.2
Eastern Cape Coastal Area	66	1426.4	21,915.0	19,890.9	6.5	7.2
Natal	12	1740.4	20,621.8	19,161.6	8.4	9.1
N. Transvaal	12	908.3	47,245.4	44,952.7	1.9	2.0
Western Province	14	364.3	24,385.6	21,788.7	1.5	1.7
Eastern Transvaal	25	2378.4	36,705.8	33,632.9	6.5	7.1
Average for all areas	176	1523.1	24,361.5	22,197.9	6.2	6.9

TABLE 20   <u>Dispersal of farms according to size of mortgage debt on farms in seven citrus areas of the Union – 1950</u>

Size groups Bond £	W.Tvl	NEC	ECCA	N.Tvl	Natal	WP	E.Tvl	Total	% of total for all areas
			Number of farms						%
0	23	4	36	8	7	11	13	102	57.9
0 – 500	1	1	2	–	1	–	–	5	2.9
501 –1000	3	2	1	–	–	–	2	8	4.5
1001 –1500	1	3	6	1	–	–	1	12	6.8
1501 –2000	–	–	5	1	1	3	–	10	5.7
2001 –2500	–	–	3	–	–	–	1	4	2.3
2501 –3000	–	–	1	1	2	–	1	5	2.9
3001 –3500	–	–	1	–	–	–	2	3	1.7
3501 –4000	–	3	2	–	–	–	–	5	2.9
4001 –4500	–	1	2	–	–	–	–	3	1.7
4501 –5000	–	1	3	1	–	–	1	6	3.4
5001 –5500	–	1	1	–	–	–	–	2	1.1
5501 –6000	–	–	1	–	–	–	1	2	1.1
6001 and more	–	3	2	–	1	–	3	9	5.1
Total	28	19	66	12	12	14	25	176	100

Western Transvaal and 19.2 percent in the North
Eastern Cape with an average for all the areas
combined of 6.9 percent. The relatively low
indebtedness of citrus growers may be regarded as
an indication that the Industry is fundamentally
sound.

In Table 20 the dispersal of farms in
each area is shown according to size of mortgage
debt. In six of the seven areas, over 50 percent
of the growers interviewed had no bonds on their
farms. Of the 176 replies received in this respect
17.0 percent had bonds of over £3,000 per farm
and 25.1 percent had bonds of between £1 - £3,000.
Only 9, or 5.1 percent of the total number had bonds
on their farms of over £6,000.

In Table 21, a dispersal of farms is
shown according to the percentage which bonds con-
stituted of the total fixed capital per farm.
Whereas 58.0 percent of all the growers inter-
viewed had no bonds on their farms, a further 17.6
percent had bonds which constituted less than 15
percent of the total fixed capital per farm. Al-
together 91.5 percent of growers had bonds constit-
uting less than 30.0 percent of the total fixed
capital per farm. In the remaining 8.5 percent
of cases, the mortgage debt position was less sat-
isfactory. It should be borne in mind that a
low percentage of bond debt to fixed capital might
have been caused either by a relatively low bond or
by a relatively high amount of fixed capital per
farm. In view of the present inflationary tendency
in the value of land, grave risks are incurred
by growers who still show, or recently incurred
heavy bonds on land at the present price level.

TABLE 21

Dispersal of farms in seven citrus areas of the Union according to the ratio of bonds to fixed capital 1950.

Ratio bond: fixed capital	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	All areas combined
%			Number of Farms					
0	23	4	36	7	8	11	13	102
0.1 - 15	3	4	10	3	3	3	5	31
15.1 - 30	2	9	12	2	1	-	2	28
30.1 - 45	-	1	4	-	-	-	4	9
45.1 - 60	-	1	2	-	-	-	-	3
60.1 and more	-	-	2	-	-	-	1	3
Number of cases	28	19	66	12	12	14	25	176
			Percentage of farms					
0	82.1	21.0	54.5	58.3	66.7	78.6	52.0	58.0
0.1 - 15	10.7	21.0	15.2	25.0	25.0	21.4	20.0	17.6
15.1 - 30	7.2	47.4	18.2	16.7	8.3	-	8.0	15.9
30.1 - 45	-	5.3	6.1	-	-	-	16.0	5.1
45.1 - 60	-	5.3	3.0	-	-	-	-	1.7
60.1 and more	-	-	3.0	-	-	-	4.0	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

It is evident that those growers who find it
difficult to repay mortgage debt under the present
favourable price conditions on the export market
will find it wellnigh impossible to do so when
prices decline and interest on debt becomes an
increased burden.

FINANCIAL RESULTS OF THE ENTIRE FARMING ORGANISATION

Although the main objective of the
investigation under review was to determine costs
and profits in the Citrus Industry in the Union,
it must be understood that the citrus enterprise
cannot be isolated from the entire farming organ-
isation and studied as an independent component
part of the farm business. Any agricultural
undertaking should be regarded as an organic unit
constituted of the various enterprises practised
on the farm. Owing to supplementary and/or
complementary relationships between the enterprises
it is evident that to study any single enterprise
in isolation would entail a disturbance of the
balance between the various enterprises constituting
the entire farming organisation. In citrus
production, for instance, lucerne is grown in some
areas to be cut and applied in orchards for manuring
purposes. Livestock provide equally valuable
manure in other areas for use in the orchards.
Both lucerne and livestock may have an essential
purpose in this respect although not showing a
profit as individual enterprises.

In view of the above explanation, it
is considered essential to show the financial
results of the entire farming organisation even

although the citrus enterprise was of predominating
importance from both a cost and an income point of
view on each of the farms included in the survey.

COMPOSITION OF TOTAL FARM COSTS : In presenting the
average composition of the total amount of costs
incurred per farm in each of the areas, the diffi-
culty was encountered that some of the growers
interviewed, employed co-operative services in
respect of picking, transport of fruit and packing
whereas other growers performed these tasks them-
selves.   Although the cost of each of these tasks
was calculated separately on all the farms in order
to determine the cost of production of citrus fruit,
it appeared unwarranted to break down each indiv-
idual cost item to determine the balance of the
cost merely for the sake of form in the presentation
of the data.   The final results were considered
the main objective in the analysis of the financial
results of the entire farming organisation.   The
data shown in Tables 22 to 24 should be regarded,
therefore, as the basic material on which the
average financial results per farm were calculated.
In the presentation of the composition of total
costs for citrus production only, the individual
cost items will be shown in proper perspective.

"Total general farm costs" as shown
in Table 22 denotes the average cost incurred by
growers, excluding packing material and co-operative
handling of the fruit i.e. co-operative picking,
transport to packhouse and packing.   It should

TABLE 22

Analysis of composition of average total general
farm costs on 178 farms covered by the survey in
7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	21	67	12	11	14	25	178
Depreciation	£	£	£	£	£	£	£	£
Improvements	41.4	64.8	69.4	48.2	65.5	100.3	84.1	67.3
General Equipment	27.1	115.9	104.8	91.0	121.0	109.2	167.2	103.1
Mech. power eq.	81.0	114.0	111.6	91.1	146.2	141.1	163.7	117.5
Repairs								
Improvements	24.3	49.8	47.8	33.7	41.4	69.8	40.1	43.6
General Equipment	5.5	23.7	30.8	28.2	46.9	31.0	23.5	25.8
Mech. power eq.	52.2	92.8	52.2	45.7	60.1	53.3	65.0	58.9
Running cost mech. power	126.8	279.5	218.9	141.4	267.9	289.5	343.2	232.4
Draught Animals	0.5	13.6	16.2	4.0	1.8	30.9	10.2	12.0
Labour	657.5	721.6	1132.0	1150.4	1848.9	1107.4	2056.3	1182.4
Cash Expenses	354.2	427.0	540.9	813.3	1038.1	1023.3	996.7	649.2
Services by Packhouse	66.4	9.0	113.5	28.8	0	20.5	50.2	64.8
Depreciation on live-stock	1.1	205.3	8.3	8.7	2.7	0	9.7	29.6
Total general farm cost excl. interest	1438.0	2117.0	2446.4	2484.5	3640.5	2976.3	4009.9	2586.6
Interest at 5%	611.2	1242.8	1084.1	1031.1	2362.3	1219.3	1835.3	1220.0
Total general farm cost incl. interest	2049.2	3359.8	3530.5	3515.6	6002.8	4195.6	5845.2	3806.6

TABLE 23

Percentage analysis &position of average total
farm costs on 178 farms covered by the survey in 7
citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	21	67	12	11	14	25	178
Depreciation	%	%	%	%	%	%	%	%
Improvements	2.9	3.1	2.8	1.9	1.8	3.4	2.1	2.6
General Equipment	1.9	5.5	4.3	3.7	3.3	3.7	4.2	4.0
Mech. power eq.	5.6	5.4	4.6	3.7	4.0	4.7	4.1	4.5
Repairs								
Improvements	1.7	2.4	2.0	1.4	1.1	2.3	1.0	1.7
General Equipment	0.4	1.1	1.3	1.1	1.3	1.1	0.6	1.0
Mech. Power eq.	3.6	4.3	2.1	1.8	1.6	1.8	1.6	2.3
Running cost mech.power	8.8	13.2	8.9	5.7	7.4	9.7	8.6	9.0
Draught animals	0	0.6	0.7	0.2	0.1	1.0	0.2	0.5
Labour	45.7	34.1	46.3	46.3	50.8	37.2	51.4	45.7
Cash expenses	24.6	20.2	22.1	32.7	28.5	34.4	24.8	25.1
Services by packhouse	4.7	0.4	4.6	1.2	0	0.7	1.2	2.5
Depreciation on livestock	0.1	9.7	0.3	0.3	0.1	0	0.2	1.1
Total cost excl. interest	100	100	100	100	100	100	100	100
Int. as % of cost incl. interest	29.8	37.0	30.7	29.3	39.4	29.1	31.4	32.0

TABLE 24.

<u>Analysis of composition of total farm costs including cost of Picking, Transport, Packing and Packing material - 7 citrus areas of the Union 1950</u>

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
Number of Cases	28	21	67	12	11	14	25	178
Total general farm costs[1] excl. int.	£ 1438.0	£ 2117.0	£ 2446.4	£ 2484.5	£ 3640.5	£ 2976.3	£ 4009.9	£ 2586.6
Cost of packing material	1204.7	699.7	1595.7	1999.3	2482.1	1504.9	2210.7	1589.7
Cost of Co-operative packing	442.6	243.9	740.0	539.2	1118.8	561.0	337.4	573.9
Cost of Co-operative picking	116.3	-	-	53.1	-	-	45.6	28.3
Cost of road motor transport or hired transport on fruit	57.2	34.3	83.4	46.4	35.0	136.2	97.3	74.1
Total farm costs excluding interest	3258.8	3094.9	4865.5	5122.5	7276.5	5178.4	6700.9	4852.6

[1] In the case of non-co-operative members, the costs of picking, own transport of fruit to packhouse and packing (excluding packing material) are included under total general farm costs. These costs are part of the items related to the cost of improvements, equipment and labour.

be noted however, that the "total general farm
costs" shown in Table 22, includes the cost of
picking, transport and packing of those growers
who performed these tasks themselves. In Table
24, the average cost of co-operative handling of
the fruit plus packing material is added to the
previously mentioned total in order to present the
average total cost for the entire farm business.

As the average total farm costs shown
in Table 24 are not comparable between areas owing
to variations in the average size of farms between
the areas, it is evident that these data are of
value only in as much that they enable a calculation
of the average financial results per farm in each
of the areas. It will be noted that the average
total cost, excluding interest, per farm varied
between £3,094.9 in the North Eastern Cape and
£7,276.5 in the Northern Transvaal with an average
for all the areas combined of £4,852.6.

SUMMARY OF TOTAL FARM INCOME : In Table 25 a
summary is presented of the composition of the total
farm income in each of the seven citrus areas. In
this instance, once again, the average total income
per farm in the various areas, is not comparable
owing to variations in the average size of the total
farm area. The average total farm income varied
between £4,732.0 in the North Eastern Cape and
£15,599.7 in the Northern Transvaal with an average
for all the areas combined of £9,688.5 per farm.

It is evident that the citrus enterprise
contributed a predominating percentage towards the

TABLE 25.

Summary of average total income realised by the entire farming organisation on farms in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	21	67	12	11	14	25	178
Income from crops other than citrus	£ 410.3	76.5	276.6	742.2	1950.0	786.0	2111.4	706.6
Income from live-stock products	£ 79.2	267.5	361.8	37.5	61.4	164.3	46.2	205.9
Appreciation livestock	£ 18.4	84.4	46.3	5.9	11.3	326.4	60.1	65.5
Income from other sources	£ 0	0	7.9	0	6.9	8.8	0	4.1
Income from citrus fruit	£ 7461.1	4303.6	8883.8	9491.7	13570.1	7679.6	11382.0	8706.4
Total farm income	£ 7969.0	4732.0	9576.4	10277.3	15599.7	8965.1	13599.7	9688.5
			Percentages					
Income from crops other than citrus	% 5.2	1.6	2.9	7.2	12.5	8.8	15.5	7.3
Income from live-stock products	% 1.0	5.7	3.7	0.4	0.4	1.8	0.3	2.1
Appreciation livestock	% 0.2	1.8	0.5	0.1	0.1	3.6	0.5	0.7
Income from other sources	% 0	0	0.1	0	0	0	0	0
Income from citrus fruit	% 93.6	90.9	92.8	92.3	87.0	85.7	83.7	89.9
Total farm income	% 100	100	100	100	100	100	100	100

average total farm income in each of the seven
citrus areas.   The percentage of the total farm
income derived from the sale of citrus fruit
varied between 83.7 percent in the Eastern
Transvaal and 93.6 percent in the Western Transvaal
with an average for all the areas combined of
89.9 percent.   Other crops contributed significant
amounts, although only small percentages, towards
the total farm income in all the areas with the
exception of the North Eastern Cape.   In this
area general crop failures were caused by extreme
drought.   Timber in the Northern Transvaal and
sub-tropical fruit and vegetables in the Eastern
Transvaal constituted the main sources of income
under this heading in these two areas where 12.5
and 15.5 percent respectively of the total farm
income was obtained from crops other than citrus.

The average amount of income from
other crops in Natal viz. £742.2 is misleading.
In reality most of the farms covered by the survey,
derived no significant income from crops other than
citrus.   Practically the entire amount on which
the average of £742.2 was based, was comprised by
the income of one grower from sugar cane.

Livestock provided significant gross
incomes in the North Eastern Cape, Eastern Cape
Coastal area and the Western Province where on an
average per farm £351.9, £408.1 and £490.7 respect-
ively was realised by way of livestock products
sold and appreciation on livestock.   It should be
stressed that these figures do not imply any degree
of profitability of the livestock enterprise.

They are quoted merely as an illustration of the relative significance of the enterprise.

SUMMARY OF FINANCIAL RESULTS: In Table 26, below, a summary is presented of the average financial results per farm in each of the seven citrus areas of the Union during 1950.

Table 26.   Summary of average financial results achieved on 178 citrus farms in seven citrus areas of the Union during 1950.

Area.	No. of Cases.	Total cost excluding interest.	Total farm income.	Nett farm income.	Interest on capital @ 5%.	Oper-ators' earn-ings.
		£.	£.	£.	£.	£.
Western Transvaal.	28	3258.8	7969.0	4710.2	611.2	4099.0
North East-ern Cape.	21	3094.9	4732.0	1637.1	1242.8	394.3
Eastern Cape Coastal area	67	4865.5	9576.4	4710.9	1084.1	3626.8
Natal.	12	5122.5	10277.3	5154.8	1031.1	4123.7
Northern Transvaal.	11	7276.5	15599.7	8323.2	2362.3	5960.9
Western Province.	14	5178.4	8965.1	3786.7	1219.3	2567.4
Eastern Transvaal.	25	6700.9	13599.7	6898.8	1835.3	5063.5
All areas combined.	178	4852.6	9688.5	4835.9	1220.0	3615.9

The nett farm income shown in Table 26 represents the balance between income realised and costs, excluding interest, incurred on farms in each of the seven citrus areas. From a personal accounting point of view, nett farm income as calculated above would reflect the financial results achieved by growers with no bonds on their farms. This figure varied between an average of £1637.1 per farm in the North Eastern Cape and £8,323.2

in the Northern Transvaal with an average for all
the areas combined of £4,835.9 per farm.

As a basis for comparison of the
profitability of farming in each of the areas as well
as between farms in the same area, nett farm
income has the disadvantage of not reflecting the
capital intensity at which any particular gross income
was obtained.   Nett farm income may be regarded
as the remuneration earned both by the capital
investment in the farm and the organisation and
management of the farm operator.   By allowing
capital an arbitrary return of 5%, operators earnings
may be calculated from the nett farm income.
This latter unit of measurement of financial success,
reflects the true balance between income realised
and costs incurred including the amount of capital
employed in the process of production.

Average Operator's earnings per farm
varied between £394.3 in the North Eastern Cape
and £5,960.9 in the Northern Transvaal with an
average per farm for all the areas combined of
£3,615.9.   These results indicate beyond doubt
that the Citrus Industry in the Union was enjoying
an extremely prosperous period as a result of
favourable price conditions on the overseas markets.
This aspect of the matter will be expanded upon
at a later stage.

In Table 27 the disporsal of farms in
each area according to operators earnings on the
entire farm business is shown.   It is evident that
the inclusion in the sample of 41 growers (23.0
percent of the sample) with operators earnings

TABLE 27

Dispersal of farms according to operators earnings on the entire farming organisation on farms in 7 citrus areas of the Union - 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Total for all areas	
No. of cases	28	21	67	12	11	14	25	178	% of total 100
Size Groups: operators earnings £			Number of farms						
- 1000 and less		7					2	9	5.1
- 1000 to -500		3		2	1	1		7	3.9
- 500 to 0	1	2	1	1	1	2	2	10	5.6
0 to 500		1	6	1	1	1		10	5.6
500 to 1000	1	1	12	1	1	1	3	20	11.2
1000 to 1500	2	2	6		2	1	1	14	7.9
1500 to 2000	3	1	11	1			1	17	9.6
2000 to 2500	2	1	5	1		1		10	5.6
2500 to 3000	5			1		2	1	9	5.1
3000 to 3500	1	1	4					6	3.4
3500 to 4000	1	.	6		1	2	1	11	6.2
4000 to 4500	1		1	1			1	4	2.2
4500 to 5000	5	1	2		1		1	10	5.6
5000 and more	6	1	13	3	3	3	12	41	23.0
Average per farm £	4099.0	394.3	3626.8	4123.7	5960.9	2567.4	5063.5	3615.9	

considerably above £5000 per farm tended to in-
crease the average unduly in relation to the re-
turns realised by the rest of the sample. It
will be noted that whereas the average amount of
operators earnings per farm for all the areas
combined was £3615.9, only 37.0 percent of growers
in all the areas combined realised more than £3500.

Of the 26 growers (14.6 percent of the
sample) who realised negative financial results
during the year, 12 occurred in the North Eastern
Cape. In spite of the relatively favourable con-
ditions of prices in general, losses instead of pro-
fits were shown by one or more growers in each area.
It will be noted that in most of the areas and parti-
cularly the Eastern Cape, Natal and Northern Trans-
vaal, the average for the area was considerably
above the operators earnings of the majority of
growers in the sample.

RETURN ON CAPITAL : In order to determine returns on
capital investment, the value of the operators time
for his management and risk has to be deducted
from the nett farm income as calculated earlier.
It was found however that not only did growers
find it difficult to allocate their time between
labour, management and leisure but also that most
growers had no idea of the value of their own
time. The problem was complicated even more by
extensive variations in the size of farms of in-
dividual growers.

In order to overcome the above diffi-
culties, it was considered advisable to calculate

remuneration to the grower on a flat rate per
pocket basis. As any particular rate which
may be decided upon will be open to criticism,
a range of rates from 3d to 1/3 per pocket was
applied and returns on capital calculated at each
rate of remuneration to the grower. As nett in-
come represents the combined earnings of the ope-
rator and capital it is evident that an increase
in the allowance to the operator will be accompanied
by a decrease in the returns on capital.

It is shown by the analysis given in
Table 28, that at a basic remuneration to the grower
of 1/3 per pocket, a total amount cf operators earn-
ings of £1500 was realised per farm during 1950. At
this rate of remuneration to the grower, returns on
capital amounted to 13.7 percent for all the areas
combined. The relative ratio between total opera-
tors' remuneration and returns on capital at various
rates of remuneration per pocket is clearly indicated
in the table, for each area and for all the areas
combined. It is evident that even at a relative-
ly high total remuneration per farm to the grower
an exceptionally remunerative return on capital was
realised in all the areas with the exception of the
North Eastern Cape.

In considering which of the suggested
rates of remuneration per pocket should be regarded
as the most appropriate, it should be borne in mind
that the average size of crops per farm as deter-
mined by the survey, was undoubtedly above the true
average for the Union. The calculations for all
areas combined in Table 28 were based on the average
crop per farm of approximately 24,000 pockets. The
average number of bearing trees per farm on these

TABLE 28.

Calculation of return capital investment in citrus production - 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	All areas combined
Nett farm income	£ 4710.2	1637.1	4710.9	5154.8	8323.2	3786.7	6898.8	4835.9
Operators remuneration @ 3d per pocket	£ 195.6	131.6	281.8	361.1	523.4	267.7	480.7	300.0
Returns on capital	£ 4514.6	1505.5	4429.1	4793.7	7799.8	3519.0	6418.1	4535.9
% returns on Capital	36.9	6.0	20.4	23.2	16.5	14.4	17.5	18.6
Operators remuneration @ 6d per pocket	£ 391.2	263.2	563.6	722.2	1046.8	535.4	961.4	600.0
Returns on capital	£ 4319.0	1373.9	4147.3	4432.6	7276.4	3251.3	5937.4	4235.9
% returns on capital	35.3	5.5	19.1	21.5	15.4	13.3	16.2	17.4
Operators remuneration @ 9d per pocket	£ 586.8	394.8	845.4	1083.3	1570.2	803.1	1442.1	900.0
Returns on capital	£ 4123.4	1242.3	3865.5	4071.5	6753.0	2983.6	5456.7	3935.9
% returns on capital	33.7	5.0	17.8	19.7	14.3	12.2	14.9	16.1
Operators remuneration @ 1/-per pocket	£ 782.4	526.4	1127.2	1444.4	2093.6	1070.8	1922.8	1200.0
Returns on Capital	£ 3927.8	1110.7	3583.7	3710.4	6229.6	2715.9	4976.0	3635.9
% returns on capital	32.1	4.5	16.5	18.0	13.2	11.1	13.6	14.9
Operators remuneration @ 1/3 per pocket	£ 978.0	658.0	1409.0	1805.5	2617.0	1338.5	2403.5	1500.0
Returns on capital	£ 3732.2	979.1	3301.9	3349.3	5706.2	2448.2	4495.3	3335.9
% Returns on capital	30.5	3.9	15.2	16.2	12.1	10.0	12.2	13.7

farms amounted to approximately 3500 trees. If
3000 bearing trees are regarded as the maximum size
of orchards which could[i] be managed by one individual
and 6.5 pockets per tree as a normal yield[ii] it will
be found that at the rate of 1/3 per pocket, opera-
tors remuneration will amount to approximately £1200
per annum. Considering that a citrus farm with
3000 bearing citrus trees required a capital invest-
ment for citrus production only, of approximately
£10,000,[iii] this amount does not appear excessive in
view of the responsibility and size of the under-
taking. In view of the preceding argument in justi-
fication of the rate of 1/3 per pocket as applied in
the final calculation in Table 28, it is considered
that the rate of return on capital of 13.7 percent
may, under present conditions, be regarded as a fair-
ly accurate indication of the true return on capital
in citrus production.

i. A point of view favoured by the present
General Manager of the Citrus Exchange.

ii. The average yield per tree for the three
surveys combined was 6.42 pockets (Table 129)

iii. Capital investment for citrus production only,
amounted to £3.39 per tree (Table 42).

CONCERNING THE CITRUS ENTERPRISE

THE ORGANISATION OF CITRUS ORCHARDS

<u>CAPITAL REQUIREMENTS</u>: In Tables 29 to 32 analyses are presented of the average capital investment for citrus production in each of the seven citrus areas during the period 1948 - 1950. The data shown in these tables are the actual average values enumerated during each of the three investigations. On the basis of these values, a combined weighted average value has been calculated for each area and for all the areas combined for the three year period.

Examination of the values of each particular capital item shown for each individual area during the three years, creates the impression that little uniformity existed in the values which were obtained from year to year. The difficulties encountered in enumerating the value of the individual capital items, were pointed out earlier. It will be noted that the average values given for 1949 and 1950 were considerably lower than the 1948 values. This is partly due to the fact that in order to increase the size of the sample during the two later surveys, a number of small farms had to be included in the survey. It will be shown that whereas the average size of citrus orchards per farm was 26.2 morgen during 1948, the average for 1949 was only 23.5 morgen and for 1950, 25.4 morgen. As differences in the average size of farms in the sample are apparently one of the causes for variations in the average total capital investment for citrus production between the three

TABLE 29

Average Capital Investment for citrus production per farm in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Land	£11765.2	9337.9	12144.2	16745.4	19139.6	7961.7	15697.5	12744.4
Fixed improvements	£ 2072.5	2352.6	2558.0	2353.3	3904.9	2484.6	1992.5	2446.1
Citrus Equipment	£ 39.9	159.0	227.1	343.7	348.4	9.3	122.7	171.8
General farm equipm.	£ 84.8	238.7	344.5	220.7	179.1	232.7	204.6	236.6
Mech. power equipment	£ 442.6	967.7	840.9	599.8	885.8	673.0	687.9	755.8
Draught Animals	£ 21.1	0	52.9	76.2	7.1	33.0	38.7	33.4
Total	£14426.1	13055.9	16167.6	20339.1	24464.9	11394.3	18743.9	16388.1
Percentages								
Land	% 81.5	71.6	75.1	82.3	78.2	69.9	83.7	77.8
Fixed improvements	% 14.4	18.0	15.8	11.6	16.0	21.8	10.6	14.9
Citrus Equipment	% 0.3	1.2	1.4	1.7	1.4	0.1	0.7	1.0
General farm equipm.	% 0.6	1.8	2.2	1.1	0.8	2.0	1.1	1.5
Mech. power equipm.	% 3.1	7.4	5.2	2.9	3.6	5.9	3.7	4.6
Draught Animals	% 0.1	0	0.3	0.4	0	0.3	0.2	0.2
Total	% 100	100	100	100	100	100	100	100

TABLE 30

Average capital investment for citrus production per farm in 7 citrus areas of the Union 1949

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		28	24	59	16	13	14	26	180
Land	£	9046.8	8901.7	10100.1	10098.4	18156.3	10748.2	15221.5	11148.3
Fixed improvements	£	1203.1	1573.8	1392.5	690.4	2241.4	1811.5	1168.0	1386.3
Citrus equipment	£	14.8	177.5	66.1	138.8	207.5	42.1	86.6	90.7
General farm equipment	£	62.2	161.5	218.5	153.2	148.7	245.5	198.7	175.0
Mech. power equipment	£	416.6	661.6	626.8	435.9	820.3	780.0	501.4	589.6
Draught Animals	£	39.0	65.4	21.9	41.8	27.0	34.8	51.6	37.8
Total	£	10782.5	11541.5	12425.9	11558.5	21601.2	13662.1	17227.8	13427.7
				Percentages					
Land	%	83.9	77.1	81.3	87.4	84.0	78.7	88.4	83.0
Fixed Improvements	%	11.1	13.6	11.2	6.0	10.4	13.2	6.8	10.3
Citrus Equipment	%	0.1	1.5	0.5	1.2	1.0	0.3	0.5	0.7
General farm equipment	%	0.6	1.4	1.8	1.3	0.7	1.8	1.1	1.3
Mech. power equipment	%	3.9	5.8	5.0	3.8	3.8	5.7	2.9	4.4
Draught Animals	%	0.4	0.6	0.2	0.3	0.1	0.3	0.3	0.3
Total	%	100	100	100	100	100	100	100	100

TABLE 31

Average Capital Investment for citrus production per farm in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Land	£ 6897.8	11368.2	10333.7	13898.3	17360.7	11369.6	19041.8	12000.1
Fixed improvements	£ 1472.8	1846.8	1664.3	1265.1	2892.2	2770.4	2535.8	1925.9
Citrus Equipment	£ 22.8	153.2	41.3	164.3	238.1	43.9	168.9	92.2
General farm equipment	£ 70.7	162.7	257.4	213.9	220.8	201.3	234.1	204.2
Mech. power equipment	£ 499.4	691.0	490.4	445.3	745.0	649.2	806.4	588.9
Draught Animals	£ 19.0	30.2	10.4	18.5	44.8	23.2	24.4	20.0
Total	£ 8982.5	14252.1	12797.5	16005.4	21501.6	15057.6	22811.4	14831.3
				Percentages				
Land	% 76.8	79.8	80.8	86.9	80.7	75.5	83.5	80.9
Fixed improvements	% 16.4	13.0	13.0	7.9	13.5	18.4	11.1	13.0
Citrus equipment	% 0.2	1.1	0.3	1.0	1.1	0.3	0.7	0.6
General farm equipment	% 0.8	1.1	2.0	1.3	1.0	1.3	1.0	1.4
Mech. power equipment	% 5.6	4.8	3.8	2.8	3.5	4.3	3.6	4.0
Draught Animals	% 0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1
Total	% 100	100	100	100	100	100	100	100

TABLE 32.

Average capital investment for citrus production per farm in 7 citrus areas of the Union during the years 1948, 1949 and 1950 combined.

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		77	72	171	38	37	40	79	514
Land	£	9006.8	9812.9	10729.6	13047.6	18217.2	10129.8	16683.9	11921.9
Fixed improvements	£	1538.3	1938.4	1805.7	1309.5	2992.0	2349.0	1906.8	1890.8
Citrus equipment	£	24.6	163.4	98.7	200.8	263.2	32.9	126.6	115.2
General farm equipment	£	71.4	189.8	266.9	190.1	181.9	226.2	212.7	203.5
Mech. Power equipment	£	453.8	781.1	629.7	482.0	817.1	702.1	667.0	638.5
Draught Animals	£	26.9	31.0	25.6	43.5	26.3	30.2	38.1	30.2
Total	£	11121.8	12916.6	13556.2	15273.5	22497.7	13470.2	19635.1	14800.1
				Percentages					
Land	%	81.0	76.0	79.1	85.4	81.0	75.2	85.0	80.5
Fixed improvements	%	13.8	15.0	13.3	8.6	13.3	17.4	9.7	12.8
Citrus equipment	%	0.2	1.3	0.7	1.3	1.2	0.3	0.6	0.8
General farm equipment	%	0.7	1.5	2.0	1.2	0.8	1.7	1.1	1.4
Mech. power equipment	%	4.1	6.0	4.7	3.2	3.6	5.2	3.4	4.3
Draught animals	%	0.2	0.2	0.2	0.3	0.1	0.2	0.2	0.2
Total	%	100	100	100	100	100	100	100	100

years, the average value for the three years
combined, weighted in accordance with 514 obser-
vations made on 260 different farms, should be a
more reliable reflection of the actual capital in-
vestment than any one of the three annual averages.

In view of the large volume of data con-
tained in these tables and in the light of the above
explanation as regards the significance of the com-
bined averages for the three surveys, the detailed
discussion of capital investment for citrus production
may profitably be confined to Table 32.

It is shown in this Table that the aver-
age total investment per farm for citrus production
varied between £11,121.8 in the Western Transvaal
and £22,497.7 in the Northern Transvaal with an
average for all areas for the three years combined
of £14,800.1 per farm. Of the total capital in-
vestment for citrus production, the percentage com-
prised by orchard land capital, varied between 76.0
percent in the North Eastern Cape and 85.4 percent
in Natal with an average for all areas of 80.5 per-
cent. Natal showed the lowest average investment
in improvements for citrus production per farm viz.
£1309.5 as against the highest average in this res-
pect of £2992.0, shown by the Northern Transvaal.
The average investment in improvements for citrus
production on all farms amounted to £1890.8 per
farm, comprising 12.8 percent of the total farm
capital. The total investment per farm in citrus
equipment i.e. fumigation tents, hand operated
dusters and sprays, pruning saws and other appli-
ances, used mainly in connection with the orchards
on farms, varied between £24.6 in the Western Transvaal,

and £263.2 in the Northern Transvaal with an average
for all areas of £115.2 per farm.   In the former
area the majority of farmers included in the survey,
had fumigation and spraying done co-operatively
whereas in the latter area these co-operative facili-
ties were not available to growers.   With the excep-
tion of the Western Transvaal area, where only £71.4
was invested, per farm, in general farm equipment for
citrus production, little difference occurred between
the areas in respect of the average amount invested
per farm in this item.   The average investment in
general farm equipment, per farm, for all the areas
combined, amounted to £203.5 or 1.4 percent of the
total farm capital.

Mechanical power equipment comprised the
major portion of the floating capital for citrus pro-
duction on citrus farms.   The amount invested in trac-
tors, lorries, power dusters and sprays and miscella-
neous engines for citrus production, varied between
£453.8 per farm in the Western Transvaal and £817.1
per farm in the Northern Transvaal.   The average
for all areas amounted to £638.5 per farm, comprising
4.3 percent of the total farm capital.

Draught animals contributed an insigni-
ficant amount both to the total capital and total
costs of citrus farms.

In order to facilitate comparisons of the
three annual averages for all the areas combined with
the average for all the areas for the three sur-
veys combined, a summary of these data is presented
in Table 33.

Table 33   Comparative summary of average composition of total capital investment for citrus production per farm in the Union during the period 1948 - 1950.

Item	1948	1949	1950	Three Years combined.
Number of cases	152	180	182	514
Average per farm : -				
Land	£12744.4	11148.3	12000.1	11921.9
Fixed improvements	£ 2446.1	1386.3	1925.9	1890.8
Citrus equipment	£ 171.8	90.7	92.2	115.2
General farm equipment	£ 236.6	175.0	204.2	203.5
Mechanical power equipment	£ 755.8	589.6	588.9	638.5
Draught animals	£ 33.4	37.8	20.0	30.2
Total capital investment	£16388.1	13427.7	14831.3	14800.1
PERCENTAGES				
Land	% 77.8	83.0	80.9	80.5
Fixed improvements	% 14.9	10.3	13.0	12.8
Citrus equipment	% 1.0	0.7	0.6	0.8
General farm equipment	% 1.5	1.3	1.4	1.4
Mechanical power equipment	% 4.6	4.4	4.0	4.3
Draught animals	% 0.2	0.3	0.1	0.2
Total capital investment	% 100	100	100	100

Value of Citrus Orchard land: In view of the fact that land comprised, on an average, 80.5 percent of the total capital investment for citrus production, it may be desirable to illustrate the average value of citrus orchard land, on a comparable basis, for each of the seven citrus areas. In Tables 34 - 36 the average value of orchard land, calculated as a result of the three investigations, is expressed per morgen and per citrus tree. In Table 37, the weighted average

TABLE 34

Analysis of average value of citrus orchards, per morgen and per citrus tree, on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Av. cap. citrus orchards	£11765.2	9337.9	12144.2	16745.4	19139.5	7961.7	15697.6	12744.4
Av. no. morgen citrus	14.7	22.8	28.7	29.2	33.2	27.0	29.8	26.2
Av. no. citrus trees	2686.4	4661.5	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
Value of citrus orchards per:								
morgen	£ 797.8	410.3	422.4	574.4	577.1	294.9	527.3	486.4
citrus tree	£ 4.4	2.0	2.3	3.8	3.7	1.2	3.3	2.7

TABLE 35.

Analysis of average value of citrus orchards per morgen and per citrus tree on farms in 7 citrus areas of the Union — 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Av. cap. citrus orchards	£9046.8	8901.7	9827.2	10098.4	18133.2	10748.2	15190.7	11052.7
Av. no. morgen citrus	13.8	21.0	22.2	24.3	37.3	31.3	27.5	23.5
Av. no. of citrus trees	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
Value of citrus orchards per:-								
morgen	£ 656.6	423.7	442.2	415.9	486.3	343.6	551.8	470.5
citrus tree	£ 4.0	2.2	2.5	2.9	3.2	1.6	3.4	2.7

TABLE 36   **Analysis of average value of citrus orchards per morgen and per citrus tree on farms in 7 citrus areas of the Union 1950**

Item	Western Transvaal	North Eastern Cape	Eastern Cape coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Av. cap. citrus orchards	£6897.8	11368.2	10306.9	13898.3	17360.7	11369.6	19041.8	11990.2
Av. no. morgen citrus	11.6	23.9	22.1	27.7	38.9	30.6	39.2	25.4
Av. no. of citrus trees	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Value citrus orchards per:								
morgen	£ 593.4	475.9	467.2	501.6	446.0	371.6	484.9	472.6
citrus tree	£ 3.4	2.4	2.7	3.5	3.0	1.7	3.2	2.8

TABLE 37   **Analysis of average value of citrus orchards per morgen and per citrus tree on farms in 7 citrus areas of the Union during the three years 1948, 1949 and 1950 combined**

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Av. cap. citrus orchards	£9006.8	9812.8	10624.9	13047.6	18209.1	10129.8	16673.7	11884.9
Av. no. morgen citrus	13.2	22.5	23.9	26.6	36.5	29.8	32.3	25.0
Av. no. of citrus trees	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Value of citrus orchards per:								
morgen	£ 679.2	435.7	445.0	489.7	499.1	340.4	516.6	476.2
citrus tree	£ 3.9	2.2	2.5	3.4	3.3	1.5	3.3	2.7

value is shown on the same basis for each area
for the three surveys combined.

Perusal of the average value per
morgen and per tree for each area during the three
years leaves the impression that, with the exception
of the Western Transvaal, relatively small disparities
occurred between the three average values determined
for each area.   In the mentioned area, however the
three averages varied between £797.8 per morgen dur-
ing 1948, £656.6 per morgen during 1949 and £593.4
per morgen during 1950.   In this particular area,
it will be admitted, the valuation of land proved to
be an even more difficult matter than under the usual
circumstances.   The location of the area confers
residential value to the land which in itself, ow-
ing to an above average suitability for citrus pro-
duction, is of high agricultural value.   It may be
assumed that during the initial survey growers sub-
mitted bona fide valuations of their land as it occur-
red to them at the time.   During the succeeding
investigations both growers and enumerators were
aware of the comparatively wide margin between values
in this area and the averages for other areas, as
revealed by the report on the 1948 survey.   This
consideration may intentionally or subconsciously
have caused a lowering of the level at which land
was valued.   At any rate, it may be assumed that
the average values for the three year's provide a
more satisfactory basis for the calculation of costs
both in this and in all the other citrus areas.

It is of significance to note that the
average value of orchard land per morgen for all
the areas combined, varied between £476.2 during
1948, £486.4 during 1949 and £470.5 during 1950.

The average for all areas for the three surveys combined, amounted to £472.6 per morgen. Equally significant is the fact that the average value of citrus orchard land per citrus tree was £2.7 during 1948, £2.7 during 1949 and £2.8 during 1950, with an average for the three surveys combined of £2.7 per tree. The combined average values of orchard land for the individual areas varied between £340.4 per morgen(£1.5 per tree) in the Western Province and £679.2 per morgen (£3.9 per tree) in the Western Transvaal.

As a matter of interest, the following values of citrus orchard land per morgen are quoted from the report on the 1938 citrus cost survey.[1]

Area	Value per morgen		1938-1939 1949-1950	
	1938-1939	1949-1950	(1938-1939 = 100)	
Western Transvaal	£ 143	£ 679	100	475
N.E. Cape	199	436	100	219
Eastern Cape Area	184	445	100	242
Natal	440	490	100	111
Northern Transvaal	179	499	100	279
Western Province	190	340	100	179
Eastern Transvaal	146	517	100	354

It is evident that in all the areas with the exception of Natal and the Western Province the value of orchard land has been more than doubled during the period since 1938.

While the above increases in the value of citrus orchard land were comparatively severe and

1. Department of Agriculture and Forestry Bulletin No. 221 Op. Cit. P.48.

may as such be open to criticism, it has been determined that the relative increases in the value of orchard land in each of the seven citrus areas, compare favourably with the general trend in land values from 1938-39 to 1949 - 1950. The following comparative values will illustrate the above claim.[1]

Area	1938-1939 1949-1950 (Values per morgen)		1938-1939 1949-1950 (1938-1939 = 100)	
	£	£		
Cape Province	1.419	3.89	100	274
Natal	4.061	12.00	100	295
Transvaal	2.453	9.08	100	370
Orange Free State	3.686	8.74	100	237
Union of S.A.	1.973	5.74	100	291
Britstown (sheep)	0.926	2.75	100	297
Kuruman (cattle)	0.460	1.09	100	237
Malmesbury (wheat)	5.858	9.52	100	162
Paarl (wine)	22.943	67.13	100	292
Stellenbosch (wine & fruit)	43.909	154.39	100	352
Bethal (Maize)	6.036	17.15	100	284

The above average values were based on actual sales of agricultural land and not on estimates as in the case of the value of citrus orchard land. It will be noted that the value of practically all types of land increased by over 200 percent during the period 1938-39 to 1949-50. Caution should be expressed that although Paarl and Stellenbosch were quoted as representative of the fruit areas, the value of land shown in these two /

1 Office of Census and Statistics, Union of S.A. Special reports Nos. 133 and 187 - Transfers of Rural Immovable Property.

areas (as in the other areas) was based on transfers
of all types of land and not only vineyard and
orchard land. These values should therefore not be
compared with the value of citrus orchard land.
Only the trend in land values in general is of
significance in the above comparative statement.

Percentage of total farm capital comprised by the
citrus enterprise : From a descriptive point of view
it is desirable to illustrate the significance of the
citrus enterprise in the farming organisation in
each of the citrus areas. In Table 38 an analysis
is presented of the percentage of each of the various
capital items employed for citrus production in each
of the seven areas. The percentage of the total
farm capital allocated to citrus production varied
between 39.6 percent in the Northern Transvaal and
77.6 percent in Natal with an average for all areas
of 58.6 percent. In the former area only 37.5 per-
cent of the total land capital on farms, was employed
for citrus production as against 83.0 percent in
Natal. The land utilisation aspect of this matter
has been discussed earlier. In spite of the fact
that citrus was the main enterprise on practically
every farm included in the three surveys, the pro-
portion of the total farm capital allocated to citrus
production, appears relatively low. Although the
capital requirements for citrus production, as dis-
cussed earlier, may appear high to the uninitiated,
it should be borne in mind that these values were
determined by a system of rigid allocations in which
only the direct capital items which applied to citrus,
were allocated. In many instances the value of in-
evitable waste land, fallow land, roads, and the
area occupied by the farmstead was not charged to
citrus production on farms where citrus was the only

TABLE 38

Analysis of the percentage of each of the various items of total farm capital, employed for citrus production on farms in 7 citrus areas of the Union 1950.

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		28	21	67	12	11	14	25	178
Land	%	75.6	58.5	63.7	83.0	37.5	67.1	61.6	61.4
Improvements	%	71.0	52.5	48.0	52.5	58.9	57.2	60.6	54.9
Citrus equipment[i]	%	49.0	46.4	24.4	41.6	59.0	14.8	22.8	31.7
General farm equipment	%	55.8	48.9	60.0	72.1	59.7	48.8	62.5	58.5
Mech. power equipment	%	88.0	77.2	59.7	70.0	58.0	58.6	57.5	64.3
Draught animals	%	46.3	42.0	35.1	71.3	63.4	63.4	76.7	50.2
Total Capital	%	73.5	54.1	59.0	77.6	39.6	61.7	59.5	58.6

[i] The percentage of citrus equipment employed for citrus production is relatively low owing to the fact that picking and packing equipment was included under this heading in the total farm capital. It should be noted that the above allocation of capital is in respect of capital for citrus production only i.e. as defined earlier.

enterprise. This was the case particularly in Natal and the Western Transvaal where the majority of growers concentrated on citrus only. In these instances it would have been justified to charge the entire amount of land capital to citrus production. This aspect of the matter should receive due consideration in any criticism of the values revealed by the surveys.

Under the value of total farm improvements, private citrus packhouses on farms have been included. As these packhouses were omitted in the calculation of the total capital for citrus production, the percentage comprised by total citrus improvements, including packhouses, would have been slightly higher than 54.9 percent of the value of total farm improvements as shown in Table 38. It is of significance that of the three main capital items for citrus production viz. land, improvements and mechanical power equipment, only 61.4, 54.9 and 64.3 percent, respectively, of the total farm capital was allocated to citrus for all the areas combined.

<u>Detailed analysis of capital investment for citrus production per citrus tree</u> : It often occurs that prospective citrus growers require to know what amount of capital they would require to establish and maintain a citrus orchard of a particular number of trees. Whereas the capital requirements for citrus production varies from farm to farm, according to local conditions, and from area to area and it is therefore impossible to furnish specific advice on this matter, the following average capital requirements for each of the seven areas, may serve as /

a guide to growers.   In Tables 39 to 41 the average capital requirements per citrus tree for each of the three surveys, are shown.   In Table 42 the weighted average investment per tree is given for the three surveys combined.   As stated before, these latter averages for the individual areas, may be regarded as a more significant reflection of the actual position and the discussion will therefore be confined to Table 42.

The total capital investment per citrus tree, during the three years 1948 to 1950, varied between £2.02 in the Western Province and £4.85 in the Western Transvaal with an average for all the areas combined of £3.39.   In the former area the average investment in land per citrus tree, was only £1.52 as against £3.93 in the Western Transvaal. It is shown that £0.34 per tree was required in Natal in respect of fixed improvements for citrus production as against £0.67 per tree in the Western Transvaal.   The average investment in fixed improvements per tree for all the areas combined, amounted to £0.43.   The value of mechanical power equipment varied between £0.10 per tree in the Western Province and £0.20 in the Western Transvaal with an average for all areas of £0.14 per tree.

In the application of the findings of an analysis of this nature, one or more qualifying factors are usually in operation.   In this instance, the number of trees planted per morgen of citrus orchard land, exercised considerable influence on capital investment per citrus tree. The average capital requirements per citrus tree, given in Table 42, should be regarded as significant only at the average planting distances/

TABLE 39

Detailed analysis of capital investment for citrus production per citrus tree on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Av. no. trees per farm	2686.4	4661.5	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
Av. investment per tree in:-								
Land	£ 4.38	2.00	2.35	3.81	3.71	1.21	3.27	2.69
Fixed improvements	£ 0.77	0.51	0.50	0.53	0.76	0.38	0.41	0.51
Citrus equipment	£ 0.02	0.03	0.04	0.08	0.07	0	0.03	0.04
General farm equipment	£ 0.03	0.05	0.07	0.05	0.03	0.03	0.04	0.05
Mech. power equipment	£ 0.16	0.21	0.16	0.14	0.17	0.10	0.14	0.16
Draught Animals	£ 0.01	0	0.01	0.01	0	0.01	0.01	0.01
Total cap. investment	£ 5.37	2.80	3.13	4.62	4.74	1.73	3.90	3.46

TABLE 40

Detailed analysis of capital investment for citrus production per citrus tree on farms in 7 citrus areas of the Union 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Av. no. trees per farm	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
Av. invest. per tree in:								
Land	£ 4.02	2.18	2.55	2.86	3.19	1.61	3.41	2.73
Fixed improvements	£ 0.53	0.39	0.35	0.20	0.39	0.27	0.26	0.34
Citrus equipment	£ 0.01	0.04	0.02	0.04	0.04	0.01	0.02	0.02
General farm equipment	£ 0.03	0.04	0.05	0.04	0.03	0.04	0.05	0.04
Mech. power equipment	£ 0.18	0.16	0.16	0.12	0.14	0.12	0.11	0.15
Draught animals	£ 0.02	0.02	0.01	0.01	0	0	0.01	0.01
Total cap. investment	£ 4.79	2.83	3.14	3.27	3.79	2.05	3.86	3.29

TABLE 41   Detailed analysis of capital investment for citrus production per citrus tree on farms in 7 citrus areas of the Union   -   1950.

Item	W. Transvaal	N.E.Cape	E.C.C.A.	Natal	N.Transvaal	W.Province	E.Transvaal	Av. all areas
No. of cases	28	22	67	12	12	14	27	182
Av. no. trees per farm	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Av.invest. per tree in: Land	£ 3.38	2.38	2.73	3.53	2.98	1.68	3.19	2.77
Fixed improvements	£ 0.72	0.39	0.44	0.32	0.50	0.41	0.42	0.44
Citrus equipment	£ 0.01	0.03	0.01	0.04	0.04	0.01	0.03	0.02
General farm equipment	£ 0.03	0.03	0.07	0.05	0.04	0.03	0.04	0.05
Mech. power equipment	£ 0.24	0.14	0.13	0.11	0.13	0.10	0.13	0.14
Draught animals	£ 0.01	0.01	0	0	0	0	0.01	0
Total cap. investment	£ 4.39	2.98	3.38	4.05	3.69	2.23	3.82	3.42

TABLE 42.   Detailed analysis of capital investment for citrus production per citrus tree on farms in 7 citrus areas of the Union during the years 1948, 1949 and 1950 combined.

Item	W.Transvaal	N.E. Cape	E.C.C.A.	Natal	N.Transvaal	W.Province	E.Transvaal	Av.all areas
No. of cases	77	72	171	38	37	40	79	514
Av. no. trees per farm	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Av. invest. per tree in: Land	£ 3.93	2.18	2.55	3.35	3.28	1.52	3.28	2.73
Fixed improvements	£ 0.67	0.43	0.43	0.34	0.54	0.35	0.37	0.43
Citrus equipment	£ 0.01	0.04	0.02	0.05	0.05	0.01	0.02	0.03
General farm equipment	£ 0.03	0.04	0.06	0.05	0.03	0.03	0.04	0.05
Mech. power equipment	£ 0.20	0.17	0.15	0.12	0.14	0.10	0.13	0.14
Draught animals	£ 0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total capital invest.	£ 4.85	2.87	3.22	3.92	4.05	2.02	3.85	3.39

shown in Table 89. It will be understood that
as land comprised the major portion of the
capital investment per morgen on citrus farms, a
smaller or larger number of trees planted to the
morgen will cause a higher or lower investment per
tree. In the following analysis various additional
aspects of the matter will be presented.

Calculation of total capital investment for citrus
production in terms of various units :   For des-
criptive purposes and in view of the influence of
capital costs on total farm costs, it was considered
necessary to express the total capital investment for
citrus production in terms of several other units
of measurement. In the ensuing four tables an
analysis is presented of capital investment for
citrus production per morgen of citrus orchard land,
per citrus tree, per bearing tree and per pocket of
citrus fruit produced on farms in each of the seven
citrus areas of the Union during the period 1948-1950.
In Table 46 the weighted average values are shown for
the three years combined for each of the areas.

Each one of the four units of measure-
ment employed in the analysis, serves a different
purpose. By employing the unit of area (i.e. per
morgen) differences in the number of trees per mor-
gen, the percentage of bearing trees and yield per
bearing tree, are eliminated. Capital investment
per morgen represents the basic capital requirements
of each of the areas and the values given are com-
parable between areas without qualifications as
regards the above factors. According to Table 46,
the capital investment for citrus production per
morgen varied between £452.6 in the Western Province
and £838.8 in the Western Transvaal with an average

TABLE 43.

Calculation of the total capital investment for citrus production per morgen per citrus tree, per bearing tree and per pocket of citrus fruit produced on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average:- Total capital	£14426.1	13055.9	16167.6	20339.1	24464.9	11394.3	18743.9	16388.1
Number of morgen citrus	14.7	22.8	28.7	29.2	33.2	27.0	29.8	26.2
Number of citrus trees	2686.4	4661.5	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
Number of bearing trees	2150.0	4392.5	4577.4	4257.6	4241.9	4561.5	4186.7	4094.8
Number of pockets produced	16119.4	20522.1	32998.7	33242.1	38782.8	21062.3	30534.2	27641.3
Average investment per: morgen	£ 978.2	573.7	562.4	697.7	737.6	422.0	629.6	625.5
citrus tree	£ 5.37	2.80	3.13	4.62	4.74	1.73	3.90	3.46
bearing tree	£ 6.71	2.97	3.53	4.78	5.77	2.50	4.48	4.00
pocket of fruit	£ 0.89	0.64	0.49	0.61	0.63	0.54	0.61	0.59

TABLE 44

Calculation of the total capital investment for citrus production per morgen, per citrus tree, per bearing tree and per pocket of citrus fruit produced on farms in 7 citrus areas of the Union 1949.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average: Total capital	£10782.5	11541.5	12425.9	11558.5	21601.2	13662.1	17227.8	13427.7
Number of morgen citrus	13.8	21.0	22.2	24.3	37.3	31.3	27.5	23.5
Number of citrus trees	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
Number of bearing trees	1817.8	3978.7	3332.4	3386.2	4862.8	4656.3	3571.5	3435.8
Number of pockets produced	14138.3	13140.7	19760.0	19365.6	39441.9	19382.4	19593.0	19335.9
Average investment per:								
morgen	£ 782.6	549.4	559.1	476.0	579.4	436.7	625.8	571.6
citrus tree	£ 4.79	2.83	3.14	3.27	3.79	2.05	3.86	3.29
bearing tree	£ 5.93	2.90	3.73	3.41	4.44	2.93	4.82	3.91
pocket of fruit	£ 0.76	0.88	0.63	0.60	0.55	0.70	0.88	0.69

TABLE 45

Calculation of the total capital investment for citrus production per morgen, per citrus tree, per bearing tree and per pocket of citrus fruit produced on farms in 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Ave age: Total capital	£ 8982.5	14252.1	12797.5	16005.4	21501.6	15057.6	22811.4	14831.3
Number of morgen citrus	11.6	23.9	22.1	27.7	38.9	30.6	39.2	25.4
Number of citrus trees	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Number of bearing trees	1648.6	4574.3	3128.9	3654.2	4510.2	4598.8	4353.5	3496.3
Number of pockets produced	15651.4	10529.4	22544.7	28890.6	41870.2	21418.1	38453.5	23997.8
Average investment per: morgen	£ 772.7	596.7	580.2	577.6	552.4	492.1	580.9	584.6
citrus tree	£ 4.39	2.98	3.38	4.05	3.69	2.23	3.82	3.42
bearing tree	£ 5.45	3.12	4.09	4.38	4.77	3.27	5.24	4.24
pocket of fruit	£ 0.57	1.35	0.57	0.55	0.51	0.70	0.59	0.62

TABLE 46

Calculation of the total capital investment for citrus production per morgen per citrus tree, per bearing tree and per pocket of citrus fruit produced on farms in 7 citrus areas of the Union for the three years 1948, 1949 and 1950 combined.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Average: Total capital	£11121.8	12916.6	13556.2	15273.5	22497.7	13470.2	19635.1	14800.1
Number of morgen citrus	13.2	22.5	23.9	26.6	36.5	29.8	32.3	25.0
Number of citrus trees	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Number of bearing trees	1846.9	4310.1	3580.3	3700.1	4547.1	4607.7	4041.3	3652.1
Number of pockets produced	15228.8	15008.3	24335.0	26025.2	40015.7	20598.9	29639.9	23442.7
Average investment per: morgen	£ 838.8	573.6	567.8	573.2	616.7	452.6	608.3	593.0
citrus tree	£ 4.85	2.87	3.22	3.92	4.05	2.02	3.85	3.39
bearing tree	£ 6.02	3.00	3.79	4.13	4.95	2.92	4.86	4.05
pocket of fruit	£ 0.73	0.86	0.56	0.59	0.56	0.65	0.66	0.63

for all areas combined of £593.0. In the five
areas not mentioned, capital investment was on a
more or less equal level on.a morgen basis.

Variations in the average proximity
of planting of citrus trees in the various areas,
led to a wide disparity in the average capital
investment per citrus tree between the areas. It
is shown, for instance, that although the North
Eastern Cape and Natal both had a total capital
investment for citrus production of £573 per morgen,
the former area showed an investment of £2.87 per
citrus tree as against £3.92 per tree in the latter
area. It will be shown later that in the North
Eastern Cape a considerably larger number of trees
was planted per morgen than in Natal. The Western
Province area which showed the lowest capital in-
vestment per morgen also had the largest number
of trees planted per morgen and consequently showed
by far the lowest investment per citrus tree of
all the areas. In the calculation of cost of pro-
duction per citrus tree, this factor will prove of
considerable significance in the determination of the
amount of interest on capital per tree.

Variations in the average percentage
of bearing trees of the total number of citrus trees,
were responsible for a further disparity between
areas as regards capital investment per bearing
tree. Capital per bearing citrus tree varied be-
tween £2.92 in the Western Province and £6.02 in
the Western Transvaal with an average for all areas
of £4.05. This calculation is of importance as in
the calculation of costs, bearing trees are charged
with the entire farm cost for citrus production

The significance of this latter calculation is perhaps more clearly illustrated by the final analysis shown in Table 46 in which capital investment per pocket of citrus fruit is given.

Variations in yield per bearing tree between areas determined, in the final instance, the disparities in capital investment per pocket of fruit produced. Although this factor is of no practical value to the farmer, it has theoretical value in as much that it provides a direct indication of the extent to which differences in interest per pocket may be expected between areas. In this analysis it is shown for instance that the Western Province lost its comparative advantage of the lowest capital investment per morgen, per citrus tree and per bearing tree as a result of a low yield per tree. The Northern Transvaal with a relatively high average investment per morgen and per tree, showed the lowest investment of £0.56 per pocket as a result of a relatively high yield per tree. The North Eastern Cape area showed the highest investment of £0.86 per pocket as a result of a general crop failure in the area and not because the average level of capital investment for citrus production in the area was high.

In order to facilitate a comparison of the results of these analyses for the three surveys, the average values for all the areas combined during each of the years 1948 to 1950 is summarised in Table 47.

Table 47. Comparative summary of average capital
investment for citrus production in the
Union, expressed in terms of various
units, during the period 1948 - 1950.

Item	1948	1949	1950	Three Years combined.
Average per farm: -				
Total capital investment	£16388.1	13427.7	14831.3	14800.1
Number of morgen citrus	26.2	23.5	25.4	25.0
Number of citrus trees	4736.5	4080.2	4334.0	4364.2
Number of bearing trees	4094.8	3435.8	3496.3	3652.1
Number of pockets of citrus fruit produced.	27641.3	19335.9	23997.8	23442.7
Average investment per:				
Morgen citrus £	625.5	571.6	584.6	593.0
Citrus tree £	3.46	3.29	3.42	3.39
Bearing tree £	4.00	3.91	4.24	4.05
Pocket of citrus fruit £	0.59	0.69	0.62	0.63

Ratio of fixed to floating capital. In Tables 48 to 50
various aspects of the composition of the total capital
for citrus production by fixed and floating capital
for the period 1948 - 1950, is shown. In Table 51
the same analysis is presented for each area for the
three surveys combined. It may be seen that the per-
centages comprised by fixed and floating capital,
respectively, of the total capital for citrus produc-
tion were remarkably similar in all the areas. On an
average, for all the areas, fixed capital comprised
93.3 percent of the total citrus capital as against
6.7 percent floating capital.

The amount of fixed capital per morgen varied
between £419.3 in the Western Province and £795.3 in
the Western Transvaal with an average for all areas of
£553.4. The amount of floating capital per morgen
varied between £32.4 in the Eastern Transvaal and

TABLE 48.

Analysis of the ratio between fixed and floating capital for citrus production on farms in 7 citrus areas of the Union 1948

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		21	26	45	10	12	12	26	152
Total capital investment	£	14426.1	13055.9	16167.6	20339.1	24464.9	11394.3	18743.9	16388.1
Total fixed capital	£	13837.7	11690.5	14702.2	19098.7	23044.5	10446.3	17690.1	15190.6
Total floating capital	£	588.4	1365.4	1465.4	1240.4	1420.4	948.0	1053.8	1197.5
No. of morgen citrus		14.7	22.8	28.7	29.2	33.2	27.0	29.8	26.2
No. of citrus trees		2686.4	4661.5	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
% fixed capital of total capital	%	95.9	89.5	90.9	93.9	94.2	91.7	94.4	92.7
% floating capital of total capital	%	4.1	10.5	9.1	6.1	5.8	8.3	5.6	7.3
Total fixed capital per morgen	£	938.3	513.7	511.4	655.2	694.8	386.9	594.2	579.8
Total floating capital per morgen	£	39.9	60.0	51.0	42.6	42.8	35.1	35.4	45.7
Total fixed capital per citrus tree	£	5.15	2.51	2.84	4.34	4.47	1.59	3.68	3.21
Total floating capital per citrus tree	£	0.22	0.29	0.28	0.28	0.28	0.14	0.22	0.25

TABLE 49

Analysis of the ratio between fixed and floating capital for citrus production on farms in 7 citrus areas of the Union 1949

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		28	24	59	16	13	14	26	180
Total capital investment	£	10782.5	11541.5	12425.9	11358.5	21601.2	13662.1	17227.8	13427.7
Total fixed capital	£	10250.0	10475.5	11492.6	10783.8	20397.7	12559.7	16389.4	12534.6
Total floating capital	£	532.5	1066.0	933.3	769.7	1203.5	1102.4	838.4	893.1
No. of morgen citrus		13.8	21.0	22.2	24.3	37.3	31.3	27.5	23.5
No. of citrus trees		2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
% fixed capital of total capital	%	95.1	90.8	92.5	93.3	94.4	91.9	95.1	93.3
% floating capital of total capital	%	4.9	9.2	7.5	6.7	5.6	8.1	4.9	6.7
Total fixed capital per morgen	£	743.9	498.6	517.1	444.3	547.1	401.4	595.4	533.6
Total floating capital per morgen	£	38.6	50.7	42.0	31.7	32.3	35.2	30.4	38.0
Total fixed capital per citrus tree	£	4.56	2.57	2.90	3.05	3.58	1.88	3.67	3.07
Total floating capital per citrus tree	£	0.24	0.26	0.24	0.22	0.21	0.16	0.19	0.22

TABLE 50.

Analysis of the ratio between fixed and floating capital for citrus production on farms in 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Total capital investment	£ 8982.5	14252.1	12797.5	16005.4	21501.6	15057.6	22811.4	14831.3
Total fixed capital	£ 8370.6	13215.0	11998.0	15163.4	20252.9	14140.0	21577.6	13926.0
Total floating capital	£ 611.9	1037.1	799.5	842.0	1248.7	917.6	1233.8	905.3
Number of morgen citrus	11.6	23.9	22.1	27.7	38.9	30.6	39.2	25.4
Number of citrus trees	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
% fixed capital of total capital	% 93.2	92.7	93.8	94.7	94.2	93.9	94.6	93.9
% floating capital of total capital	% 6.8	7.3	6.2	5.3	5.8	6.1	5.4	6.1
Total fixed capital per morgen	£ 720.1	553.2	543.9	547.2	520.3	462.1	549.5	548.9
Total floating capital per morgen	£ 52.6	43.4	36.2	30.4	32.1	30.0	31.4	35.7
Total fixed capital per citrus tree	£ 4.10	2.77	3.17	3.84	3.48	2.09	3.61	3.21
Total floating capital per citrus tree	£ 0.30	0.22	0.21	0.21	0.21	0.14	0.21	0.21

TABLE 51

Analysis of the ratio between fixed and floating capital for citrus production on farms in 7 citrus areas of the Union for the three years 1948, 1949 and 1950 combined

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Total capital invest-ment	£11121.8	12916.6	13556.2	15273.5	22497.7	13470.2	19635.1	14800.1
Total fixed capital	£10545.1	11751.3	12535.3	14357.1	21209.2	12478.8	18590.7	13812.7
Total floating capital	£ 576.7	1165.3	1020.9	916.4	1288.5	991.4	1044.4	987.4
Number of morgen citrus	13.2	22.5	23.9	26.6	36.5	29.8	32.3	25.0
Number of citrus trees	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5130.1	4370.0
% fixed capital of total capital	% 94.8	91.0	92.5	94.0	94.3	92.6	94.7	93.3
% floating capital of total capital	% 5.2	9.0	7.5	6.0	5.7	7.4	5.3	6.7
Total fixed capital per morgen	£ 795.3	521.8	525.0	538.8	581.4	419.3	576.0	553.4
Total floating capital per morgen	£ 43.5	51.7	42.8	34.4	35.3	33.3	32.4	39.6
Total fixed capital per citrus tree	£ 4.60	2.61	2.98	3.69	3.81	1.87	3.65	3.16
Total floating capital per citrus tree	£ 0.25	0.26	0.24	0.24	0.23	0.15	0.20	0.23

£51.7 in the North Eastern Cape with an average for
all areas of £39.6.

The amount of fixed capital per citrus tree
varied between £1.87 in the Western Province and
£4.60 in the Western Transvaal with an average for
all areas of £3.16. Floating capital per citrus tree
varied between £0.15 in the Western Province and £0.26
in the North Eastern Cape with an average for all areas
of £0.23. It should be noted that a remarkable simi-
larity existed between six of the seven areas in re-
spect of floating capital per citrus tree. It appears
as if the number of citrus trees per farm was the de-
termining factor in the total amount of floating capital
that was required per farm. It appears furthermore
as if, on an average, growers in most of the areas re-
quired the same amount of floating capital per citrus
tree for the production of citrus fruit.

ANALYSIS OF THE COMPOSITION OF CITRUS ORCHARDS. The
average composition of citrus orchards in each of the
seven citrus producing areas of the Union is one of
the most important aspects of the organisation of citrus
farms in South Africa. Information as regards the
composition of orchards by varieties and by age groups,
is not only desirable but essential in the enterpre-
tation of the cost data which will be submitted in a
later section.

Composition of total citrus orchards by varieties: In
Tables 52 to 54 an analysis is given to illustrate the
average composition of total citrus orchards on farms
in the seven citrus areas, by various species of citrus
trees. In Table 55 the weighted average composition
of orchards for the three surveys combined is shown.
According to the data contained in the latter Table,
the average total number of trees per farm varied

TABLE 52

Analysis by species of average composition of total citrus orchards on farms in 7 citrus areas of the Union — 1948.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average total. Citrus trees	2686.4	4661.4	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
Orange trees	2617.7	4441.7	4157.4	3775.3	4820.1	6316.3	3717.8	4115.8
Grapefruit trees	3.9	212.2	846.2	623.5	23.5	119.3	510.6	427.0
Lemon trees	31.2	7.2	156.9	0	26.3	25.0	544.7	149.2
Naartjie trees	6.3	0.3	9.2	0	241.2	78.3	17.2	31.8
Seville trees	27.3	0	0	0	43.3	41.7	13.0	12.7
Percentages								
Citrus trees %	100	100	100	100	100	100	100	100
Oranges trees %	97.5	95.3	80.4	85.8	93.5	96.0	77.4	86.9
Grapefruit trees %	0.1	4.5	16.4	14.2	0.5	1.8	10.6	9.0
Lemon trees %	1.2	0.2	3.0	0	0.5	0.4	11.3	3.1
Naartjie trees %	0.2	0	0.2	0	4.7	1.2	0.4	0.7
Seville trees %	1.0	0	0	0	0.8	0.6	0.3	0.3

TABLE 53.

Analysis by species of average composition of total citrus orchards on farms in 7 citrus areas of the Union 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average total: Citrus trees	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
Orange trees	2201.6	3953.6	3213.2	3180.5	5431.4	6255.6	3955.7	3655.7
Grapefruit trees	8.9	125.6	652.2	337.5	17.2	90.9	154.4	292.5
Lemon trees	16.9	0	82.8	0	36.6	106.6	334.3	89.0
Naartjie trees	19.3	0	11.5	18.8	208.3	105.7	17.3	34.2
Seville trees	3.4	0	0.2	0	0	102.8	1.3	8.8
Percentages								
Citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	97.8	96.9	81.1	89.9	95.4	93.9	88.6	89.6
Grapefruit trees %	0.4	3.1	16.5	9.5	0.3	1.4	3.5	7.2
Lemon trees %	0.8	0	2.1	0	0.6	1.6	7.5	2.2
Naartjie trees %	0.9	0	0.3	0.6	3.7	1.6	0.4	0.8
Seville trees %	0.1	0	0	0	0	1.5	0	0.2

TABLE 54.

Analysis by species of average composition of total citrus orchards on farms in 7 citrus areas of the Union – 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Average total:								
Citrus trees	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Orange trees	1998.8	4696.7	3052.4	3484.3	5612.3	6390.8	4762.4	3796.8
Grapefruit trees	9.8	68.0	639.3	450.1	57.7	108.1	542.1	367.3
Lemon trees	13.0	0	84.2	0	55.3	94.3	594.0	132.0
Naartjie trees	17.9	4.5	6.7	8.3	94.1	73.1	75.2	29.4
Seville trees	3.4	0	0	0	0	99.3	2.6	8.5
Percentages								
Citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	97.8	98.5	80.7	88.4	96.4	94.5	79.7	87.6
Grapefruit trees %	0.5	1.4	16.9	11.4	1.0	1.6	9.1	8.5
Lemon trees %	0.6	0	2.2	0	1.0	1.4	9.9	3.0
Naartjie trees %	0.9	0.1	0.2	0.2	1.6	1.0	1.2	0.7
Seville trees %	0.2	0	0	0	0	1.5	0.1	0.2

TABLE 55

Analysis by species of average composition of total citrus orchards on farms in 7 citrus areas of the Union during the three years 1948, 1949 and 1950 combined

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Average total: Citrus trees	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Orange trees	2241.3	4356.9	3398.7	3433.0	5291.8	6321.1	4153.1	3841.7
Grapefruit trees	7.9	139.3	698.2	448.3	32.4	105.4	404.2	358.8
Lemon trees	19.4	2.6	102.8	0	39.3	77.8	492.3	122.0
Naartjie trees	15.2	1.5	9.0	10.5	182.0	86.1	37.0	31.8
Seville trees	10.0	0	0.1	0	14.0	83.3	5.6	9.9
Percentages								
Citrus trees	% 100	100	100	100	100	100	100	100
Orange trees	% 97.7	96.8	80.8	88.2	95.2	94.7	81.6	88.1
Grapefruit trees	% 0.4	3.1	16.6	11.5	0.6	1.6	7.9	8.2
Lemon trees	% 0.8	0.1	2.4	0	0.7	1.2	9.7	2.8
Naartjie trees	% 0.7	0	0.2	0.3	3.3	1.3	0.7	0.7
Seville trees	% 0.4	0	0	0	0.2	1.2	0.1	0.2

between 2293.8 in the Western Transvaal and 6673.7
in the Western Province with an average for all areas
of 4364.2 trees. It is of interest to know to
which extent the averages as regards total number
of trees per farm, given in Table 55 were represen-
tative of each individual area. In view of the
importance of the average total number of trees per
farm, an analysis is presented in Table 56 of the
dispersal of 182 farms in seven citrus areas during
1950 according to number of trees per farm. The 1950.
survey has been selected for this analysis as the
averages for this year closely resembled those for
the three surveys combined. The dispersal of farms
could not be analysed for the entire 514 cases in-
cluded in the three surveys combined as duplication
and triplication of the same farms occurred to make
up the total sample. According to Table 56, 59.9
percent of all the growers included in the 1950 survey,
had less than 4000 trees which is just short of the
average number per farm for the three surveys combined.
In the Western Transvaal, Eastern Cape Coastal area
and Natal the majority of growers had less than 4000
trees. The average number of trees per farm in the
Eastern Cape Coastal area was somewhat unduly increased
by the inclusion of five citrus producing units each
comprised of more than 10,000 trees.

The analysis presented in Table 55, shows
that during the period 1948 - 1950, orange trees
comprised on an average, 88.1 percent of the total
number of citrus trees per farm, grapefruit trees
8.2 percent, lemon trees 2.8 percent, naartje

TABLE 56

Dispersal of farms according to size of citrus orchards by number of citrus trees in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas	
No. of cases	28	22	67	12	12	14	27	182	% of total number farms 100
Size groups: Number of trees									
0 - 1000	4	1	2	1	-	1	-	9	4.9
1001 - 2000	11	7	20	5	1	1	2	47	25.8
2001 - 3000	10	3	18	-	2	-	5	38	20.9
3001 - 4000	1	1	8	1	2	1	1	15	8.3
4001 - 5000	1	2	6	1	2	-	5	17	9.3
5001 - 6000	1	1	4	1	2	4	-	13	7.1
6001 - 7000	-	1	1	-	-	2	4	8	4.4
7001 - 8000	-	-	1	1	-	2	4	8	4.4
8001 - 9000	-	3	-	1	-	-	1	5	2.8
9001 -10000	-	2	2	1	-	1	2	8	4.4
10,001 -11,000	-	-	-	-	1	-	1	2	1.1
11,001 -12,000	-	-	1	-	-	1	-	2	1.1
12,001 and more	-	1	4	-	2	1	2	10	5.5
Average number of trees per farm	2043	4769	3783	3943	5819	6766	5976	4334	

trees 0.7 percent and seville trees 0.2 percent. The percentage of orange trees of the total number of citrus trees per farm, varied between 80.8 percent in the Eastern Cape Coastal area and 97.7 percent in the Western Transvaal. In the former area grapefruit trees comprised 16.6 percent of the total number of citrus trees per farm, whereas in the latter area other species of citrus fruit were not grown in significant numbers on an average per farm. Although grapefruit trees are shown to have comprised 11.5 percent of the average total number of citrus trees per farm in Natal, the impression created by the average composition of orchards in Natal is false as grapefruit is not generally produced in this area. The entire number of grapefruit trees enumerated in this area occurred on a single farm near Zululand where this fruit was produced on a large scale.

Although comprising a relatively small percentage of the average total number of citrus trees per farm, grapefruit and lemon trees to the extent of 404.2 and 492.3 respectively, were found on an average per farm in the Eastern Transvaal. The Eastern Cape Coastal Area, Eastern Transvaal and to a lesser extent the Western Province should be regarded as the main grapefruit and lemon producing areas in the Union. Naartjes are grown commercially mainly in the Northern Transvaal, portions of the Eastern Cape Coastal Area and the Western Province and sevilles mainly in the Western Province and Northern Transvaal although only on a limited scale.

Composition of all citrus trees under one year by varieties: During the war years 1939 - 1946, various factors came into operation which tended to check new plantings of citrus trees. It is contended by

the S.A. Co-operative Citrus Exchange that plant-
ings effected during these years were not even
sufficient to replace the number of trees that
went out of production owing to age. The factors
mentioned were viz: difficulties in disposing of
crops owing to limited exports of fruit and scar-
city of fertilizers and essential production re-
quirements. It is of particular interest to know
at this stage whether growers have attempted to
make up the lee-way in replacements incurred
during the war through extensive new plantings
and also whether any expansion of the Industry
may be observed. It is also of importance to the
Industry to be aware of any significant trends in
new plantings particularly as regards the varieties
of oranges planted. For the above reasons, de-
tailed analyses are presented of some of the most
significant aspects of the composition of citrus
orchards as determined by the surveys.

In Tables 57 to 59 analyses are shown of
the average composition of all citrus trees under
1 year in each of the seven citrus areas of the
Union during the period 1948 - 1950. In Table
60 the weighted average composition is given for
the three years combined. According to the latter
Table, the average total number of young trees
planted annually per farm during this period,
varied between 27.1 in Natal and 445.9 in the
Western Province with an average per farm for all
areas of 182.8. New plantings were limited in
number in the Western Transvaal, North Eastern
Cape and Natal. In the Northern Transvaal, Western
Province and Eastern Transvaal areas, extensive
new plantings were indicated. It is significant
that in all the areas, new plantings consisted

TABLE 57

Analysis by species of average composition of all citrus trees under 1 year on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average number of trees under 1 yr:-								
All citrus trees	16.2	0	242.5	40.0	302.5	492.5	267.9	185.3
Orange trees	13.6	0	239.7	40.0	302.5	492.5	233.5	178.2
Grapefruit trees	0	0	2.2	0	0	0	0	0.7
Lemon trees	0.2	0	0.5	0	0	0	33.5	5.9
Naartjie trees	2.4	0	0.1	0	0	0	0.9	0.5
Seville trees	0	0	0	0	0	0	0	0
			Percentages					
All citrus trees	% 100	100	100	100	100	100	100	100
Orange trees	% 84.0	0	98.8	100	100	100	87.2	96.2
Grapefruit trees	% 0	0	0.9	0	0	0	0	0.4
Lemon trees	% 1.2	0	0.2	0	0	0	12.5	3.2
Naartjie trees	% 14.8	0	0.1	0	0	0	0.3	0.2
Seville trees	% 0	0	0	0	0	0	0	0

TABLE 58

Analysis by species of average composition of all citrus trees
under 1 year on farms in 7 citrus areas of the Union - 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average number of trees under 1 year:-								
All citrus trees	110.8	1.6	94.0	9.4	207.7	689.8	146.2	138.8
Orange trees	109.8	1.6	93.5	9.4	169.2	664.8	142.4	133.3
Grapefruit trees	0	0	0	0	0	0	0	0
Lemon trees	0	0	0.5	0	0	0	3.8	0.7
Naartjie trees	1.0	0	0	0	38.5	0	0	2.9
Seville trees	0	0	0	0	0	25.0	0	1.9
Percentages								
All citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	99.1	100	99.5	100	81.5	96.4	97.4	96.0
Grapefruit trees %	0	0	0	0	0	0	0	0
Lemon trees %	0	0	0.5	0	0	0	2.6	0.5
Naartjie trees %	0.9	0	0	0	18.5	0	0	2.1
Seville trees %	0	0	0	0	0	3.6	0	1.4

TABLE 59

Analysis by species of average composition of all citrus trees under 1 year on farms in 7 citrus areas of the Union - 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Average number of trees under 1 year:								
All citrus trees	96.6	135.2	202.6	40.0	539.7	161.9	456.0	224.1
Orange trees	95.2	135.2	199.2	40.0	533.0	137.9	452.3	219.7
Grapefruit trees	0.5	0	3.1	0	0	10.0	0	2.1
Lemon trees	0	0	0.3	0	0	0	3.7	0.6
Naartjie trees	0.9	0	0	0	6.7	0	0	0.6
Seville trees	0	0	0	0	0	14.0	0	1.1
Percentages								
All citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	98.6	100	98.3	100	98.8	85.2	99.2	98.0
Grapefruit trees %	0.5	0	1.5	0	0	6.2	0	0.9
Lemon. trees %	0	0	0.2	0	0	0	0.8	0.3
Naartjie trees %	0.9	0	0	0	1.2	0	0	0.3
Seville trees %	0	0	0	0	0	8.6	0	0.5

TABLE 60

Item	Western Transvaal	North. Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Average number of trees under 1 year:								
All citrus trees	79.8	41.9	175.6	27.1	346.1	445.9	292.1	182.8
Orange trees	78.3	41.9	173.4	27.1	330.4	428.7	278.3	177.2
Grapefruit trees	0.2	0	1.8	0	0	3.5	0	0.9
Lemon trees	0	0	0.4	0	0	0	13.5	2.2
Naartjie trees	1.3	0	0	0	15.7	0	0.3	1.4
Seville trees	0	0	0	0	0	13.7	0	1.1
Percentages								
All citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	98.1	100	98.8	100	95.5	96.1	95.3	96.9
Grapefruit trees %	0.3	0	1.0	0	0	0.8	0	0.5
Lemon trees %	0	0	0.2	0	0	0	4.6	1.2
Naartjie trees %	1.6	0	0	0	4.5	0	0.1	0.8
Seville trees %	0	0	0	0	0	3.1	0	0.6

practically entirely of orange trees. Of the average total number of young trees planted annually per farm during this period, 96.9 per-sent consisted of orange trees. In the Eastern Transvaal only, noticeable attention was given to the planting of young lemon trees at the average rate of 13.5 trees per farm per annum.

Composition of the total number of bearing trees by varieties: In Tables 61 to 63 an analysis is shown of the average composition of bearing citrus orchards by species of citrus trees, during each of the years 1948 to 1950. In Table 64 the weighted average composition of orchards for the three surveys combined, is given. According to the data contained in the latter Table, the average number of bearing citrus trees per farm varied between 1846.9 in the Western Transvaal and 4607.7 in the Western Province with an average of 3652.1 trees per farm for all the areas combined.

Of the total number of bearing citrus trees per farm, oranges comprised, on an average for all the areas, 86.7 percent, grapefruit 9.5 percent, lemons 2.9 percent, naartjies 0.7 percent and sevilles 0.2 percent. Bearing grape-fruit trees, it will be noted, comprised a slightly higher percentage of the average total number of bearing trees per farm than did total grapefruit trees of the total number of citrus trees per farm. The respective proportions·were 9.5 percent in the case of the former analysis as against 8.2 percent in the latter analysis. It appears as if the relative importance of grapefruit in the grapefruit producing areas declined after the war as a result of greater concentration by growers

TABLE 61

Analysis by species of the average composition of the total number of bearing trees on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average number of bearing trees:								
All citrus trees	2150.0	4392.4	4577.4	4257.6	4241.9	4561.5	4186.8	4094.8
Orange trees	2114.2	4210.1	3613.4	3634.1	4074.3	4328.0	3206.2	3532.9
Grapefruit trees	3.9	174.8	839.6	623.5	23.5	119.3	471.4	411.9
Lemon trees	28.0	7.2	115.7	0	22.1	12.5	479.9	124.1
Naartjie trees	3.9	0.3	8.7	0	120.4	60.0	16.3	20.2
Seville trees	0	C	0	0	1.6	41.7	13.0	5.7
Percentages								
All citrus trees %	10C	100	100	100	100	100	100	100
Orange trees %	98.3	95.8	78.9	85.4	96.0	94.9	76.6	86.3
Grapefruit trees %	0.2	4.0	18.4	14.6	0.6	2.6	11.2	10.1
Lemon trees %	1.3	0.2	2.5	0	0.5	0.3	11.5	3.0
Naartjie trees %	0.2	0	0.2	0	2.8	1.3	0.4	0.
Seville trees %	0	0	0	0	0.1	0.9	0.3	0.

TABLE 62

Analysis by species of the average composition of the total number of bearing trees on farms in 7 citrus areas of the Union 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average number of bearing trees:-								
All citrus trees	1817.8	3978.7	3332.5	3386.2	4862.8	4656.3	3571.5	3435.8
Orange trees	1772.2	3853.1	2613.7	3029.9	4708.4	4300.3	3134.0	3042.6
Grapefruit trees	8.9	125.6	632.1	337.5	17.2	80.2	134.8	282.3
Lemon trees	16.9	0	75.2	0	36.6	106.6	287.9	79.8
Naartjie trees	16.4	0	11.5	18.8	100.6	105.7	13.5	25.4
Seville trees	3.4	0	0	0	0	63.5	1.3	5.7
				Percentages				
All citrus trees	% 100	100	100	100	100	100	100	100
Orange trees	% 97.5	96.8	78.4	89.5	96.8	92.4	87.8	88.6
Grapefruit trees	% 0.5	3.2	19.0	10.0	0.4	1.7	3.8	8.2
Lemon trees	% 0.9	0	2.3	0	0.8	2.3	8.1	2.3
Naartjie trees	% 0.9	0	0.3	0.5	2.0	2.3	0.3	0.7
Seville trees	% 0.2	0	0	0	0	1.3	0	0.2

TABLE 63.

Analysis by species of the average composition of the total number of bearing trees on farms in 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Average number of bearing trees:-								
All citrus trees	1643.6	4574.3	3120.9	3654.2	4510.1	4598.8	4353.5	3496.3
Orange trees	1609.6	4501.0	2421.1	3195.8	4309.7	4271.3	3235.4	2986.5
Grapefruit trees	9.3	68.0	623.2	450.1	57.7	98.1	522.8	357.6
Lemon trees	12.8	0	77.9	0	55.3	92.4	521.8	118.8
Naartjie trees	13.5	4.5	6.7	8.3	87.4	73.1	70.9	27.6
Seville trees	3.4	0	0	0	0	63.9	2.6	5.8
Percentages								
All citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	97.6	98.4	77.4	87.5	95.6	92.9	74.3	85.4
Grapefruit trees %	0.6	1.5	19.9	12.3	1.3	2.1	12.0	10.2
Lemon trees %	0.8	0	2.5	0	1.2	2.0	12.0	3.4
Naartjie trees %	0.8	0.1	0.2	0.2	1.9	1.6	1.6	0.8
Seville trees %	0.2	0	0	0	0	1.4	0.1	0.2

TABLE 64

Analysis by species of the average composition of the total number of bearing trees on farms in 7 citrus areas of the Union during the three years 1948, 1949 and 1950 combined.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Average number of bearing trees:								
All citrus trees	1846.9	4310.1	3580.3	3700.1	4547.1	4607.7	4041.3	3652.1
Orange trees	1806.3	4180.2	2801.3	3241.3	4373.4	4298.4	3192.4	3167.7
Grapefruit trees	7.7	125.8	683.2	448.3	32.4	98.2	378.3	347.4
Lemon trees	18.5	2.6	86.9	0	38.0	73.4	431.0	106.7
Naartjie trees	11.9	1.5	8.9	10.5	102.8	80.6	34.0	24.6
Seville trees	2.5	0	0	0	0.5	57.1	5.6	5.7
				Percentages				
All citrus trees	% 100	100	100	100	100	100	100	100
Orange trees	% 97.8	97.0	78.2	87.6	96.2	93.3	79.0	86.7
Grapefruit trees	% 0.4	2.9	19.1	12.1	0.7	2.1	9.4	9.5
Lemon trees	% 1.0	0.1	2.4	0	0.8	1.6	10.7	2.9
Naartjie trees	% 0.7	0	0.3	0.3	2.3	1.8	0.8	0.7
Seville trees	% 0.1	0	0	0	0	1.2	0.1	0.2

on the planting of young orange trees. It may for
instance be seen that whereas bearing grapefruit
trees comprised 19.1 percent of the total number
of bearing citrus trees in the Eastern Cape Coastal
area during the period 1948 - 1950 (Table 64) total
grapefruit trees comprised only 16.6 percent of the
total number of citrus trees, in this area during
the same period (Table 55). In the Eastern Trans-
vaal these percentages were 9.4 as against 7.9
respectively.

The percentage of bearing orange trees,
of the average total number of bearing citrus trees
per farm, varied between 78.2 percent in the Eastern
Cape Coastal Area and 97.8 percent in the Western
Transvaal. In the former area bearing grapefruit
trees, and also lemons to a smaller extent, were an
important component part of citrus orchards. In
the Western Transvaal the production of oranges was
the main concern of growers. Although the propor-
tion of bearing grapefruit trees to the total number
of bearing trees per farm, was small in the North
Eastern Cape, Natal, Western Province and Eastern
Transvaal areas, the quantity of grapefruit produced
in these areas was by no means insignificant. The
Eastern Transvaal with 9.4 percent bearing grape-
fruit and 10.7 percent bearing lemon trees, pro-
duced a high percentage of the total grapefruit
crop as well as of the total lemon crop of the
Union.

Composition of all citrus orchards by age groups:
It is of importance to know the average composi-
tion of the total number of citrus trees per

farm, by age groups. In Tables 65 to 67 an analysis
of this nature is presented for the trees covered
by each survey and in Table 68 the weighted aver-
ages are shown for each area for the three surveys
combined. According to the latter Table the
average age composition of all the orchards covered
by the surveys during the three years 1948 to 1950
consisted of 4.2 percent of trees under 1 year,
12.1 percent of trees between the ages of 1 - 5
years and 83.7 percent of bearing trees i.e. trees
over 5 years of age.

It is of interest to note that if the
average productive life of citrus trees is taken
at 33-1/3 years, the rate of replacement of bearing
trees, in order to keep the number of bearing
trees per farm constant, should be 3 percent.
At this rate the average number of young trees
planted per farm would have been 109.6. If the
average life of citrus trees is taken as 40 years,
the rate of replacement would have to be $2\frac{1}{2}$ per-
cent and the number of young trees planted per farm
91.3. These figures, calculated on the basis
of the average number of bearing trees per farm
as revealed by the three surveys, indicate that
a considerable number of young trees in excess of
the normal rate of replacement, was planted per
farm during the period 1948 - 1950. To which
extent this excess in plantings served to make
up the deficit in replacements incurred during
the war years, is difficult to determine. At
any rate it appears as if expansion of orchards
was undertaken in the Northern Transvaal, Western
Province and Eastern Transvaal areas. In these
areas 346.1, 445.9 and 292.1 young trees were

TABLE 65 <u>Analysis of average composition of all citrus orchards by age groups on farms in 7 citrus areas of the Union 1948.</u>

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
<u>Average total number of trees:</u>								
under 1 year	16.2	0	242.5	40.0	302.5	492.5	267.9	185.3
1 - 5 years	520.2	269.0	349.8	101.2	610.0	1526.6	348.6	456.4
over 5 years	2150.0	4392.4	4577.4	4257.6	4241.9	4561.5	4186.8	4094.8
Total	2686.4	4661.4	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
				Percentages				
<u>Percentage of trees:</u>								
under 1 year	% 0.6	0	4.7	0.9	5.9	7.5	5.6	3.9
1 - 5 years	% 19.4	5.8	6.8	2.3	11.8	23.2	7.2	9.6
over 5 years	% 80.0	94.2	88.5	96.8	82.3	69.3	87.2	86.5
Total	% 100	100	100	100	100	100	100	100

TABLE 66

Analysis of average composition of all citrus orchards by age groups on farms in 7 citrus areas of the Union – 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average total number of trees:								
Under 1 year	110.8	1.6	94.0	9.4	207.7	689.8	146.2	138.8
1 – 5 years	321.5	98.9	533.4	141.2	623.0	1315.5	745.3	505.6
Over 5 years	1817.8	3978.7	3332.5	3386.2	4862.8	4656.3	3571.5	3435.8
Total	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
			Percentages					
Percentage of trees:								
Under 1 year	% 4.9	0	2.3	0.3	3.7	10.4	3.3	3.4
1 – 5 years	% 14.3	2.4	13.5	4.0	10.9	19.7	16.7	12.4
Over 5 years	% 80.8	97.6	84.2	95.7	85.4	69.9	80.0	84.2
Total	% 100	100	100	100	100	100	100	100

TABLE 67

Analysis of average composition of all citrus orchards by age groups on farms in 7 citrus areas of the Union - 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coas-Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Total citrus trees: Under 1 year	96.6	135.2	202.6	40.0	539.7	161.9	456.0	224.1
1 - 5 years	297.7	59.7	451.1	248.5	769.6	2004.9	1166.8	613.6
Over 5 years	1648.6	4574.3	3128.9	3654.2	4510.1	4598.8	4353.5	3496.3
Total	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Percentages								
Total citrus trees: Under 1 year	% 4.7	2.8	5.4	1.0	9.3	2.4	7.5	5.2
1 - 5 years	% 14.6	1.3	11.9	6.3	13.2	29.6	19.5	14.1
over 5 years	% 80.7	95.9	82.7	92.7	77.5	68.0	72.9	80.7
Total	% 100	100	100	100	100	100	100	100

TABLE 68.

Analysis of average composition of all citrus orchards by age groups on farms in 7 citrus areas of the Union during the three years 1948, 1949 and 1950 combined

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Total citrus trees: Under 1 year	79.8	41.9	175.6	27.1	346.1	445.9	292.1	182.8
1 – 5 years	367.1	148.3	452.9	164.6	666.3	1620.1	758.8	529.3
Over 5 years	1846.9	4310.1	3580.3	3700.1	4547.1	4607.7	4041.3	3652.1
Total	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Percentages								
Total citrus trees under 1 year %	3.5	0.9	4.1	0.7	6.2	6.6	5.7	4.2
1 – 5 years %	16.0	3.3	10.8	4.2	12.0	24.3	14.9	12.1
over 5 years %	80.5	95.8	85.1	95.1	81.8	69.1	79.4	83.7
Total %	100	100	100	100	100	100	100	100

planted annually per farm. In the North Eastern
Cape area, which suffered severe drought during
this period, and Natal, few plantings were under-
taken. The percentage of bearing citrus trees
varied between 69.1 percent in the Western Pro-
vince and 95.8 percent in the North Eastern Cape
with an average for all areas of 83.7 percent.
The percentage of total non-bearing trees varied
correspondingly between 4.2 percent in the North
Eastern Cape and 30.9 percent in the Western
Province with an average for all areas of 16.3
percent.

Finally it is of significance to note
that the percentage of bearing trees declined from
86.5 percent to 84.2 percent and 80.7 percent during
the period 1948 to 1950 with a corresponding in-
crease in the percentage of non-bearing trees. As
citrus trees take at least 5 years to reach ma-
turity, the annual number of plantings will have
an accumulative effect on the total number of non-
bearing trees and a consequent increase in the
percentage of non-bearing trees per farm. This
tendency would continue until the new plantings
start coming into production.

Composition of orange orchards by varieties and
age groups: In the ensuing Tables the analysis
of citrus orchards is continued with the object
of giving more specific information as regards
the varieties of oranges grown in each of the
various areas. In Tables 69 to 71 analyses are
presented of the average composition of orange
orchards by varieties and age groups in each of
the seven citrus areas of the Union during the

enterprise. This was the case particularly in
Natal and the Western Transvaal where the majority
of growers concentrated on citrus only. In these
instances it would have been justified to charge
the entire amount of land capital to citrus pro-
duction. This aspect of the matter should receive
due consideration in any criticism of the values re-
vealed by the surveys.

Under the value of total farm improve-
ments, private citrus packhouses on farms have been
included. As these packhouses were omitted in the
calculation of the total capital for citrus produc-
tion, the percentage comprised by total citrus im-
provements, including packhouses, would have been
slightly higher than 54.9 percent of the value of
total farm improvements as shown in Table 38. It
is of significance that of the three main capital
items for citrus production viz. land, improvements
and mechanical power equipment, only 61.4, 54.9
and 64.3 percent, respectively, of the total farm
capital was allocated to citrus for all the areas com-
bined.

Detailed analysis of capital investment for citrus
production per citrus tree : It often occurs that
prospective citrus growers require to know what
amount of capital they would require to establish
and maintain a citrus orchard of a particular number
of trees. Whereas the capital requirements for citrus
production varies from farm to farm, according to
local conditions, and from area to area and it is
therefore impossible to furnish specific advice
on this matter, the following average capital re-
quirements for each of the seven areas, may serve as /

a guide to growers. In Tables 39 to 41 the average capital requirements per citrus tree for each of the three surveys, are shown. In Table 42 the weighted average investment per tree is given for the three surveys combined. As stated before, these latter averages for the individual areas, may be regarded as a more significant reflection of the actual position and the discussion will therefore be confined to Table 42.

The total capital investment per citrus tree, during the three years 1948 to 1950, varied between £2.02 in the Western Province and £4.85 in the Western Transvaal with an average for all the areas combined of £3.39. In the former area the average investment in land per citrus tree, was only £1.52 as against £3.93 in the Western Transvaal. It is shown that £0.34 per tree was required in Natal in respect of fixed improvements for citrus production as against £0.67 per tree in the Western Transvaal. The average investment in fixed improvements per tree for all the areas combined, amounted to £0.43. The value of mechanical power equipment varied between £0.10 per tree in the Western Province and £0.20 in the Western Transvaal with an average for all areas of £0.14 per tree.

In the application of the findings of an analysis of this nature, one or more qualifying factors are usually in operation. In this instance, the number of trees planted per morgen of citrus orchard land, exercised considerable influence on capital investment per citrus tree. The average capital requirements per citrus tree, given in Table 42, should be regarded as significant only at the average planting distances/

TABLE 39 — Detailed analysis of capital investment for citrus production per citrus tree on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Av. no. trees per farm	2686.4	4661.5	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
Av. investment per tree in:- Land	£ 4.38	2.00	2.35	3.81	3.71	1.21	3.27	2.69
Fixed improvements	£ 0.77	0.51	0.50	0.53	0.76	0.38	0.41	0.51
Citrus equipment	£ 0.02	0.03	0.04	0.08	0.07	0	0.03	0.04
General farm equipment	£ 0.03	0.05	0.07	0.05	0.03	0.03	0.04	0.05
Mech. power equipment	£ 0.16	0.21	0.16	0.14	0.17	0.10	0.14	0.16
Draught Animals	£ 0.01	0	0.01	0.01	0	0.01	0.01	0.01
Total cap. investment	£ 5.37	2.80	3.13	4.62	4.74	1.73	3.90	3.46

TABLE 40 — Detailed analysis of capital investment for citrus production per citrus tree on farms in 7 citrus areas of the Union 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Av. no. trees per farm	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
Av. invest. per tree in: Land	£ 4.02	2.18	2.55	2.86	3.19	1.61	3.41	2.73
Fixed improvements	£ 0.53	0.39	0.35	0.20	0.39	0.27	0.26	0.34
Citrus equipment	£ 0.01	0.04	0.02	0.04	0.04	0.01	0.02	0.02
General farm equipment	£ 0.03	0.04	0.05	0.04	0.03	0.04	0.05	0.04
Mech. power equipment	£ 0.18	0.16	0.16	0.12	0.14	0.12	0.11	0.15
Draught animals	£ 0.02	0.02	0.01	0.01	0	0	0.01	0.01
Total cap. investment	£ 4.79	2.83	3.14	3.27	3.79	2.05	3.86	3.29

TABLE 41 — Detailed analysis of capital investment for citrus production per citrus tree on farms in 7 citrus areas of the Union — 1950.

Item	W. Transvaal	N.E.Cape	E.C.C.A.	Natal	N.Transvaal	W.Province	E.Transvaal	Av. all areas
No. of cases	28	22	67	12	12	14	27	182
Av. no. trees per farm	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Av. invest. per tree in:								
Land	£ 3.38	2.38	2.73	3.53	2.98	1.68	3.19	2.77
Fixed improvements	£ 0.72	0.39	0.44	0.32	0.50	0.41	0.42	0.44
Citrus equipment	£ 0.01	0.03	0.01	0.04	0.04	0.01	0.03	0.02
General farm equipment	£ 0.03	0.03	0.07	0.05	0.04	0.03	0.04	0.05
Mech. power equipment	£ 0.24	0.14	0.13	0.11	0.13	0.10	0.13	0.14
Draught animals	£ 0.01	0.01	0	0	0	0	0.01	0
Total cap. investment	£ 4.39	2.98	3.38	4.05	3.69	2.23	3.82	3.42

TABLE 42. — Detailed analysis of capital investment for citrus production per citrus tree on farms in 7 citrus areas of the Union during the years 1948, 1949 and 1950 combined.

Item	W.Transvaal	N.E. Cape	E.C.C.A.	Natal	N.Transvaal	W.Province	E.Transvaal	Av.all areas
No. of cases	77	72	171	38	37	40	79	514
Av. no. trees per farm	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Av. invest. per tree in:								
Land	£ 3.93	2.18	2.55	3.35	3.28	1.52	3.28	2.73
Fixed improvements	£ 0.67	0.43	0.43	0.34	0.54	0.35	0.37	0.43
Citrus equipment	£ 0.01	0.04	0.02	0.05	0.05	0.01	0.02	0.03
General farm equipment	£ 0.03	0.04	0.06	0.05	0.03	0.03	0.04	0.05
Mech. power equipment	£ 0.20	0.17	0.15	0.12	0.14	0.10	0.13	0.14
Draught animals	£ 0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total capital invest.	£ 4.85	2.87	3.22	3.92	4.05	2.02	3.85	3.39

shown in Table 89. It will be understood that
as land comprised the major portion of the
capital investment per morgen on citrus farms, a
smaller or larger number of trees planted to the
morgen will cause a higher or lower investment per
tree. In the following analysis various additional
aspects of the matter will be presented.

Calculation of total capital investment for citrus
production in terms of various units : For des-
criptive purposes and in view of the influence of
capital costs on total farm costs, it was considered
necessary to express the total capital investment for
citrus production in terms of several other units
of measurement. In the ensuing four tables an
analysis is presented of capital investment for
citrus production per morgen of citrus orchard land,
per citrus tree, per bearing tree and per pocket of
citrus fruit produced on farms in each of the seven
citrus areas of the Union during the period 1948-1950.
In Table 46 the weighted average values are shown for
the three years combined for each of the areas.

Each one of the four units of measure-
ment employed in the analysis, serves a different
purpose. By employing the unit of area (i.e. per
morgen) differences in the number of trees per mor-
gen, the percentage of bearing trees and yield per
bearing tree, are eliminated. Capital investment
per morgen represents the basic capital requirements
of each of the areas and the values given are com-
parable between areas without qualifications as
regards the above factors. According to Table 46,
the capital investment for citrus production per
morgen varied between £452.6 in the Western Province
and £838.8 in the Western Transvaal with an average

TABLE 43.

Calculation of the total capital investment for citrus production per morgen per citrus tree, per bearing tree and per pocket of citrus fruit produced on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average:- Total capital	£14426.1	13055.9	16167.6	20339.1	24464.9	11394.3	18743.9	16388.1
Number of morgen citrus	14.7	22.8	28.7	29.2	33.2	27.0	29.8	26.2
Number of citrus trees	2686.4	4661.5	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
Number of bearing trees	2150.0	4392.5	4577.4	4257.6	4241.9	4561.5	4186.7	4094.8
Number of pockets produced	16119.4	20522.1	32998.7	33242.1	38782.8	21062.3	30534.2	27641.3
Average investment per: morgen	£ 978.2	573.7	562.4	697.7	737.6	422.0	629.6	625.5
citrus tree	£ 5.37	2.80	3.13	4.62	4.74	1.73	3.90	3.46
bearing tree	£ 6.71	2.97	3.53	4.78	5.77	2.50	4.48	4.00
pocket of fruit	£ 0.89	0.64	0.49	0.61	0.63	0.54	0.61	0.59

TABLE 44

Calculation of the total capital investment for citrus production per morgen, per citrus tree, per bearing tree and per pocket of citrus fruit produced on farms in 7 citrus areas of the Union 1949.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average: Total capital	£10782.5	11541.5	12425.9	11558.5	21601.2	13662.1	17227.8	13427.7
Number of morgen citrus	13.8	21.0	22.2	24.3	37.3	31.3	27.5	23.5
Number of citrus trees	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
Number of bearing trees	1817.8	3978.7	3332.4	3386.2	4862.8	4656.3	3571.5	3435.8
Number of pockets produced	14138.3	13140.7	19760.0	19365.6	39441.9	19382.4	19593.0	19335.9
Average investment per:								
morgen	£ 782.6	549.4	559.1	476.0	579.4	436.7	625.8	571.6
citrus tree	£ 4.79	2.83	3.14	3.27	3.79	2.05	3.86	3.29
bearing tree	£ 5.93	2.90	3.73	3.41	4.44	2.93	4.82	3.91
pocket of fruit	£ 0.76	0.88	0.63	0.60	0.55	0.70	0.88	0.69

TABLE 45

Calculation of the total capital investment for citrus production per morgen, per citrus tree, per bearing tree and per pocket of citrus fruit produced on farms in 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Ave age: Total capital	£ 8982.5	14252.1	12797.5	16005.4	21501.6	15057.6	22811.4	14831.3
Number of morgen citrus	11.6	23.9	22.1	27.7	38.9	30.6	39.2	25.4
Number of citrus trees	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Number of bearing trees	1648.6	4574.3	3128.9	3654.2	4510.2	4598.8	4353.5	3496.3
Number of pockets produced	15651.4	10529.4	22544.7	28890.6	41870.2	21418.1	38453.5	23997.8
Average investment per: morgen	£ 772.7	596.7	580.2	577.6	552.4	492.1	580.9	584.6
citrus tree	£ 4.39	2.98	3.38	4.05	3.69	2.23	3.82	3.42
bearing tree	£ 5.45	3.12	4.09	4.38	4.77	3.27	5.24	4.24
pocket of fruit	£ 0.57	1.35	0.57	0.55	0.51	0.70	0.59	0.62

TABLE 46

Calculation of the total capital investment for citrus production per morgen per citrus tree, per bearing tree and per pocket of citrus fruit produced on farms in 7 citrus areas of the Union for the three years 1948, 1949 and 1950 combined.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Average: Total capital	£11121.8	12916.6	13556.2	15273.5	22497.7	13470.2	19635.1	14800.1
Number of morgen citrus	13.2	22.5	23.9	26.6	36.5	29.8	32.3	25.0
Number of citrus trees	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Number of bearing trees	1846.9	4310.1	3580.3	3700.1	4547.1	4607.7	4041.3	3652.1
Number of pockets produced	15228.8	15008.3	24335.0	26025.2	40015.7	20598.9	29639.9	23442.7
Average investment per: morgen	£ 838.8	573.6	567.8	573.2	616.7	452.6	608.3	593.0
citrus tree	£ 4.85	2.87	3.22	3.92	4.05	2.02	3.85	3.39
bearing tree	£ 6.02	3.00	3.79	4.13	4.95	2.92	4.86	4.05
pocket of fruit	£ 0.73	0.86	0.56	0.59	0.56	0.65	0.66	0.63

for all areas combined of £593.0. In the five
areas not mentioned, capital investment was on a
more or less equal level on a morgen basis.

Variations in the average proximity
of planting of citrus trees in the various areas,
led to a wide disparity in the average capital
investment per citrus tree between the areas. It
is shown, for instance, that although the North
Eastern Cape and Natal both had a total capital
investment for citrus production of £573 per morgen,
the former area showed an investment of £2.87 per
citrus tree as against £3.92 per tree in the latter
area. It will be shown later that in the North
Eastern Cape a considerably larger number of trees
was planted per morgen than in Natal. The Western
Province area which showed the lowest capital in-
vestment per morgen also had the largest number
of trees planted per morgen and consequently showed
by far the lowest investment per citrus tree of
all the areas. In the calculation of cost of pro-
duction per citrus tree, this factor will prove of
considerable significance in the determination of the
amount of interest on capital per tree.

Variations in the average percentage
of bearing trees of the total number of citrus trees,
were responsible for a further disparity between
areas as regards capital investment per bearing
tree. Capital per bearing citrus tree varied be-
tween £2.92 in the Western Province and £6.02 in
the Western Transvaal with an average for all areas
of £4.05. This calculation is of importance as in
the calculation of costs, bearing trees are charged
with the entire farm cost for citrus production

The significance of this latter calculation is per-
haps more clearly illustrated by the final analysis
shown in Table 46 in which capital investment per
pocket of citrus fruit is given.

Variations in yield per bearing tree
between areas determined, in the final instance,
the disparities in capital investment per pocket of
fruit produced.   Although this factor is of no
practical value to the farmer, it has theoretical
value in as much that it provides a direct indication
of the extent to which differences in interest per
pocket may be expected between areas.   In this
analysis it is shown for instance that the Western
Province lost its comparative advantage of the lowest
capital investment per morgen, per citrus tree and
per bearing tree as a result of a low yield per tree.
The Northern Transvaal with a relatively high aver-
age investment per morgen and per tree, showed the
lowest investment of £0.56 per pocket as a result
of a relatively high yield per tree. The North
Eastern Cape area showed the highest investment of
£0.86 per pocket as a result of a general crop failure
in the area and not because the average level of
capital investment for citrus production in the
areawas high.

In order to facilitate a comparison of
the results of these analyses for the three sur-
veys, the average values for all the areas com-
bined during each of the years 1948 to 1950 is
summarised in Table 47.

Table 47. Comparative summary of average capital investment for citrus production in the Union, expressed in terms of various units, during the period 1948 - 1950.

Item	1948	1949	1950	Three Years combined.
Average per farm: -				
Total capital investment	£16388.1	13427.7	14831.3	14800.1
Number of morgen citrus	26.2	23.5	25.4	25.0
Number of citrus trees	4736.5	4080.2	4334.0	4364.2
Number of bearing trees	4094.8	3435.8	3496.3	3652.1
Number of pockets of citrus fruit produced.	27641.3	19335.9	23997.8	23442.7
Average investment per:				
Morgen citrus £	625.5	571.6	584.6	593.0
Citrus tree £	3.46	3.29	3.42	3.39
Bearing tree £	4.00	3.91	4.24	4.05
Pocket of citrus fruit £	0.59	0.69	0.62	0.63

Ratio of fixed to floating capital. In Tables 48 to 50 various aspects of the composition of the total capital for citrus production by fixed and floating capital for the period 1948 - 1950, is shown. In Table 51 the same analysis is presented for each area for the three surveys combined. It may be seen that the percentages comprised by fixed and floating capital, respectively, of the total capital for citrus production were remarkably similar in all the areas. On an average, for all the areas, fixed capital comprised 93.3 percent of the total citrus capital as against 6.7 percent floating capital.

The amount of fixed capital per morgen varied between £419.3 in the Western Province and £795.3 in the Western Transvaal with an average for all areas of £553.4. The amount of floating capital per morgen varied between £32.4 in the Eastern Transvaal and

TABLE 48.

Analysis of the ratio between fixed and floating capital
for citrus production on farms in 7 citrus areas of the
Union 1948

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		21	26	45	10	12	12	26	152
Total capital investment	£	14426.1	13055.9	16167.6	20339.1	24464.9	11394.3	18743.9	16388.1
Total fixed capital	£	13837.7	11690.5	14702.2	19098.7	23044.5	10446.3	17690.1	15190.6
Total floating capital	£	588.4	1365.4	1465.4	1240.4	1420.4	948.0	1053.8	1197.5
No. of morgen citrus		14.7	22.8	28.7	29.2	33.2	27.0	29.8	26.2
No. of citrus trees		2686.4	4661.5	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
% fixed capital of total capital	%	95.9	89.5	90.9	93.9	94.2	91.7	94.4	92.7
% floating capital of total capital	%	4.1	10.5	9.1	6.1	5.8	8.3	5.6	7.3
Total fixed capital per morgen	£	938.3	513.7	511.4	655.2	694.8	386.9	594.2	579.8
Total floating capital per morgen	£	39.9	60.0	51.0	42.6	42.8	35.1	35.4	45.7
Total fixed capital per citrus tree	£	5.15	2.51	2.84	4.34	4.47	1.59	3.68	3.21
Total floating capital per citrus tree	£	0.22	0.29	0.28	0.28	0.28	0.14	0.22	0.25

TABLE 49

Analysis of the ratio between fixed and floating capital for citrus production on farms in 7 citrus areas of the Union 1949

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		28	24	59	16	13	14	26	180
Total capital investment	£	10782.5	11541.5	12425.9	11358.5	21601.2	13662.1	17227.8	13427.7
Total fixed capital	£	10250.0	10475.5	11492.6	10783.8	20397.7	12559.7	16389.4	12534.6
Total floating capital	£	532.5	1066.0	933.3	769.7	1203.5	1102.4	838.4	893.1
No. of morgen citrus		13.8	21.0	22.2	24.3	37.3	31.3	27.5	23.5
No. of citrus trees		2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
% fixed capital of total capital	%	95.1	90.8	92.5	93.3	94.4	91.9	95.1	93.3
% floating capital of total capital	%	4.9	9.2	7.5	6.7	5.6	8.1	4.9	6.7
Total fixed capital per morgen	£	743.9	498.6	517.1	444.3	547.1	401.4	595.4	533.6
Total floating capital per morgen	£	38.6	50.7	42.0	31.7	32.3	35.2	30.4	38.0
Total fixed capital per citrus tree	£	4.56	2.57	2.90	3.05	3.58	1.88	3.67	3.07
Total floating capital per citrus tree	£	0.24	0.26	0.24	0.22	0.21	0.16	0.19	0.22

TABLE 50.

Analysis of the ratio between fixed and floating capital for citrus production on farms in 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Total capital investment	£ 8982.5	14252.1	12797.5	16005.4	21501.6	15057.6	22811.4	14831.3
Total fixed capital	£ 8370.6	13215.0	11998.0	15163.4	20252.9	14140.0	21577.6	13926.0
Total floating capital	£ 611.9	1037.1	799.5	842.0	1248.7	917.6	1233.8	905.3
Number of morgen citrus	11.6	23.9	22.1	27.7	38.9	30.6	39.2	25.4
Number of citrus trees	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
% fixed capital of total capital	% 93.2	92.7	93.8	94.7	94.2	93.9	94.6	93.9
% floating capital of total capital	% 6.8	7.3	6.2	5.3	5.8	6.1	5.4	6.1
Total fixed capital per morgen	£ 720.1	553.2	543.9	547.2	520.3	462.1	549.5	548.9
Total floating capital per morgen	£ 52.6	43.4	36.2	30.4	32.1	30.0	31.4	35.7
Total fixed capital per citrus tree	£ 4.10	2.77	3.17	3.84	3.48	2.09	3.61	3.21
Total floating capital per citrus tree	£ 0.30	0.22	0.21	0.21	0.21	0.14	0.21	0.21

TABLE 51   Analysis of the ratio between fixed and floating capital for citrus production on farms in 7 citrus areas of the Union for the three years 1948, 1949 and 1950 combined

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Total capital investment	£11121.8	12916.6	13556.2	15273.5	22497.7	13470.2	19635.1	14800.1
Total fixed capital	£10545.1	11751.3	12535.3	14357.1	21209.2	12478.8	18590.7	13812.7
Total floating capital	£ 576.7	1165.3	1020.9	916.4	1288.5	991.4	1044.4	987.4
Number of morgen citrus	13.2	22.5	23.9	26.6	36.5	29.8	32.3	25.0
Number of citrus trees	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5130.1	4370.0
% fixed capital of total capital	% 94.8	91.0	92.5	94.0	94.3	92.6	94.7	93.3
% floating capital of total capital	% 5.2	9.0	7.5	6.0	5.7	7.4	5.3	6.7
Total fixed capital per morgen	£ 795.3	521.8	525.0	538.8	581.4	419.3	576.0	553.4
Total floating capital per morgen	£ 43.5	51.7	42.8	34.4	35.3	33.3	32.4	39.6
Total fixed capital per citrus tree	£ 4.60	2.61	2.98	3.69	3.81	1.87	3.65	3.16
Total floating capital per citrus tree	£ 0.25	0.26	0.24	0.24	0.23	0.15	0.20	0.23

£51.7 in the North Eastern Cape with an average for
all areas of £39.6.

The amount of fixed capital per citrus tree
varied between £1.87 in the Western Province and
£4.60 in the Western Transvaal with an average for
all areas of £3.16.   Floating capital per citrus tree
varied between £0.15 in the Western Province and £0.26
in the North Eastern Cape with an average for all areas
of £0.23.   It should be noted that a remarkable simi-
larity existed between six of the seven areas in re-
spect of floating capital per citrus tree.   It appears
as if the number of citrus trees per farm was the de-
termining factor in the total amount of floating capital
that was required per farm.   It appears furthermore
as if, on an average, growers in most of the areas re-
quired the same amount of floating capital per citrus
tree for the production of citrus fruit.

ANALYSIS OF THE COMPOSITION OF CITRUS ORCHARDS.   The
average composition of citrus orchards in each of the
seven citrus producing areas of the Union is one of
the most important aspects of the organisation of citrus
farms in South Africa.   Information as regards the
composition of orchards by varieties and by age groups,
is not only desirable but essential in the enterpre-
tation of the cost data which will be submitted in a
later section.

Composition of total citrus orchards by varieties: In
Tables 52 to 54 an analysis is given to illustrate the
average composition of total citrus orchards on farms
in the seven citrus areas, by various species of citrus
trees.   In Table 55 the weighted average composition
of orchards for the three surveys combined is shown.
According to the data contained in the latter Table,
the average total number of trees per farm varied

TABLE 52

Analysis by species of average composition of total citrus orchards on farms in 7 citrus areas of the Union - 1948.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average total. Citrus trees	2686.4	4661.4	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
Orange trees	2617.7	4441.7	4157.4	3775.3	4820.1	6316.3	3717.8	4115.8
Grapefruit trees	3.9	212.2	846.2	623.5	23.5	119.3	510.6	427.0
Lemon trees	31.2	7.2	156.9	0	26.3	25.0	544.7	149.2
Naartjie trees	6.3	0.3	9.2	0	241.2	78.3	17.2	31.8
Seville trees	27.3	0	0	0	43.3	41.7	13.0	12.7
Percentages								
Citrus trees %	100	100	100	100	100	100	100	100
Oranges trees %	97.5	95.3	80.4	85.8	93.5	96.0	77.4	86.9
Grapefruit trees %	0.1	4.5	16.4	14.2	0.5	1.8	10.6	9.0
Lemon trees %	1.2	0.2	3.0	0	0.5	0.4	11.3	3.1
Naartjie trees %	0.2	0	0.2	0	4.7	1.2	0.4	0.7
Seville trees %	1.0	0	0	0	0.8	0.6	0.3	0.3

TABLE   53.

Analysis by species of average composition of total ci-
trus orchards on farms in 7 citrus areas of the Union 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average total: Citrus trees	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
Orange trees	2201.6	3953.6	3213.2	3180.5	5431.4	6255.6	3955.7	3655.7
Grapefruit trees	8.9	125.6	652.2	337.5	17.2	90.9	154.4	292.5
Lemon trees	16.9	0	82.8	0	36.6	106.6	334.3	89.0
Naartjie trees	19.3	0	11.5	18.8	208.3	105.7	17.3	34.2
Seville trees	3.4	0	0.2	0	0	102.8	1.3	8.8
Percentages								
Citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	97.8	96.9	81.1	89.9	95.4	93.9	88.6	89.6
Grapefruit trees %	0.4	3.1	16.5	9.5	0.3	1.4	3.5	7.2
Lemon trees %	0.8	0	2.1	0	0.6	1.6	7.5	2.2
Naartjie trees %	0.9	0	0.3	0.6	3.7	1.6	0.4	0.8
Seville trees %	0.1	0	0	0	0	1.5	0	0.2

TABLE 54.

Analysis by species of average composition of total citrus orchards on farms in 7 citrus areas of the Union - 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Average total: Citrus trees	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Orange trees	1998.8	4696.7	3052.4	3484.3	5612.3	6390.8	4762.4	3796.8
Grapefruit trees	9.8	68.0	639.3	450.1	57.7	108.1	542.1	367.3
Lemon trees	13.0	0	84.2	0	55.3	94.3	594.0	132.0
Naartjie trees	17.9	4.5	6.7	8.3	94.1	73.1	75.2	29.4
Seville trees	3.4	0	0	0	0	99.3	2.6	8.5
Percentages								
Citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	97.8	98.5	80.7	88.4	96.4	94.5	79.7	87.6
Grapefruit trees %	0.5	1.4	16.9	11.4	1.0	1.6	9.1	8.5
Lemon trees %	0.6	0	2.2	0	1.0	1.4	9.9	3.0
Naartjie trees %	0.9	0.1	0.2	0.2	1.6	1.0	1.2	0.7
Seville trees %	0.2	0	0	0	0	1.5	0.1	0.2

TABLE 55

Analysis by species of average composition of total citrus orchards on farms in 7 citrus areas of the Union during the three years 1948, 1949 and 1950 combined

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Average total: Citrus trees	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Orange trees	2241.3	4356.9	3398.7	3433.0	5291.8	6321.1	4153.1	3841.7
Grapefruit trees	7.9	139.3	698.2	448.3	32.4	105.4	404.2	358.8
Lemon trees	19.4	2.6	102.8	0	39.3	77.8	492.3	122.0
Naartjie trees	15.2	1.5	9.0	10.5	182.0	86.1	37.0	31.8
Seville trees	10.0	0	0.1	0	14.0	83.3	5.6	9.9
Percentages								
Citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	97.7	96.8	80.8	88.2	95.2	94.7	81.6	88.1
Grapefruit trees %	0.4	3.1	16.6	11.5	0.6	1.6	7.9	8.2
Lemon trees %	0.8	0.1	2.4	0	0.7	1.2	9.7	2.8
Naartjie trees %	0.7	0	0.2	0.3	3.3	1.3	0.7	0.7
Seville trees %	0.4	0	0	0	0.2	1.2	0.1	0.2

between 2293.8 in the Western Transvaal and 6673.7 in the Western Province with an average for all areas of 4364.2 trees. It is of interest to know to which extent the averages as regards total number of trees per farm, given in Table 55 were represen- tative of each individual area. In view of the importance of the average total number of trees per farm, an analysis is presented in Table 56 of the dispersal of 182 farms in seven citrus areas during 1950 according to number of trees per farm. The 1950. survey has been selected for this analysis as the averages for this year closely resembled those for the three surveys combined. The dispersal of farms could not be analysed for the entire 514 cases in- cluded in the three surveys combined as duplication and triplication of the same farms occurred to make up the total sample. According to Table 56, 59.9 percent of all the growers included in the 1950 survey, had less than 4000 trees which is just short of the average number per farm for the three surveys combined. In the Western Transvaal, Eastern Cape Coastal area and Natal the majority of growers had less than 4000 trees. The average number of trees per farm in the Eastern Cape Coastal area was somewhat unduly increased by the inclusion of five citrus producing units each comprised of more than 10,000 trees.

The analysis presented in Table 55, shows that during the period 1948 – 1950, orange trees comprised on an average, 88.1 percent of the total number of citrus trees per farm, grapefruit trees 8.2 percent, lemon trees 2.8 percent, naartje

TABLE 56

Dispersal of farms according to size of citrus orchards by number of citrus trees in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas	% of total number farms 100
No. of cases	28	22	67	12	12	14	27	182	
Size groups: Number of trees									
0 - 1000	4	1	2	1	-	1	-	9	4.9
1001 - 2000	11	7	20	5	1	1	2	47	25.8
2001 - 3000	10	3	18	-	2	-	5	38	20.9
3001 - 4000	1	1	8	1	2	1	1	15	8.3
4001 - 5000	1	2	6	1	2	-	5	17	9.3
5001 - 6000	1	1	4	1	2	4	-	13	7.1
6001 - 7000	-	1	1	-	-	2	4	8	4.4
7001 - 8000	-	-	1	1	-	2	4	8	4.4
8001 - 9000	-	3	-	1	-	-	1	5	2.8
9001 - 10000	-	2	2	1	-	1	2	8	4.4
10,001 - 11,000	-	-	-	-	1	-	1	2	1.1
11,001 - 12,000	-	-	4	-	-	1	-	2	1.1
12,001 and more	-	1	4	-	2	1	2	10	5.5
Average number of trees per farm	2043	4769	3783	3943	5819	6766	5976	4334	

trees 0.7 percent and seville trees 0.2 percent. The
percentage of orange trees of the total number of citrus
trees per farm, varied between 80.8 percent in the Eas-
tern Cape Coastal area and 97.7 percent in the Western
Transvaal. In the former area grapefruit trees com-
prised 16.6 percent of the total number of citrus trees
per farm, whereas in the latter area other species of
citrus fruit were not grown in significant numbers on
an average per farm. Although grapefruit trees are
shown to have comprised 11.5 percent of the average
total number of citrus trees per farm in Natal, the
impression created by the average composition of orchards
in Natal is false as grapefruit is not generally pro-
duced in this area. The entire number of grapefruit
trees enumerated in this area occurred on a single farm
near Zululand where this fruit was produced on a large
scale.

Although comprising a relatively small
percentage of the average total number of citrus trees
per farm, grapefruit and lemon trees to the extent of
404.2 and 492.3 respectively, were found on an
average per farm in the Eastern Transvaal. The
Eastern Cape Coastal Area, Eastern Transvaal and to a
lesser extent the Western Province should be regarded
as the main grapefruit and lemon producing areas in
the Union. Naartjes are grown commercially mainly
in the Northern Transvaal, portions of the Eastern
Cape Coastal Area and the Western Province and sevilles
mainly in the Western Province and Northern Transvaal
although only on a limited scale.

Composition of all citrus trees under one year by
varieties: During the war years 1939 - 1946, various
factors came into operation which tended to check new
plantings of citrus trees. It is contended by

the S.A. Co-operative Citrus Exchange that plant-
ings effected during these years were not even
sufficient to replace the number of trees that
went out of production owing to age. The factors
mentioned were viz: difficulties in disposing of
crops owing to limited exports of fruit and scar-
city of fertilizers and essential production re-
quirements. It is of particular interest to know
at this stage whether growers have attempted to
make up the lee-way in replacements incurred
during the war through extensive new plantings
and also whether any expansion of the Industry
may be observed. It is also of importance to the
Industry to be aware of any significant trends in
new plantings particularly as regards the varieties
of oranges planted. For the above reasons, de-
tailed analyses are presented of some of the most
significant aspects of the composition of citrus
orchards as determined by the surveys.

In Tables 57 to 59 analyses are shown of
the average composition of all citrus trees under
1 year in each of the seven citrus areas of the
Union during the period 1948 - 1950. In Table
60 the weighted average composition is given for
the three years combined. According to the latter
Table, the average total number of young trees
planted annually per farm during this period,
varied between 27.1 in Natal and 445.9 in the
Western Province with an average per farm for all
areas of 182.8. New plantings were limited in
number in the Western Transvaal, North Eastern
Cape and Natal. In the Northern Transvaal, Western
Province and Eastern Transvaal areas, extensive
new plantings were indicated. It is significant
that in all the areas, new plantings consisted

TABLE 57

Analysis by species of average composition of all citrus trees under 1 year on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average number of trees under 1 yr:-								
All citrus trees	16.2	0	242.5	40.0	302.5	492.5	267.9	185.3
Orange trees	13.6	0	239.7	40.0	302.5	492.5	233.5	178.2
Grapefruit trees	0	0	2.2	0	0	0	0	0.7
Lemon trees	0.2	0	0.5	0	0	0	33.5	5.9
Naartjie trees	2.4	0	0.1	0	0	0	0.9	0.5
Seville trees	0	0	0	0	0	0	0	0
			Percentages					
All citrus trees	% 100	100	100	100	100	100	100	100
Orange trees	% 84.0	0	98.8	100	100	100	87.2	96.2
Grapefruit trees	% 0	0	0.9	0	0	0	0	0.4
Lemon trees	% 1.2	0	0.2	0	0	0	12.5	3.2
Naartjie trees	% 14.8	0	0.1	0	0	0	0.3	0.2
Seville trees	% 0	0	0	0	0	0	0	0

TABLE 58

Analysis by species of average composition of all citrus trees under 1 year on farms in 7 citrus areas of the Union – 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average number of trees under 1 year:-								
All citrus trees	110.8	1.6	94.0	9.4	207.7	689.8	146.2	138.8
Orange trees	109.8	1.6	93.5	9.4	169.2	664.8	142.4	133.3
Grapefruit trees	0	0	0	0	0	0	0	0
Lemon trees	0	0	0.5	0	0	0	3.8	0.7
Naartjie trees	1.0	0	0	0	38.5	0	0	2.9
Seville trees	0	0	0	0	0	25.0	0	1.9
Percentages								
All citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	99.1	100	99.5	100	81.5	96.4	97.4	96.0
Grapefruit trees %	0	0	0	0	0	0	0	0
Lemon trees %	0	0	0.5	0	0	0	2.6	0.5
Naartjie trees %	0.9	0	0	0	18.5	0	0	2.1
Seville trees %	0	0	0	0	0	3.6	0	1.4

TABLE 59

Analysis by species of average composition of all citrus trees under 1 year on farms in 7 citrus areas of the Union - 1950

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		28	22	67	12	12	14	27	182
Average number of trees under 1 year:									
All citrus trees		96.6	135.2	202.6	40.0	539.7	161.9	456.0	224.1
Orange trees		95.2	135.2	199.2	40.0	533.0	137.9	452.3	219.7
Grapefruit trees		0.5	0	3.1	0	0	10.0	0	2.1
Lemon trees		0	0	0.3	0	0	0	3.7	0.6
Naartjie trees		0.9	0	0	0	6.7	0	0	0.6
Seville trees		0	0	0	0	0	14.0	0	1.1
					Percentages				
All citrus trees	%	100	100	100	100	100	100	100	100
Orange trees	%	98.6	100	98.3	100	98.8	85.2	99.2	98.0
Grapefruit trees	%	0.5	0	1.5	0	0	6.2	0	0.9
Lemon trees	%	0	0	0.2	0	0	0	0.8	0.3
Naartjie trees	%	0.9	0	0	0	1.2	0	0	0.3
Seville trees	%	0	0	0	0	0	8.6	0	0.5

TABLE 60

Analysis by species of average composition of all citrus trees under 1 year on farms in 7 citrus areas of the Union during the three years 1948, 1949 and 1950 combined.

Item	Western Transvaal	North. Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Average number of trees under 1 year:								
All citrus trees	79.8	41.9	175.6	27.1	346.1	445.9	292.1	182.8
Orange trees	78.3	41.9	173.4	27.1	330.4	428.7	278.3	177.2
Grapefruit trees	0.2	0	1.8	0	0	3.5	0	0.9
Lemon trees	0	0	0.4	0	0	0	13.5	2.2
Naartjie trees	1.3	0	0	0	15.7	0	0.3	1.4
Seville trees	0	0	0	0	0	13.7	0	1.1
Percentages								
All citrus trees %	100	100	100	100	100	100	100	100
Orange trees %	98.1	100	98.8	100	95.5	96.1	95.3	96.9
Grapefruit trees %	0.3	0	1.0	0	0	0.8	0	0.5
Lemon trees %	0	0	0.2	0	0	0	4.6	1.2
Naartjie trees %	1.6	0	0	0	4.5	0	0.1	0.8
Seville trees %	0	0	0	0	0	3.1	0	0.6

practically entirely of orange trees. Of the
average total number of young trees planted
annually per farm during this period, 96.9 per-
sent consisted of orange trees. In the Eastern
Transvaal only, noticeable attention was given
to the planting of young lemon trees at the average
rate of 13.5 trees per farm per annum.

<u>Composition of the total number of bearing trees</u>
<u>by varieties</u>: In Tables 61 to 63 an analysis is
shown of the average composition of bearing citrus
orchards by species of citrus trees, during each
of the years 1948 to 1950. In Table 64 the
weighted average composition of orchards for the
three surveys combined, is given. According to
the data contained in the latter Table, the average
number of bearing citrus **trees per farm** varied
between 1846.9 in the Western Transvaal and 4607.7
in the Western Province with an average of 3652.1
trees per farm for all the areas combined.

Of the total number of bearing citrus
trees per farm, oranges comprised, on an average
for all the areas, 86.7 percent, grapefruit 9.5
percent, lemons 2.9 percent, naartjies 0.7
percent and sevilles 0.2 percent. Bearing grape-
fruit trees, it will be noted, comprised a
slightly higher percentage of the average total
number of bearing trees per farm than did total
grapefruit trees of the total number of citrus trees
per farm. The **respective proportions·were** 9.5
percent in the case **of the former analysis** as against
8.2 percent in the latter analys**is**. It appears
as if the relative importance of grapefruit in
the grapefruit producing areas declined after the
war as a result of greater concentration by growers

TABLE 61

Analysis by species of the average composition of the total
number of bearing trees on farms in 7 citrus areas of the
Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average number of bearing trees:								
All citrus trees	2150.0	4392.4	4577.4	4257.6	4241.9	4561.5	4186.8	4094.8
Orange trees	2114.2	4210.1	3613.4	3634.1	4074.3	4328.0	3206.2 .	3532.9
Grapefruit trees	3.9	174.8	839.6	623.5	23.5	119.3	471.4	411.9
Lemon trees	28.0	7.2	115.7	0	22.1	12.5	479.9	124.1
Naartjie trees	3.9	0.3	8.7	0	120.4	60.0	16.3	20.2
Seville trees	0	C	0	0	1.6	41.7	13.0	5.7
				Percentages				
All citrus trees %	10C	100	100	100	100	100	100	100
Orange trees %	98.3	95.8	78.9	85.4	96.0	94.9	76.6	86.3
Grapefruit trees %	0.2	4.0	18.4	14.6	0.6	2.6	11.2	10.1
Lemon trees %	1.3	0.2	2.5	0	0.5	0.3	11.5	3.(
Naartjie trees %	0.2	0	0.2	0	2.8	1.3	0.4	0.
Seville trees %	0	0	0	0	0.1	0.9	0.3	0.

TABLE 62

<u>Analysis by species of the average composition of the total number of bearing trees on farms in 7 citrus areas of the Union 1949</u>

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
<u>Average number of bearing trees:-</u>								
All citrus trees	1817.8	3978.7	3332.5	3386.2	4862.8	4656.3	3571.5	3435.8
Orange trees	1772.2	3853.1	2613.7	3029.9	4708.4	4300.3	3134.0	3042.6
Grapefruit trees	8.9	125.6	632.1	337.5	17.2	80.2	134.8	282.3
Lemon trees	16.9	0	75.2	0	36.6	106.6	287.9	79.8
Naartjie trees	16.4	0	11.5	18.8	100.6	105.7	13.5	25.4
Seville trees	3.4	0	0	0	0	63.5	1.3	5.7
<u>Percentages</u>								
All citrus trees	% 100	100	100	100	100	100	100	100
Orange trees	% 97.5	96.8	78.4	89.5	96.8	92.4	87.8	88.6
Grapefruit trees	% 0.5	3.2	19.0	10.0	0.4	1.7	3.8	8.2
Lemon trees	% 0.9	0	2.3	0	0.8	2.3	8.1	2.3
Naartjie trees	% 0.9	0	0.3	0.5	2.0	2.3	0.3	0.7
Seville trees	% 0.2	0	0	0	0	1.3	0	0.2

TABLE 63.

Analysis by species of the average composition of the total number of bearing trees on farms in 7 citrus areas of the Union 1950.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Average number of bearing trees:-								
All citrus trees	1648.6	4574.3	3128.9	3654.2	4510.1	4598.8	4353.5	3496.3
Orange trees	1609.6	4501.8	2421.1	3195.8	4309.7	4271.3	3235.4	2986.5
Grapefruit trees	9.3	68.0	623.2	450.1	57.7	98.1	522.8	357.6
Lemon trees	12.8	0	77.9	0	55.3	92.4	521.8	118.8
Naartjie trees	13.5	4.5	6.7	8.3	87.4	73.1	70.9	27.6
Seville trees	3.4	0	0	0	0	63.9	2.6	5.8
Percentages								
All citrus trees	% 100	100	100	100	100	100	100	100
Orange trees	% 97.6	98.4	77.4	87.5	95.6	92.9	74.3	85.4
Grapefruit trees	% 0.6	1.5	19.9	12.3	1.3	2.1	12.0	10.2
Lemon trees	% 0.8	0	2.5	0	1.2	2.0	12.0	3.4
Naartjie trees	% 0.8	0.1	0.2	0.2	1.9	1.6	1.6	0.8
Seville trees	% 0.2	0	0	0	0	1.4	0.1	0.2

TABLE 64

Analysis by species of the average composition of the total number of bearing trees on farms in 7 citrus areas of the Union during the three years 1948, 1949 and 1950 combined.

Item		Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases		77	72	171	38	37	40	79	514
Average number of bearing trees:									
All citrus trees		1846.9	4310.1	3580.3	3700.1	4547.1	4607.7	4041.3	3652.1
Orange trees		1806.3	4180.2	2801.3	3241.3	4373.4	4298.4	3192.4	3167.7
Grapefruit trees		7.7	125.8	683.2	448.3	32.4	98.2	378.3	347.4
Lemon trees		18.5	2.6	86.9	0	38.0	73.4	431.0	106.7
Naartjie trees		11.9	1.5	8.9	10.5	102.8	80.6	34.0	24.6
Seville trees		2.5	0	0	0	0.5	57.1	5.6	5.7
Percentages									
All citrus trees	%	100	100	100	100	100	100	100	100
Orange trees	%	97.8	97.0	78.2	87.6	96.2	93.3	79.0	86.7
Grapefruit trees	%	0.4	2.9	19.1	12.1	0.7	2.1	9.4	9.5
Lemon trees	%	1.0	0.1	2.4	0	0.8	1.6	10.7	2.9
Naartjie trees	%	0.7	0	0.3	0.3	2.3	1.8	0.8	0.7
Seville trees	%	0.1	0	0	0	0	1.2	0.1	0.2

on the planting of young orange trees. It may for
instance be seen that whereas bearing grapefruit
trees comprised 19.1 percent of the total number
of bearing citrus trees in the Eastern Cape Coastal
area during the period 1948 - 1950 (Table 64) total
grapefruit trees comprised only 16.6 percent of the
total number of citrus trees, in this area during
the same period (Table 55). In the Eastern Trans-
vaal these percentages were 9.4 as against 7.9
respectively.

The percentage of bearing orange trees,
of the average total number of bearing citrus trees
per farm, varied between 78.2 percent in the Eastern
Cape Coastal Area and 97.8 percent in the Western
Transvaal. In the former area bearing grapefruit
trees, and also lemons to a smaller extent, were an
important component part of citrus orchards. In
the Western Transvaal the production of oranges was
the main concern of growers. Although the propor-
tion of bearing grapefruit trees to the total number
of bearing trees per farm, was small in the North
Eastern Cape , Natal, Western Province and Eastern
Transvaal areas, the quantity of grapefruit produced
in these areas was by no means insignificant. The
Eastern Transvaal with 9.4 percent bearing grape-
fruit and 10.7 percent bearing lemon trees, pro-
duced a high percentage of the total grapefruit
crop as well as of the total lemon crop of the
Union.

Composition of all citrus orchards by age groups:
It is of importance to know the average composi-
tion of the total number of citrus trees per

farm, by age groups.   In Tables 65 to 67 an analysis
of this nature is presented for the trees covered
by each survey and in Table 68 the weighted aver-
ages are shown for each area for the three surveys
combined.   According to the latter Table the
average age composition of all the orchards covered
by the surveys during the three years 1948 to 1950
consisted of 4.2 percent of trees under 1 year,
12.1 percent of trees between the ages of 1 - 5
years and 83.7 percent of bearing trees i.e. trees
over 5 years of age.

It is of interest to note that if the
average productive life of citrus trees is taken
at 33-1/3 years, the rate of replacement of bearing
trees, in order to keep the number of bearing
trees per farm constant, should be 3 percent.
At this rate the average number of young trees
planted per farm would have been 109.6.   If the
average life of citrus trees is taken as 40 years,
the rate of replacement would have to be $2\frac{1}{2}$ per-
cent and the number of young trees planted per farm
91.3.   These figures, calculated on the basis
of the average number of bearing trees per farm
as revealed by the three surveys, indicate that
a considerable number of young trees in excess of
the normal rate of replacement, was planted per
farm during the period 1948 - 1950. To which
extent this excess in plantings served to make
up the deficit in replacements incurred during
the war years, is difficult to determine. At
any rate it appears as if expansion of orchards
was undertaken in the Northern Transvaal, Western
Province and Eastern Transvaal areas.   In these
areas 346.1, 445.9 and 292.1 young trees were

TABLE 65

Analysis of average composition of all citrus orchards by age groups on farms in 7 citrus areas of the Union 1948.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Average total number of trees:								
under 1 year	16.2	0	242.5	40.0	302.5	492.5	267.9	185.3
1 - 5 years	520.2	269.0	349.8	101.2	610.0	1526.6	348.6	456.4
over 5 years	2150.0	4392.4	4577.4	4257.6	4241.9	4561.5	4186.8	4094.8
Total	2686.4	4661.4	5169.7	4398.8	5154.4	6580.6	4803.3	4736.5
Percentages								
Percentage of trees:								
under 1 year	% 0.6	0	4.7	0.9	5.9	7.5	5.6	3.9
1 - 5 years	% 19.4	5.8	6.8	2.3	11.8	23.2	7.2	9.6
over 5 years	% 80.0	94.2	88.5	96.8	82.3	69.3	87.2	86.5
Total	% 100	100	100	100	100	100	100	100

TABLE 66

Analysis of average composition of all citrus orchards by age groups on farms in 7 citrus areas of the Union – 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Average total number of trees:								
Under 1 year	110.8	1.6	94.0	9.4	207.7	689.8	146.2	138.8
1 – 5 years	321.5	98.9	533.4	141.2	623.0	1315.5	745.3	505.6
Over 5 years	1817.8	3978.7	3332.5	3386.2	4862.8	4656.3	3571.5	3435.8
Total	2250.1	4079.2	3959.9	3536.8	5693.5	6661.6	4463.0	4080.2
Percentages								
Percentage of trees:								
Under 1 year	% 4.9	0	2.3	0.3	3.7	10.4	3.3	3.4
1 – 5 years	% 14.3	2.4	13.5	4.0	10.9	19.7	16.7	12.4
Over 5 years	% 80.8	97.6	84.2	95.7	85.4	69.9	80.0	84.2
Total	% 100	100	100	100	100	100	100	100

TABLE 67

Analysis of average composition of all citrus orchards by age groups on farms in 7 citrus areas of the Union – 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coas-Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Total citrus trees: Under 1 year	96.6	135.2	202.6	40.0	539.7	161.9	456.0	224.1
1 – 5 years	297.7	59.7	451.1	248.5	769.6	2004.9	1166.8	613.6
Over 5 years	1648.6	4574.3	3128.9	3654.2	4510.1	4598.8	4353.5	3496.3
Total	2042.9	4769.2	3782.6	3942.7	5819.4	6765.6	5976.3	4334.0
Percentages								
Total citrus trees: Under 1 year	% 4.7	2.8	5.4	1.0	9.3	2.4	7.5	5.2
1 – 5 years	% 14.6	1.3	11.9	6.3	13.2	29.6	19.5	14.1
over 5 years	% 80.7	95.9	82.7	92.7	77.5	68.0	72.9	80.7
Total	% 100	100	100	100	100	100	100	100

TABLE 68.   Analysis of average composition of all citrus orchards by age groups on farms in 7 citrus areas of the Union during the three years 1948, 1949 and 1950 combined

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Total citrus trees: Under 1 year	79.8	41.9	175.6	27.1	346.1	445.9	292.1	182.8
1 - 5 years	367.1	148.3	452.9	164.6	666.3	1620.1	758.8	529.3
Over 5 years	1846.9	4310.1	3580.3	3700.1	4547.1	4607.7	4041.3	3652.1
Total	2293.8	4500.3	4208.8	3891.8	5559.5	6673.7	5092.2	4364.2
Percentages								
Total citrus trees under 1 year	% 3.5	0.9	4.1	0.7	6.2	6.6	5.7	4.2
1 - 5 years	% 16.0	3.3	10.8	4.2	12.0	24.3	14.9	12.1
over 5 years	% 80.5	95.8	85.1	95.1	81.8	69.1	79.4	83.7
Total	% 100	100	100	100	100	100	100	100

planted annually per farm. In the North Eastern
Cape area, which suffered severe drought during
this period, and Natal, few plantings were under-
taken. The percentage of bearing citrus trees
varied between 69.1 percent in the Western Pro-
vince and 95.8 percent in the North Eastern Cape
with an average for all areas of 83.7 percent.
The percentage of total non-bearing trees varied
correspondingly between 4.2 percent in the North
Eastern Cape and 30.9 percent in the Western
Province with an average for all areas of 16.3
percent.

Finally it is of significance to note
that the percentage of bearing trees declined from
86.5 percent to 84.2 percent and 80.7 percent during
the period 1948 to 1950 with a corresponding in-
crease in the percentage of non-bearing trees. As
citrus trees take at least 5 years to reach ma-
turity, the annual number of plantings will have
an accumulative effect on the total number of non-
bearing trees and a consequent increase in the
percentage of non-bearing trees per farm. This
tendency would continue until the new plantings
start coming into production.

Composition of orange orchards by varieties and
age groups: In the ensuing Tables the analysis
of citrus orchards is continued with the object
of giving more specific information as regards
the varieties of oranges grown in each of the
various areas. In Tables 69 to 71 analyses are
presented of the average composition of orange
orchards by varieties and age groups in each of
the seven citrus areas of the Union during the

surveys presented in Tables 150 to 153 are comparable in every respect.

CRITICAL EXAMINATION OF COST PER
MORGEN OF EACH AREA.

WESTERN TRANSVAAL: The total cost of production, excluding interest per morgen, varied between £90.04 during 1948, £82.72 during 1949 and £91.85 during 1950.   The only item of cost lending itself to criticism appears to be depreciation on fixed improvements during 1948.   The amount of £7.42 per morgen, shown under this heading, diverges considerably from the cost determined for the same item during the succeeding two surveys viz: £1.85 and £2.52 per morgen respectively.   An examination of the bases on which the above costs were calculated revealed the following: The average investment in fixed improvements per morgen varied between £140.5 during 1948, £87.3 during 1949 and £126.7 during 1950.   It is evident that improvements were valued on a higher level during 1948 than during the following two surveys.   The main cause for the disparity in depreciation on fixed improvements per morgen during 1948 in relation to the later surveys, is however to be found in the rate of depreciation applied during this year.   It has been calculated that the average rate of depreciation on fixed improvements during 1948 was 5.3 percent, during 1949 2.1 percent and during 1950 2.0 percent.

While a flat rate of 2.0 percent of depreciation on fixed improvements was agreed upon for the entire investigation, it was considered during the first survey in the Western Transvaal that the considerable investment in pumping plant and bore-

holes for irrigation purposes, warranted a higher
rate of depreciation. Taking the above circumstances
into consideration it appears indeed as if the rate
of depreciation applied during 1948 was more suited
to the purpose than the flat rate of 2 percent applied
later. The weighted average rate of depreciation on
improvements for the three surveys in this area com-
bined, of 3.23 percent, resulting in a cost of £3.76
per morgen may therefore be accepted as reasonable.

Table 154: Summary of calculations of the average
component costs per morgen.
Western Transvaal.

Item.	1948	1949	1950	Three Years Combined.
Depreciation	£.	£.	£.	£.
Improvements	7.42	1.85	2.52	3.76
General Equipment	1.32	1.27	1.33	1.30
Mechanical power equipment.	4.62	3.72	6.16	4.77
Repairs. Improvements	0.76	0.63	1.74	1.02
General equipment	0.10	0.05	0.27	0.13
Mechanical power equipment.	2.15	3.18	3.91	3.10
Running cost - Mechanical power equipment.	6.96	7.44	9.21	7.86
Draught animals	1.91	0.25	0.11	0.71
Labour	38.77	39.45	39.43	39.24
Cash expenses	20.32	20.20	21.46	20.64
Services by packhouse	5.71	4.68	5.71	5.32
Total cost excluding interest.	90.04	82.72	91.85	87.85
Total interest	48.91	39.13	38.64	41.94
Total cost including interest	138.95	121.85	130.49	129.79

In view of the above explanation and in the absence of any significant discrepancy between any of the other cost items during the three successive surveys, the weighted average results may be regarded as representative of the costs in the area during the period 1948 to 1950.

NORTH EASTERN CAPE: The average cost per morgen excluding interest, during the three years varied between £71.76 during 1948, £46.95 during 1949 and £52.27 during 1950. With the exception of the cost of labour per morgen during 1948, a remarkably close similarity existed between the amounts of all the cost items as deter- mined by the three individual surveys.   The only solu- tion that could be offered for the considerable dis- parity in the cost of labour between 1948 and the two later surveys, is to be sought in the knowledge that this area experienced severe crop failures during 1949 and 1950.   The average yield per tree decreased from 4.67 pockets during 1948 to 3.30 pockets during 1949 and 2.30 pockets during 1950.   Many growers in this area experienced severe hardships during the latter two years and in order to make ends meet, had to cur- tail all expenses to the minimum.   The figures in respect of labour cost, suggest that hired labour was disposed of to a considerable extent during 1949 and 1950.

Once again the higher cost per morgen in- curred on farms in this area during 1948 should be accepted as a true reflection of the level of costs during this year.   Although the weighted average cost of labour per morgen for the three years combined of £23.42 should be regarded as representative of the cost of labour in the North Eastern Cape during

Table 155: Summary of calculations of the average component costs per morgen. North Eastern Cape.

Item.	1948.	1949	1950	Three Years Combined.
Depreciation.	£	£	£	£
Improvements	2.49	1.44	1.49	1.84
General Equipment	2.21	2.30	2.28	2.26
Mechanical power Equipment.	5.78	4.06	3.64	4.55
Repairs.				
Improvements	1.28	0.63	1.08	1.02
General Equipment	0.26	0.41	0.39	0.35
Mechanical power Equipment	3.99	1.92	2.94	3.01
Running cost- Mechanical power Equipment	8.20	6.54	8.26	7.70
Draught animals	0	0.37	0.39	0.24
Labour	33.84	16.15	18.68	23.42
Cash Expenses	11.29	12.00	12.76	11.99
Services by P/House	2.42	1.13	0.36	1.35
Total cost excluding interest.	71.76	46.95	52.27	57.73
Total interest	28.68	27.47	29.83	28.68
Total cost including interest.	100.44	74.42	82.10	86.41

the particular period covered by the investigation, it follows from the explanation given above, that with normal crops and under normal circumstances, the level of cost of labour will be considerably higher than the indicated weighted average. It also follows that the weighted average total cost of production per morgen of £57.73 is representative of the costs of this area during a period when growers were forced to economise even if at the expense of

the well-being of their orchards. During normal
conditions of rainfall, the total cost per morgen
of this area may however be expected to be considerably
higher

EASTERN CAPE COASTAL AREA: The total cost excluding
interest per morgen of citrus orchard, varied between
£69.72 during 1948, £64.69 during 1949 and £61.91 during

Table 156: Summary of calculations of the average
component costs per morgen.
Eastern Cape Coastal Area.

Item.	1948	1949	1950	Three Years Combined.
Depreciation Improvements	£ 2.29	£ 1.25	£ 1.51	£ 1.67
General Equipment	2.35	1.95	2.14	2.14
Mechanical power Equipment	5.95	3.70	2.97	4.15
Repairs. Improvements	0.86	0.42	1.07	0.80
General Equipment	0.92	0.50	0.74	0.72
Mechanical power Equipment	2.61	1.98	1.37	1.96
Running cost - Mechanical power Equipment	5.46	5.51	5.48	5.48
Draught animals	0.87	0.54	0.26	0.54
Labour	23.01	24.10	25.95	24.43
Cash Expenses	20.00	17.90	15.28	17.62
Services by P/House	5.40	6.84	5.14	5.77
Total cost excluding interest	69.72	64.69	61.91	65.28
Total interest	28.12	27.95	29.01	28.39
Total cost including interest	97.84	92.64	90.92	93.67

1950. Although no serious discrepancy is noticeable
between the amounts of each of the individual cost

items, as enumerated by the three surveys, a decreasing tendency in total cost of production per morgen was revealed by each successive survey. Examination of the individual cost items, shows that a considerable decline occurred during the three year period in the total cost of mechanical power equipment i.e. the sum of depreciation, repairs and running cost. The sum of the above costs declined from £14.02 per morgen during 1948 to £11.19 per morgen during 1949 and £9.82 per morgen during 1950. It is evident that the decrease in the cost of this single item accounted to a major extent for the total decrease in cost per morgen from 1948 to 1950. It may furthermore be seen that the cost of depreciation on mechanical power equipment decreased from £5.95 per morgen during 1948 to £3.70 during 1949 and £2.97 per morgen during 1950. The decrease in the cost of depreciation on mechanical power equipment per morgen during the three year period was mainly responsible for the decrease in the total cost of mechanical power equipment per morgen. Examination of the bases on which depreciation on mechanical power equipment was calculated during each respective year, revealed the following facts. The amount of capital invested per morgen in mechanical power equipment varied between £29.2 during 1948, £28.2 during 1949 and £22.2 during 1950 with an average for all three surveys combined of £26.4 per morgen.

The underlying cause for the disparity in the cost of depreciation on mechanical power equipment per morgen, calculated during each of the three years, is to be found in the average rate of depreciation applied. During 1948 the average rate of depreciation was 20.3 percent, during 1949 it was 13.1 percent and during 1950 the rate was 13.4 percent.

As it was considered impractical to apply a fixed
rate of depreciation to all mechanical power equip-
ment, the abovementioned average rates were calcula-
ted on the estimated usable life of each item of
equipment.   The rate of 20.3 percent applied during
1948, appears to have been excessive.   The weighted
average rate of depreciation on mechanical power
equipment, calculated for the three surveys combined,
amounted to 15.7 percent which may be considered
reasonable in view of the type of implements used
in citrus production.

In view of the above explanation and in the
absence of any significant discrepancy between the
remaining cost items, the weighted average total
cost of production per morgen for the three year
period may be regarded as a true indication of the
level of costs in the Eastern Cape Coastal area during
the period under review.

NATAL: The total cost of production excluding inter-
est per morgen, determined by the three surveys in
Natal, varied between £60.25 during 1948, £62.91 during
1949 and £67.71 during 1950 with an average for the
three surveys of £63.72 per morgen.   The corresponding
costs including interest per morgen amounted to £95.14 during
1948, £86.71 during 1949 and £96.59 during 1950 with
an average for the three surveys of £92.38 per morgen.
The increase in total cost of production, excluding
interest, with each successive survey may be ascribed
mainly to annual increases in the total cost of labour
and of cash expenses.   The cost of labour per morgen
increased from £24.32 during 1948 to £28.86 during
1949 and decreased slightly to £27.55 during 1950.
The cost of cash expenses per morgen increased from

Table 157: Summary of calculations of the average component costs per morgen. Natal.

Item	1948	1949	1950	Three Years Combined.
Depreciation	£	£	£	£
Improvements	2.78	0.57	0.91	1.32
General equipment	3.10	2.15	1.92	2.35
Mechanical power equipment	2.68	2.35	2.35	2.44
Repairs Improvements	0.70	0.16	1.15	0.64
General equipment	0.47	0.43	0.64	0.51
Mechanical power equipment	1.43	0.60	0.98	0.96
Running cost - Mechanical power equipment	2.65	2.84	3.50	3.00
Draught animals	0.48	0.39	0.19	0.35
Labour	24.32	28.86	27.55	27.13
Cash expenses	17.86	20.86	27.48[i]	22.17
Services by P/House	3.78	3.70	1.04	2.85
Total cost excluding interest	60.25	62.91	67.71	63.72
Total interest	34.89	23.80[ii]	28.88	28.66
Total cost including interest	95.14	86.71	96.59	92.38

Note i: Considerable expenses were incurred by growers in combating "Black Spot", a disease which developed rapidly in Citrus orchards in this area during the latter part of the period covered by the survey.

Note ii: It was shown earlier that land was valued at a considerably lower level during 1949 than during the preceding and succeeding years.

£17.86 during 1948 to £20.86 during 1949 and £27.48 during 1950.

According to the analyses shown in Tables 146 to 148 considerably higher costs were incurred per citrus tree in this area in resp

and fertilizers and of insecticides and fungicides
during the two later survey years than during the initial
year of the investigation. These items may be held
responsible for a major percentage of the increase
in cost per morgen as shown in the analysis. It
should be noted that during 1949 and 1950 a decrease
in the cost of services by the packhouse is shown for
this area. This may be due entirely to the fact that
in some instances the cost of spraying materials was
included under cash **expenses incurred** by growers,
whereas in others the same cost **was** included under the
cost of spraying by the packhouse. The method of
classification depended on whether growers supplied
their own spraying materials when having their orchards
sprayed by the packhouse or whether the packhouse
supplied the material.

The cost data shown for this area for each
of the three years, appear to be above criticism and
the weighted average cost of production shown in Table
153 may consequently be accepted as a reasonable in-
dication of the level of costs in Natal during the
period 1948-1950.

NORTHERN TRANSVAAL: Remarkably close similarity is
revealed by a comparison of the individual cost items
as determined by each of the three surveys. Only in
respect of cost of labour per morgen, which amounted
to £23.49 during 1948 as against £29.27 during 1949
and £28.77 during 1950, was some disparity to be
observed. Minor variations in the amounts of the
remaining cost items between the three years, however,
neutralized the above disparity to such an extent
that little difference existed between the total cost
of production per morgen calculated for each of the
three years 1948 to 1950. The total cost of produc-

Table 158: Summary of calculations of the average component costs per morgen. Northern Transvaal.

Item.	1948	1949	1950.	Three Years Combined.
Depreciation	£	£	£	£
Improvements	1.79	1.39	1.49	1.54
General equipment	2.61	2.03	1.82	2.13
Mechanical power equipment	3.58	2.74	2.72	2.98
Repairs. Improvements	2.08	0.63	1.01	1.19
General equipment	0.37	0.53	0.73	0.55
Mechanical power equipment	2.09	2.81	1.19	2.04
Running cost - Mechanical power equipment	4.58	5.32	4.37	4.77
Draught animals	0.05	0.14	0	0.08
Labour	23.49	29.27	28.77	27.38
Cash expenses	27.87	25.07	27.36	26.69
Services by P/House	0	0	0	0
Total cost excluding interest	68.51	69.93	69.46	69.35
Total interest	36.88[1]	28.97	27.62	30.83
Total cost including interest	105.39	98.90	97.08	100.18

Note i: Differences in the valuation of orchard land, responsible for the above disparity in the amount of interest per morgen between the three years, were indicated under the discussion of the capital requirements for citrus production.

tion excluding interest per morgen amounted to £68.51 during 1948, £69.93 during 1949 and £69.46 during 1950. The corresponding total cost including interest amounted to £105.39 during 1948, £98.90 during 1949 and £97.08 during 1950. The disparity in capital investment per morgen, responsible for the varia-

tion in the amount of interest on capital per morgen
as shown in these Tables, was indicated in an earlier
analysis.

Once again the weighted average results of
the three surveys combined appears to be acceptable
as a true reflection of the average level of cost of
production of citrus fruit in the Northern Transvaal.
The weighted average cost of production, excluding
interest, for the three year period, amounted to £69.35
per morgen as against the corresponding cost including
interest of £100.18 per morgen.

WESTERN PROVINCE: In the Western Province area a
decline in the total cost of production, excluding
interest, per morgen was revealed by the three surveys.
The total cost, excluding interest, decreased from
£59.39 per morgen during 1948 to £55.18 per morgen
during 1949 and £53.93 per morgen during 1950.   The
total cost including interest varied between £80.49
per morgen during 1948,   £77.01 during 1949 and £78.53
during 1950.   The weighted average cost excluding
interest for the three year period amounted to £55.87
per morgen as against the weighted average cost inclu-
ding interest of £78.50 per morgen.

A decrease in the cost of labour per morgen
from £20.81 during 1948 to £18.19 during 1949 and
£17.45 during 1950 contributed largely to the decrease
in total cost per morgen.   A decrease may also be
observed in the total amount of cash expenses for
citrus production per morgen.   This latter cost
decreased from £24.13 per morgen during 1948 to
£23.11 during 1949 and £21.91 during 1950.
Separate analyses of the composition of the
item cash expenses revealed that the cost of manure
and fertilizers per morgen varied between £13.7 during

Table 159:   Summary of calculations of the average
compopant costs per morgen.
Western Province.

Item.	1948	1949	1950	Three Years Combined.
Depreciation.	£	£	£	£
Improvements	1.92	1.31	1.94	1.70
General equipment	1.00	1.27	1.51	1.28
Mechanical power equipment	2.94	3.03	2.62	2.86
Repairs. Improvements	0.26	0.19	0.88	0.46
General equipment	0.14	0.28	0.32	0.26
Mechanical power equipment	0.81	0.90	0.89	0.87
Running cost - Mechanical power equipment	5.90	4.68	5.08	5.15
Draught animals	0.65	0.88	0.66	0.74
Labour	20.81	18.19	17.45	18.64
Cash expenses	24.13	23.11	21.91	22.95
Services by P/House	0.83	1.34	0.67	0.96
Total cost excluding interest	59.39	55.18	53.93	55.87
Total interest	21.10	21.83	24.60	22.63
Total cost including interest	80.49	77.01	78.53	78.50

1948, £14.3 during 1949 and £12.2 during 1950.   In the latter
year a considerable decrease in the cost of fertilizers per
morgen was effected by growers in this area.   The cost of
sprays, dusts and fumigants varied between £4.7 per morgen
during 1948, £3.6 during 1949 and £5.4 during 1950.   The
total amount of various unclassified cost items, varied
between £5.7 during 1948, £5.2 during 1949 and £4.4 during
1950.

The disparities between the total amount
of each individual cost item during the three years
were small and it will be difficult to ascertain
whether the total decrease in cost per morgen should
be regarded as significant.   Nevertheless the weight-
ed average cost of production, calculated for the
three year period, could be regarded as an appropriate
indication of the level of the true cost of production
of citrus fruit in the Western Province during the
period 1948 - 1950.

EASTERN TRANSVAAL: As in the case of several of the
other areas, a decrease in the total cost of production
excluding interest, per morgen is indicated for the
Eastern Transvaal during the three-year period 1948
to 1950.   Although a considerable decline occurred
in the total cost excluding interest per morgen, in
this area from 1948 to 1950, only minor decreases
were shown in some of the items whereas fluctuating
levels were determined for others.   The most signi-
ficant decrease in any particular cost item, occurred
in the average cost of production services by the
Packhouse during 1950 in relation to 1948.   As these
figures were obtained from actual records kept by
the packhouse, their accuracy cannot be doubted.
The only conclusion that could be arrived at, is
that the members of the packhouse included in the
survey during 1950 did not incur expenses for pest
and disease control to the same extent as the
members surveyed during the previous two years.
Fumigation of trees for the control of scale is,
for instance, not undertaken every year.

The total cost of production, excluding
interest per morgen, decreased from £71.60 during
1948 to £68.10 during 1949 and £60.99 during 1950

Table 160:   Summary of Calculations of the average
component costs per morgen.
Eastern Transvaal.

Item	1948	1949	1950	Three Years Combined.
Depreciation	£	£	£	£
Improvements	2.27	0.75	1.30	1.44
General equipment	1.70	1.76	1.79	1.75
Mechanical power equipment	2.34	2.60	2.46	2.46
Repairs: Improvements	1.23	0.78	0.74	0.90
General equipment	0.58	0.64	0.27	0.47
Mechanical power equipment	1.63	1.56	0.97	1.34
Running cost - Mechanical power	3.83	3.66	5.04	4.29
Draught animals	0.70	0.46	0.14	0.40
Labour	28.38	27.88	26.11	27.29
Cash expenses	22.48	22.62	20.94	21.88
Services by P/House	6.46	5.39	1.19	3.97
Total cost excluding interest	71.60	68.10	60.95	66.19
Total interest	31.48	31.29	29.05	30.42
Total cost including interest	103.08	99.39	90.00	96.61

with an average for the three years of £66.19 per
morgen.   The corresponding total cost, including
interest per morgen, decreased from £103.08 during
1948, £99.39 during 1949 and £90.00 during 1950 with
an average for the three years combined of £96.61
per morgen.   The considerable decrease in cost per
morgen during the period covered by the survey in
this area, appears somewhat disturbing, especially
in the absence of any feasible explanation for a

decline in costs which is in contrast to the general
trend in cost of production during a period when the
spiral of prices was still ascending. The only
possible solution to be offered, appears to be that
variations occurred in the cost of production incurred
by the various groups of growers which constituted
the sample taken during each of the three surveys.

It should be noted, however, that the weight-
ed average cost of production based on 79 independent
records taken over the period of three years, would
be a more accurate reflection of the average level of
costs in the area than the results of any of the annual
surveys which were based in two instances on 26 records
and in one instance on 27 records only.

COST PER MORGEN FOR ALL THE CITRUS AREAS COMBINED.

Whereas the size of the sample taken annually in most
of the individual citrus-growing areas, was numerically
small and the representative nature of the average
results calculated for each area, consequently open
to criticism, the weighted averages for all the areas
combined for the three surveys, offer a reliable indi-
cation of the average level of cost of production in
the Union.

The fallacy in the claim by individual growers
that if prices were fixed on the basis of cost of
production with an allowance for operators earnings,
they would be assured a reasonable income, is clearly
demonstrated by the results of the present investiga-
tion. In fixing prices for the Citrus Industry as
a whole, only the average cost of production for the
Industry as a whole can be considered with disregard
to variations in costs from area to area and from
farm to farm. The extent of these variations
between areas during the course of three years, was

shown in Tables 150 to 152. Variations between the
cost of individual growers within each area, were
equally pronounced. Price fixation on the basis
of average cost of production may be in the interest
of the Industry as a whole but would not secure a
profit to each citrus grower.

According to Table 153, the three Transvaal
areas operated at a cost structure above the average
for the Union, during the period 1948 - 1950. The
influence of cost per morgen will be considered later
in conjunction with yield per morgen in its relation-
ship to the financial results achieved in each of the
areas. It may be stated in advance, however that a
high or low level of cost of production per morgen
is no criterion on which the financial results of citrus
farming in the individual areas may be judged.

The weighted average cost, excluding interest,
for all the areas combined, varied between £70.32 per
morgen during 1948, £64.25 per morgen during 1949
and £63.15 per morgen during 1950 with an average for
all the areas for the three surveys combined of £65.73
per morgen. The corresponding cost, including interest
for the three surveys, varied between £101.59 per
morgen during 1948, £92.83 per morgen during 1949
and £92.38 per morgen during 1950 with an average for
all areas for the three surveys combined of £95.38
per morgen.

It will be noted that a slightly higher
average cost figure was arrived at by the 1948 survey
than by the two later surveys. Higher amounts were
determined on a "per morgen" basis during the initial
survey than during the two later surveys in respect
of all the individual cost items with the exception
of running cost of mechanical power equipment.

Although the excess in each instance was comparative-
ly small, the accumulated difference in total cost
excluding interest during 1948 over 1949 amounted
to £6.07 per morgen and of 1948 over 1950, to £7.17
per morgen.   A factor which has to be considered in
accounting for these differences in cost per morgen
between the three surveys is undoubtedly the varia-
tions in the average size of farms covered by the
three surveys.   It has already been pointed out that
during 1949 and 1950 a considerable number of relatively
small farms was included in the survey to increase the
sample.   It will be shown in a later analysis that a
strong tendency existed for the bigger growers to
operate at a considerably higher level of costs than
the smaller growers.   In view of the above explana-
tion, it is evident that the weighted average cost per
morgen, based on 514 independent cost records, will
be a more reliable indication of the average level of
cost of production for the Citrus Industry as a whole
than the average of any single one of the three surveys.
It will, however, be realised that a shortcoming in
the weighted average cost per morgen as shown for the
industry as a whole, is that the weighting applied to
the cost of the individual areas was in accordance
with the number of morgen covered by the survey in
each area and not in accordance with the total num-
ber of morgen of citrus orchards established in
each area.   In the absence of reliable information
in respect of the total number of morgen of citrus
orchards in each area, however, the desired calcu-
lation could not be made.

In the accompanying figures 4 and 5 the
dispersal of growers, according to cost of produc-

Table 161:   Summary of calculations of the average
component costs per morgen.
All areas combined.

Item	1948	1949	1950	Three Years Combined.
Depreciation:	£	£	£	£
Improvements	2.67	1.20	1.53	1.77
General equipment	2.09	1.86	1.91	1.95
Mechanical power equipment	4.40	3.25	3.05	3.54
Repairs: Improvements	1.05	0.50	1.03	0.86
General equipment	0.54	0.45	0.51	0.50
Mechanical power equipment	2.31	1.87	1.54	1.89
Running cost - Mechanical power	5.41	5.14	5.67	5.41
Draught animals	0.66	0.46	0.25	0.44
Labour	26.85	25.61	25.72	26.04
Cash expenses	20.18	19.84	19.44	19.80
Services by P/House	4.16	4.07	2.50	3.53
Total cost excluding interest	70.32	64.25	63.15	65.73
Total interest	31.27	28.58	29.23	29.65
Total cost including interest	101.59	92.83	92.38	95.38

tion including interest per morgen, during 1950, is
shown.   It may be seen from Fig.4 that during 1950
47.3 percent of all the growers included in the survey
operated at a cost of production, including interest
per morgen, above the average for all the areas com-
bined (£90.0) while 52.7 percent of the 182 growers
operated at a level of cost per morgen below the
mentioned average.   The dispersal of the growers,

Fig 4: Dispersal of growers in each area above or below the average cost of production including interest per morgen - 1950.

% of growers with above average cost per morgen.

	W.P.	NAT.	N.Tvl.	W.Tvl.	NEC.	E.C.C.A.	E.Tvl.	All Areas
Above	50%	33·3%	41·7%	57·1%	54·8%	38·8%	59·2%	47·3%
Av. Cost per morgen	78·5	96·6	97·1	130·5	82·1	90·6	90·9	90·0
Below	50%	66·7%	58·3%	42·9%	45·5%	61·2%	40·8%	52·7%

Av. Cost per morgen for each area 1950 £

% of growers with below av. cost per morgen
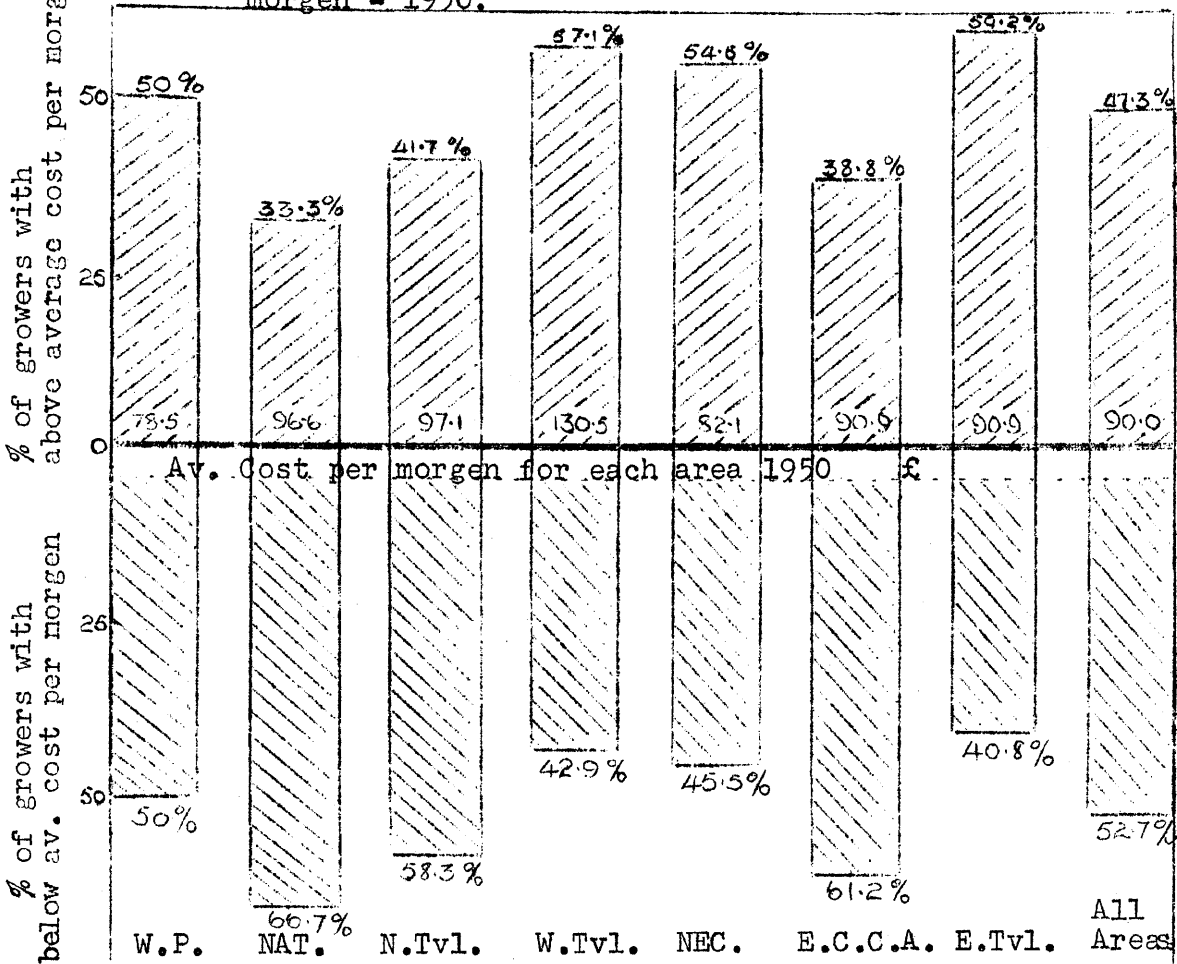
Fig 5: Dispersal of 182 growers - cost of production including interest per morgen - 7 citrus areas in the Union 1950.

% of 182 growers

3·9% 17·6% 27·4% 22·5% 13·2% 5·5% 9·9%
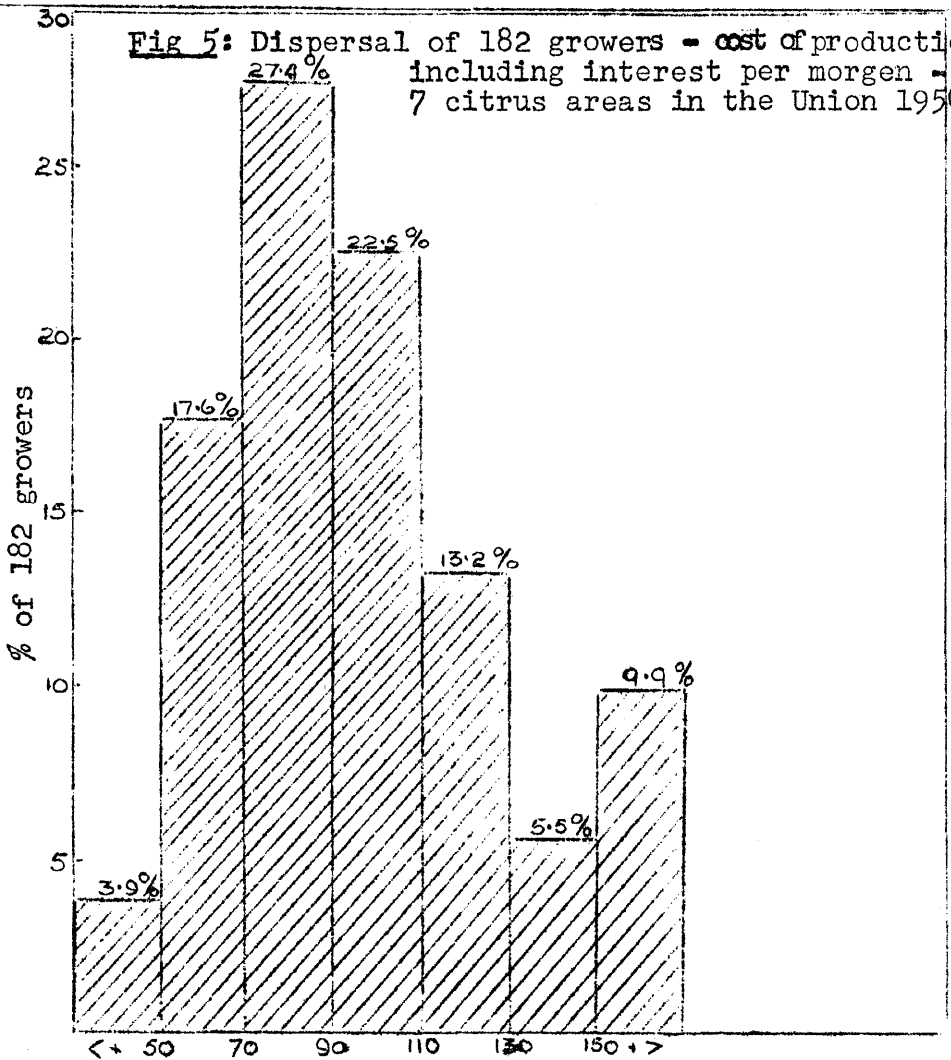
Groups - Cost including interest per morgen £

< + 50   70   90   110   130   150 + >

TABLE 162 Calculation of average combine costs per citrus tree on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Improvements	9.8	2.9	3.1	4.4	2.8	1.9	3.4	3.5
General equipment	1.7	2.6	3.1	4.9	4.0	1.0	2.5	2.8
Mech. power equipm.	6.1	6.8	7.9	4.3	5.5	2.9	3.5	5.9
Repairs:								
Improvements	1.0	1.5	1.1	1.1	3.2	0.2	1.8	1.4
General equipment	0.1	0.3	1.2	0.7	0.6	0.1	0.9	0.7
Mech. power equipm.	2.8	4.7	3.5	2.3	3.2	0.8	2.4	3.0
Run. cost mech. power	9.2	9.6	7.3	4.2	7.1	5.8	5.7	7.2
Draught animals	2.5	0	1.2	0.8	0.1	0.6	1.0	0.9
Labour	51.1	39.7	30.7	38.7	36.3	20.5	42.2	35.7
Cash expenses	26.8	13.2	26.7	28.4	43.0	23.8	33.5	26.8
Services by packhouse	7.5	2.8	7.2	8.0	0	0.8	9.6	5.5
Total cost excl. int.	118.6	84.1	93.0	95.8	105.8	58.4	106.5	93.4
Total interest	64.5	33.6	37.5	55.5	57.0	20.8	46.8	41.5
Total cost incl. int.	183.1	117.7	130.5	151.3	162.8	79.2	153.3	134.9

covered by the survey of each of the seven areas, in
relation to the average cost of production per morgen
of the individual areas, is also shown in Fig. 4.
In Fig. 5 a more detailed dispersal of growers is shown according
to the level of cost of production including interest
per morgen at which citrus orchards were operated
during 1950. Of the 182 growers interviewed, 27.4
percent showed a cost per morgen of £70 - £90 while
22.5 percent operated at a cost per morgen of £90 -
£110. Whereas 49.9 percent of these growers showed
a cost of production per morgen of £70 - £110, 21.5
percent of growers operated at a cost below £70 per
morgen while 28.6 percent of growers operated at a
cost above £110 per morgen.

COST OF PRODUCTION PER CITRUS TREE.

In view of the knowledge that certain major
costs for citrus production are incurred specifically
on a tree basis, it is evident that the number of citrus
trees planted per morgen would affect cost per morgen
of citrus orchard. The cost of fertilising, pest
and disease control, labour and to a certain extent
mechanical power equipment, is related more directly
to the number of trees per farm than to the number of
morgen of citrus orchards per farm. Cost per citrus
tree provides not only a sound basis for comparison
of the cost structure of the various citrus-growing
areas but offers an indication of the varying amounts
to be realized per tree in the various areas in order
to cover growing costs.

In Tables 162 to 164 an analysis is shown
of the average composition of the total cost of pro-

TABLE 163

Calculation of the average component costs per citrus tree on farms
in 7 citrus areas of the Union 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Depreciation:	Pence	Pence	pence	Pence	Pence	Pence	Pence	Pence
Improvements	2.7	1.8	1.7	0.9	2.2	1.5	1.1	1.7
General Equipment	1.9	2.8	2.6	3.5	3.2	1.4	2.6	2.6
Mech. power equipment	5.5	5.0	5.0	3.9	4.3	3.4	3.8	4.5
Repairs:								
Improvements	0.9	0.8	0.6	0.3	1.0	0.2	1.2	0.7
General Equipment	0.1	0.5	0.7	0.7	0.8	0.3	0.9	0.6
Mech. power equipment	4.6	2.4	2.7	1.0	4.4	1.0	2.3	2.6
Run. cost mech. power	10.9	8.1	7.4	4.7	8.4	5.3	5.4	7.1
Draught animals	0.4	0.4	0.7	0.6	0.2	1.0	0.7	0.6
Labour	58.0	20.0	32.5	47.6	46.0	20.5	41.3	35.4
Cash expenses	29.7	14.8	24.1	34.4	39.4	26.1	33.5	27.4
Services by packhouse	6.9	1.4	9.2	6.1	0	1.5	8.0	5.6
Total cost excl. int.	121.6	58.0	87.2	103.7	109.9	62.2	100.8	88.8
Total interest	57.5	34.0	37.6	39.2	45.5	24.6	46.3	39.5
Total cost incl. int.	179.1	92.0	124.8	142.9	155.4	86.8	147.1	128.3

TABLE 164

Calculation of the average component costs per citrus tree on farms in 7 citrus areas of the Union — 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Fixed Improvements	3.4	1.8	2.1	1.5	2.4	2.1	2.0	2.2
General equipment	1.8	2.7	3.0	3.2	2.9	1.6	2.8	2.7
Mech. power equipment	8.4	4.4	4.1	4.0	4.4	2.8	3.9	4.3
Repairs:								
Fixed improvements	2.4	1.3	1.5	1.9	1.6	1.0	1.2	1.4
General equipment	0.4	0.5	1.0	1.1	1.2	0.4	0.4	0.7
Mech. power equipm.	5.3	3.5	1.9	1.6	1.9	1.0	1.5	2.2
Run. cost mech. power	12.6	9.9	7.7	5.9	7.0	5.5	8.0	8.0
Cost draught animals	0.2	0.5	0.4	0.3	0.1	0.7	0.2	0.3
Cost of labour	53.8	22.5	36.3	46.5	46.1	18.9	41.2	36.1
Cash expenses	29.3	15.3	21.4	46.4	43.9	23.8	33.0	27.3
Services by packhouse	7.8	0.4	7.2	1.8	0	0.7	1.9	3.5
Total cost excl. int.	125.4	62.8	86.6	114.2	111.5	58.5	96.1	88.7
Total interest	52.8	35.9	40.6	48.7	44.3	26.7	45.8	41.1
Total cost incl. int.	178.2	98.7	127.2	162.9	155.8	85.2	141.9	129.8

TABLE 165

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Improvements	5.2	2.2	2.3	2.2	2.4	1.8	2.2	2.4
General equipment	1.8	2.7	2.9	3.9	3.4	1.4	2.7	2.7
Mech. power equipm.	6.6	5.5	5.6	4.0	4.7	3.1	3.8	4.9
Repairs:								
Improvements	1.4	1.2	1.1	1.0	1.9	0.5	1.4	1.2
General Equipment	0.2	0.4	1.0	0.8	0.9	0.3	0.7	0.7
Mech. power equipment.	4.3	3.6	2.7	1.6	3.2	0.9	2.0	2.6
Run. cost mech. power	10.9	9.3	7.4	4.9	7.5	5.5	6.5	7.4
Draught animals	1.0	0.3	0.7	0.6	0.1	0.8	0.6	0.6
Labour	54.5	28.1	33.3	44.6	43.1	19.9	41.5	35.7
Cash expenses	28.6	14.4	24.0	36.4	42.0	24.6	33.3	27.2
Services by packhouse	.4	1.6	7.9	4.7	0	1.0	6.0	4.8
Total cost excl. int.	121.9	69.3	88.9	104.7	109.2	59.8	100.7	90.2
Total interest	58.2	34.4	38.6	47.1	48.6	24.2	46.3	40.7
Total cost incl. int.	180.1	103.7	127.5	151.8	157.8	84.0	147.0	130.9

duction per citrus tree for each area during the
period 1948 to 1950. In Table 165 the weighted
average results of the three surveys combined for each
area and for all the areas combined, are given on the
same basis. Examination of the data contained in the
former three Tables, reveals a remarkable similarity
not only in total cost per tree but also in the amounts
of the individual cost items per tree for each area
during the three successive surveys. Only in the case
of the North Eastern Cape area, where, as has been men-
tioned earlier, drought occurred during the period
covered by the investigations, may a significant dis-
parity be observed between the results of the three sur-
veys. It should be noted that in the case of this area,
a reduction in the cost of labour per tree, was mainly
responsible for the decrease in costs during 1949 and
1950.

For the sake of convenience the results of the
three investigations as regards cost of production, ex-
cluding interest per citrus tree may be summarised as
follows:

Summary of cost excluding interest per citrus
tree - 1948 to 1950.

Area.	1948	1949	1950	Three Surveys Combined.	
				Cost excluding interest	Cost including interest
	pence	pence	pence	pence	pence
Western Transvaal	118.6	121.6	125.4	121.9	180.1
North Eastern Cape	84.1	58.0	62.8	69.3	103.7
Eastern Cape Coast	93.0	87.2	86.6	88.9	127.5
Natal	95.8	103.7	114.2	104.7	151.8
Northern Transvaal	105.8	109.9	111.5	109.2	157.8
Western Province	58.4	62.2	58.5	59.8	84.0
Eastern Transvaal	106.5	100.8	96.1	100.7	147.0
Averages for all areas.	93.4	88.8	88.7	90.2	130.9

The weighted average cost of production ex-
cluding interest, per citrus tree, varied between 59.8
pence in the Western Province and 121.9 pence in the
Western Transvaal with an average for all the areas
combined of 90.2 pence per citrus tree. The corres-
ponding weighted average cost including interest per
citrus tree varied between 84.0 pence in the Western
Province and 180.1 pence in the Western Transvaal
with an average for all areas combined of 130.9
pence per citrus tree. It is of significance to
note that interest amounted to an average cost vary-
ing between 24.2 pence per tree in the Western Pro-
vince and 58.2 pence per tree in the Western Transvaal
with an average of 40.7 pence per tree for all the areas
combined.

From Table 165 it may be noted that total
depreciation on capital items cost the entire industry
on an average 10.0 pence per tree, repairs to capital
items cost an average of 4.5 pence per tree, running
cost of mechanical power equipment 7.4 pence, labour
35.7 pence, cash expenses 27.2 pence, and services
by packhouses 4.8 pence per tree. The average cost
of growing citrus fruit in the Union, including inte-
rest on capital but excluding all costs incurred with
and after picking, amounted to 10 shillings 10.9d
per tree. In all the Transvaal areas as well as
in Natal the average cost of production excluding
interest per tree exceeded the weighted average for
the Union while the three areas in the Cape Pro-
vince operated at costs below the average for the
Union.

It may be seen from Table 165 that wide
differences occurred in the cost of labour per tree

between the various areas. In the Western Province
the weighted average cost of labour amounted to only
19.9 pence per tree as against 33.3 pence in the
Eastern Cape, 41.5 pence in the Eastern Transvaal,
43.1 pence in the Northern Transvaal, 44.6 pence
in Natal and 54.5 pence in the Western Transvaal. If
it is borne in mind that in the latter area extensive
co-operative facilities were available to growers in
respect of pest and disease control measures, and
that growers paid an average of 7.4 pence per tree
for these services, it is evident that labour cost
in the Western Transvaal was exceptionally high in
relation to the other areas. An explanation for this
factor may be found in the fact that growers generally
employed native labour recruited by the Rustenburg
Co-op. for orchard maintenance work. These recruited
natives are paid at rates prescribed under the Factory
Act. Growers were in addition responsible for pooled
compound costs.

COST OF PRODUCTION PER BEARING CITRUS TREE.

In calculating the cost of production per
pocket of citrus fruit, the crop produced was charged
with the entire cost of production incurred on citrus
farms, irrespective of the percentage of non-bearing
trees of the total number of citrus trees in the
orchards of individual growers. This procedure
implied that in the calculation of cost of production
per pocket of citrus fruit produced, bearing trees
were charged with the cost of establishing and
maintaining non-bearing trees in the orchards.
It is evident that variations in the average per-
centage of non-bearing trees per farm between areas,
would be an important contributing

variations in cost per pocket between areas. By
comparing cost per bearing tree as shown in Tables
166 to 169 with cost per citrus tree as given in the
preceding Tables an indication[i] may be obtained of
the cost of non-bearing trees per bearing tree. In
areas where considerable expansion is under progress,
the latter cost may assume considerable significance
in the determination of cost of production per pocket.
Whereas it will be agreed that the cost of normal re-
placements of old trees is an inherent cost in citrus
production on any farm, it does not follow that the
cost of all young orchards could be charged to the
crop in calculating cost per pocket for price fixing
purposes. It is generally claimed by those in
authority in the Citrus Industry that the normal produc-
tive life of a citrus tree in the Union is from 30 to
40 years. This means that in order to maintain the
total number of bearing trees in the Union at a con-
stant level, replacements will have to be effected
annually at the rate of $2\frac{1}{2}\%$ to 3 percent of the total
number of trees.

In Table 68 it was shown that the weighted
average annual rate of replacement for all the areas
combined during the period 1948 to 1950 was 4.2
percent. It was however, pointed out that it is
claimed by the Industry that the necessity to re-
place old trees, accumulated during the war years

[i] With the exception of pest and disease control
measures, it is considered that cultural costs
of bearing and non-bearing trees are approxi-
mately the same.

when young trees were unobtainable and the prospects
of the Industry were extremely poor owing to
restricted exports.   As this claim is supported
by evidence obtained from the field officers of
the Citrus Exchange to the effect that actual
replacement of old trees was up to the present
time still being executed extensively, it has to
be agreed that under the circumstances the total
cost of these replacements should be charged to
the crop.   It has, however, been determined that
a spirit of expansion is prevalent in the Industry
and in the immediate future due consideration
should be given to the influence of the cost of
expansion on the cost of production of citrus fruit.

In Tables 166 to 169 an analysis is given
of the cost per bearing tree in each of the seven
citrus growing areas in the Union and for all areas
combined during each of the years 1948 to 1950,
and for the three surveys combined.   It will be
observed from these Tables that a remarkably close
similarity existed between the total cost, excluding
interest, per bearing tree as determined by the
three surveys, in four of the seven areas.   These
are viz: the Western Transvaal, Eastern Cape
Coastal area,   Western Province and Eastern Trans-
vaal areas.   The reasons for disparities between
the results of the three surveys in the cases of the
North Eastern Cape and Natal have already been
mentioned under the discussion of cost per citrus
tree.   In the Northern Transvaal a higher cost per
bearing tree was registered during 1950 than during
the previous two years as a result of an extremely

TABLE 166.

Calculation of the average component costs per bearing tree on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Improvements	12.2	3.1	3.4	4.6	3.4	2.7	3.9	4.1
General Equipment	2.2	2.7	3.5	5.1	4.9	1.4	2.9	3.2
Mech. power equipm.	7.6	7.2	9.0	4.4	6.7	4.2	4.0	6.8
Repairs:								
Improvements	1.3	1.6	1.3	1.1	3.9	0.4	2.1	1.6
General Equipment	0.2	0.3	1.4	0.8	0.7	0.2	1.0	0.8
Mech. power equipment	3.5	5.0	3.9	2.3	3.9	1.1	2.8	3.6
Run. cost mech. power	11.5	10.2	8.2	4.4	8.6	8.4	6.5	8.3
Draught animals	3.1	0	1.3	0.8	0.1	0.9	1.2	1.0
Labour	63.8	42.1	34.7	40.0	44.1	29.5	48.4	41.2
Cash Expenses	33.4	14.0	30.2	29.3	52.3	34.3	38.4	31.0
Services by packhouse	9.4	3.0	8.2	6.2	0	1.2	11.0	6 4
Total cost excl. int.	148.2	89.2	105.1	99.0	128.6	84.3	122.2	108.0
Total interest	80.5	35.7	42.4	57.3	69.2	30.0	53.7	48.0
Total cost incl. int.	228.7	124.9	147.5.	156.3	197.8	114.3	175.9	156.0

TABLE 167

Calculation of the average component costs per bearing tree on farms in 7 citrus areas of the Union 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Depreciation: Improvements	Pence 3.3	Pence 1.8	Pence 2.0	Pence 1.0	Pence 2.6	Pence 2.1	Pence 1.4	Pence 2.0
General Equipment	2.3	2.9	3.1	3.7	3.7	2.0	3.3	3.0
Mech. power equipm.	6.8	5.2	5.9	4.0	5.0	4.9	4.8	5.3
Repairs Improvements	1.1	0.8	0.7	0.3	1.2	0.3	1.4	0.8
General equipment	0.1	0.5	0.8	0.7	1.0	0.4	1.2	0.7
Mech. power equipm.	5.8	2.4	3.2	1.0	5.2	1.5	2.9	3.1
Run. cost mech. power	13.5	8.3	8.8	4.9	9.8	7.6	6.8	8.4
Draught animals	0.5	0.5	0.9	0.6	0.2	1.4	0.8	0.8
Labour	71.8	20.5	38.6	49.7	53.9	29.3	51.6	42.0
Cash Expenses	36.8	15.2	28.6	35.9	46.1	37.3	41.8	32.6
Services by packhouse	8.5	1.4	10.9	6.4	0	2.2	10.0	6.7
Total cost excl. in.	150.5	59.5	103.5	108.2	128.7	89.0	126.0	105.4
Total interest	71.2	34.8	44.8	41.0	53.3	35.2	57.9	46.9
Total cost incl. int.	221.7	94.3	148.3	149.2	182.0	124.2	183.9	152.3

TABLE 168   Calculation of the average component costs per bearing tree on farms in
7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Fixed improvements	4.3	1.9	2.6	1.7	3.1	3.1	2.8	2.6
General Equipment	2.2	2.9	3.6	3.5	3.8	2.4	3.9	3.3
Mech. power equipment	10.4	4.6	5.0	4.2	5.6	4.2	5.3	5.3
Repairs:								
Fixed improvements	2.9	1.3	1.8	2.1	2.1	1.4	1.6	1.8
General Equipment	0.5	0.5	1.2	1.2	1.5	0.5	0.6	0.9
Mech. power equipment	6.6	3.7	2.3	1.8	2.5	1.4	2.1	2.7
Run. cost mech. power	15.6	10.3	9.3	6.4	9.0	8.1	10.9	9.9
Cost of draught animals	0.2	0.5	0.4	0.3	0.1	1.0	0.3	0.4
Cost of labour	66.7	23.4	43.9	50.1	59.5	27.9	56.5	44.8
Cash expenses	36.3	16.0	25.9	50.0	56.7	35.0	45.3	33.9
Services by packhouse	9.7	0.4	8.7	1.9	0	1.1	2.6	4.4
Total cost excl. int.	155.4	65.5	104.7	123.2	143.9	86.1	131.9	110.0
Total interest	65.4	37.4	49.1	52.6	57.2	39.3	62.9	50.9
Total cost incl. int	220.8	102.9	153.8	175.8	201.1	125.4	194.8	160.9

TABLE 169

Calculation of the average component costs per bearing tree on farms in 7 itrus areas of the Union for the three years 1948, 1949 and 1950 combined.

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Improvements	6.5	2.3	2.7	2.3	3.0	2.6	2.8	2.9
General equipment	2.2	2.8	3.4	4.1	4.1	2.0	3.4	3.2
Mech. power equipm.	8.2	5.7	6.7	4.2	5.7	4.4	4.7	5.8
Repairs:								
Improvements	1.8	1.3	1.3	1.1	2.3	0.7	1.7	1.4
General equipment	0.2	0.4	1.1	0.9	1.1	0.4	0.9	0.8
Mech. power equipm.	5.3	3.8	3.1	1.7	3.9	1.4	2.6	3.1
Run. cost mech. power	13.5	9.7	8.8	5.2	9.2	8.0	8.2	8.8
Draught animals	1.2	0.3	0.9	0.6	0.1	1.1	0.8	0.7
Labour	67.6	29.4	39.1	46.9	52.7	28.9	52.3	42.7
Cash Expenses	35.6	15.0	28.2	38.3	51.4	35.6	41.9	32.6
Services by packhouse	9.2	1.7	9.2	4.9	0	1.5	7.6	5.8
Total cost excl. int.	151.3	72.4	104.5	110.2	133.5	86.6	126.9	107.8
Total interest	72.3	36.0	45.4	49.5	59.4	35.1	58.3	48.6
Total cost incl. int.	223.6	108.4	149.9	159.7	192.9	121.7	185.2	156.4

high rate of planting of young orchards during this year. (See Table 67)

For the sake of convenience, the results of Tables 166 to 169 as regards total cost excluding interest per bearing tree, are summarised below:

Summary of weighted average total cost of production excluding interest per bearing tree.

Area.	1948	1949	1950	Three Surveys Combined.	
	(pence)	(Pence)	(Pence)	Cost ex. int. (Pence)	Cost inc. int. (Pence)
Western Transvaal	148.2	150.5	155.4	151.3	223.6
North Eastern Cape	89.2	59.5	65.5	72.4	108.4
Eastern Cape Coast	105.1	103.5	104.7	104.5	149.9
Natal	99.0	108.2	123.2	110.2	159.7
Northern Transvaal	128.6	128.7	143.9	133.5	192.9
Western Province	84.3	89.0	86.1	86.6	121.7
Eastern Transvaal	122.2	126.0	131.9	126.9	185.2
Average for all areas	108.0	105.4	110.0	107.8	156.4

The weighted average total cost excluding interest, per bearing tree varied between 72.4 pence in the North Eastern Cape and 151.3 pence in the Western Transvaal with an average for all the areas combined of 107.8 pence per bearing tree. The weighted average cost excluding interest per bearing tree for all the areas combined amounted to 108.0 pence during 1948, 105.4 pence during 1949 and 110.0 pence during 1950. The corresponding costs including interest varied between 108.4 pence in the North Eastern

Cape and 223.6 pence in the Western Transvaal with an average for all the areas for the three years combined of 156.4 pence.

In the following summary of the weighted average cost excluding interest per citrus and per bearing tree respectively, an indication of the average cost of non-bearing trees in the orchards, per bearing tree, is shown for each of the areas for the period 1943 - 1950.[1]

Area.	Av. cost per bearing tree.	Av. cost per citrus tree.	Av. cost of non-bearing trees per bearing tree.	% of non-bearing trees.
	(pence)	(pence)	(pence)	(pence)
Western Transvaal	151.3	121.9	29.4	19.5
North Eastern Cape	72.4	69.3	3.1	4.2
Eastern Cape Coast	104.5	88.9	15.6	14.9
Natal	110.2	104.7	5.5	4.9
Northern Transvaal	133.5	109.2	24.3	18.2
Western Province	86.6	59.8	26.8	30.9
Eastern Transvaal	126.9	100.7	26.2	20.6
Average for all areas	107.8	90.2	17.6	16.3

According to the above exposition, the Western Transvaal with 19.5 percent of non-bearing trees during the period 1948 - 1950, experienced the greatest disadvantage in respect of the average cost of non-bearing trees which was charged to bearing trees. Other areas which incurred high costs in this respect were the Northern Transvaal - 24.3 pence (18.2 percent non-bearing trees), Western - Province - 26.8 pence (30.9 percent non-bearing trees) and the Eastern Transvaal - 26.2 pence (20.6 percent non-bearing trees). The North Eastern Cape with only 4.2 percent non-bearing trees and Natal with 4.9 per-

[1] See footnote Page 128

cent non-bearing trees, incurred costs of only 3.1
pence and 5.5 pence per bearing tree respectively in
respect of the establishment and maintenance of young
orchards.   On an average, for all the areas combined
the total cost of production per bearing tree was in-
creased by 17.6 pence over the cost of production per
citrus tree as a result of the cost of 16.3 percent
of non-bearing trees in the orchards covered by the
three surveys.

COST OF PRODUCTION PER POCKET OF

CITRUS FRUIT.

In considering the cost of production per
pocket of citrus fruit in each of the seven citrus
areas, it should be borne in mind that the results
which were obtained by the investigation were qualified
by the average yield per tree realised in each area
during the period covered by the survey.   The unit of
measurement applied in this instance is more subject
to variation than any of the three units discussed
earlier.   It would be injudicious, for instance, to
form any conclusion as regards the average level of
cost of production per pocket of citrus fruit in the
Union on the basis of the results of a single survey
during any particular season.   The present investi-
gation demonstrated that although a reasonably stable
level of costs was determined by three consecutive
surveys, on a per morgen and per tree basis, extensive
fluctuations in cost per pocket occurred, not only
in the individual areas but for the industry as a
whole, during the period 1948 - 1950.   Although the
weighted average cost of production per pocket for
the industry during the three-year period will be

a more representative reflection of the average level
of costs per pocket at which growers were operating,
than the average of any one of the three surveys, the
average yield per tree on which these costs were based,
may still be open to criticism on the ground of the
shortness of the period covered by the investigation
and climatic conditions during the period.   It may
be argued that a longer period than three years is
required to determine the normal yield per bearing
tree in the Citrus Industry.

In Tables 170 to 172 an analysis is presented
of the average cost of production per pocket of citrus
fruit in each of the citrus areas and for all the areas
combined, as determined by each of the three surveys
undertaken during the period 1948 - 1950.   In Table
173 the weighted average cost of production per pocket
of citrus fruit is shown for the three surveys combined
in respect of each area separately and for all the areas
combined.

For the sake of convenience the final results
of these analyses are summarised below and the average
yield on which each cost was based is indicated. (Page 134)

It may be seen from the above summary that
the weighted average cost of production, excluding
interest, per pocket, varied between 15.173 pence in
the Northern Transvaal and 20.790 pence in the North
Eastern Cape.   In spite of the wide variation in
average yield per tree between the areas, the dif-
ference between the cost of production of the above
two areas with the lowest and highest cost per pocket
respectively, amounted to only 5.617 pence per pocket.
The fact that the North Eastern Cape realised the
highest cost per pocket of all the areas should be

TABLE 170

Calculation of the average component costs per pocket of citrus fruit on farms in 7 citrus areas of the Union 1948

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	21	26	45	10	12	12	26	152
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Improvements	1.630	0.662	0.478	0.585	0.366	0.590	0.530	0.607
General Equipment	0.290	0.588	0.491	0.653	0.536	0.308	0.397	0.476
Mech. power equipm.	1.014	1.539	1.244	0.564	0.736	0.903	0.548	1.001
Repairs:								
Improvements	0.167	0.341	0.180	0.147	0.426	0.081	0.288	0.238
General Equipment	0.021	0.070	0.192	0.100	0.076	0.043	0.136	0.123
Mech. power equipm.	0.472	1.063	0.546	0.300	0.430	0.250	0.382	0.525
Run. cost mech. power	1. 28	2.183	1.142	0.558	0.939	1.814	0.895	1.230
Draught animals	0.420	0	0.182	0.101	0.009	0.200	0.164	0.150
Labour	8.514	9.005	4.812	5.118	4.821	6.401	6.640	6.109
Cash expenses	4.460	3.005	4.182	3.758	5.721	7.425	5.261	4.591
Services by packhouse	1.255	0.643	1.130	0.796	0	0.256	1.512	0.946
Total cost excl. int.	19.771	19.099	14.579	12.680	14.060	18.271	16.753	15.996
Total interest	10.739	7.634	5.879	7.342	7.570	6.492	7.366	7.115
Total cost incl. int.	30.510	26.733	20.458	20.022	21.630	24.763	24.119	23.111

TABLE 171

Calculation of the average component costs per pocket of citrus fruit on farms in 7 citrus areas of the Union 1949

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	24	59	16	13	14	26	180
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Improvements	0.432	0.552	0.336	0.171	0.315	0.509	0.254	0.350
General equipment	0.297	0.883	0.527	0.648	0.461	0.490	0.595	0.541
Mech. power equipment	0.871	1.558	0.998	0.706	0.621	1.172	0.876	0.948
Repairs:								
Improvements	0.146	0.243	0.113	0.049	0.144	0.074	0.264	0.147
General Equipment	0.011	0.156	0.136	0.128	0.120	0.107	0.216	0.130
Mech. power equipment	0.743	0.738	0.534	0.181	0.639	0.350	0.526	0.545
Run. cost mech. power	1.740	2.509	1.487	0.854	1.206	1.815	1.234	1.499
Draught animals	0.060	0.142	0.146	0.117	0.031	0.341	0.155	0.133
Labour	9.227	6.198	6.507	8.686	6.640	7.045	9.399	7.467
Cash Expenses	4.726	4.605	4.832	6.277	5.688	8.953	7.627	5.785
Services by packhouse	1.095	0.433	1.845	1.113	0	0.518	1.817	1.187
Total cost exl. in.	19.348	18.017	17.461	18.930	15.865	21.374	22.963	18.732
Total interest	9.152	10.539	7.546	7.162	6.572	8.458	10.551	8.333
Total cost incl. int.	28.500	28.556	25.007	26.092	22.437	29.832	33.514	27.065

TABLE 172

Calculation of the average component costs per pocket of citrus fruit on farms in 7 citrus areas of the Union 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	28	22	67	12	12	14	27	182
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Fixed improvements	0.450	0.810	0.355	0.210	0.334	0.664	0.319	0.387
General equipment	0.236	1.243	0.502	0.443	0.406	0.518	0.438	0.485
Mech. power equipment	1.098	1.985	0.698	0.540	0.607	0.900	0.603	0.775
Repairs								
Fixed improvements	0.310	0.589	0.252	0.265	0.226	0.302	0.182	0.261
General equipment	0.048	0.211	0.173	0.148	0.163	0.111	0.067	0.130
Mech. power equipment	0.697	1.601	0.321	0.225	0.265	0.305	0.238	0.392
Run. cost mech. power	1.643	4.495	1.286	0.806	0.974	1.742	1.236	1.438
Cost of draught animals	0.020	0.212	0.061	0.044	0.010	0.226	0.034	0.062
Cost of labour	7.028	10.170	6.094	6.341	6.408	5.984	6.398	6.524
Cash expenses	3.825	6.946	3.588	6.326	6.104	7.511	5.133	4.933
Services by packhouse	1.018	0.196	1.208	0.239	0	-0.230	-0.290	0.634
Total cost excl. int.	16.373	28.458	14.538	15.587	15.497	18.493	14.938	16.021
Total interest	6.887	16.243	6.812	6.648	6.162	8.436	7.119	7.416
Total cost incl. int.	23.260	44.701	21.350	22.235	21.659	26.929	22.057	23.437

Calculation of the average cost costs per pocket of citrus fruit on farms in 7 citrus areas of the Union for the three years 1948, 1949 and 1950 combined

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal	Average for all areas
No. of cases	77	72	171	38	37	40	79	514
Depreciation:	Pence	Pence	Pence	Pence	Pence	Pence	Pence	Pence
Improvements	0.784	0.662	0.393	0.324	0.337	0.590	0.376	0.453
General equipment	0.272	0.814	0.505	0.578	0.466	0.444	0.459	0.498
Mech. power equipment	0.997	1.640	0.977	0.600	0.652	0.991	0.643	0.904
Repairs:								
Improvements	0.214	0.366	0.188	0.158	0.261	0.159	0.236	0.220
General equipment	0.028	0.125	0.169	0.126	0.121	0.089	0.123	0.127
Mech. power equipment	0.647	1.083	0.461	0.237	0.446	0.303	0.349	0.482
Run. cost mech. power	1.642	2.774	1.291	0.737	1.044	1.787	1.120	1.383
Draught animals	0.149	0.087	0.128	0.086	0.017	0.256	0.104	0.113
Labour	8.200	8.436	5.752	6.664	5.989	6.462	7.133	6.652
Cash expenses	4.313	4.317	4.149	5.447	5.840	7.959	5.719	5.060
Services by packhouse	1.112	0.486	1.359	0.700	0	0.333	1.037	0.903
Total cost excl. int.	18.358	20.790	15.372	15.657	15.173	19.373	17.299	16.795
Total interest	8.764	10.327	6.685	7.042	6.747	7.847	7.949	7.576
Total cost incl. int.	27.122	31.117	22.057	22.699	21.920	27.220	25.248	24.371

Summary of average cost per pocket, excluding interest, and yield per bearing citrus tree in pockets.

Area.		1948	1949	1950	Three years Combined.
Western Trans-vaal.	Cost(d)	19.771	19.348	16.373	18.358
	Yield	7.49	7.77	9.49	8.24
North Eastern Cape	Cost (d)	19.099	18.017	28.458	20.790
	Yield	4.67	3.30	2.30	3.48
Eastern Cape Coastal Area.	Cost (d)	14.579	17.461	14.538	15.372
	Yield	7.20	5.92	7.20	6.80
Natal	Cost (d)	12.680	18.930	15.587	15.657
	Yield	7.80	5.71	7.91	7.03
Northern Trans-vaal.	Cost (d)	14.060	15.865	15.497	15.173
	Yield	9.14	8.11	9.28	8.80
Western Pro-vince.	Cost (d)	18.271	21.374	18.493	19.373
	Yield	4.61	4.16	4.66	4.47
Eastern Trans-vaal.	Cost (d)	16.753	22.963	14.938	17.299
	Yield	7.29	5.48	8.83	7.33
All areas Combined.	Cost (d)	15.996	18.732	16.021	16.795
	Yield	6.75	5.62	6.86	6.42

attributed directly to it being the area with the low-est average yield per bearing tree viz: 3.48 pockets. Inversely, the Northern Transvaal with the lowest aver-age cost per pocket, realized the highest average yield per tree of 8.80 pockets. The operation of the in-fluence of yield per tree on cost per pocket is further-more demonstrated within each area during the course of the period 1948 - 1950. With the exception of the North Eastern Cape, an increase in yield per tree re-sulted in a decrease in cost per pocket and inversely from year to year in all the areas. In the mentioned area, however, cost of production per morgen was de-creased to such an extent during 1949 in relation to 1948 that the area showed a lower cost per pocket during 1949 than during the previous year in spite of a

lower yield per tree.   It is shown, however, that
although cost per morgen in this area remained on
the same level during 1949 and 1950 a further decrease
in the average yield per tree during 1950 resulted in
a considerable increase in cost per pocket.

A significant conclusion which may be drawn in
the light of the above information, is that growers
apparently adapted the cost structure at which citrus
growing is conducted in each of the areas, to the
average yield per tree which may be expected in the
area.   The inverse of the statement may also apply
viz: that some areas have a low yield as a result of
a low level of costs whereas other areas have a high
yield as a result of the high level of costs at which
the enterprise was operated.   These conclusions may
be illustrated by referring to the data for the West-
ern Province and Western Transvaal respectively.   It
was shown in earlier analyses that the Western Province
and Western Transvaal areas maintained the lowest and
highest levels of cost of production per morgen and
per citrus tree respectively, throughout the three
years of the investigation.   By realising an average
yield per tree of only 4.47 pockets, however, the
Western Province incurred a weighted average cost
per pocket of 19.373 pence as against only 18.358
pence in the case of the Western Transvaal where
an average yield per tree of 8.24 pockets was har-
vested during the period 1948 - 1950.   It is evi-
dent that growers in the Western Transvaal area en-
joyed a comparative advantage over Western Province
growers in spite of operating at a level of costs per
morgen of more than 200 percent higher than the aver-
age level determined for the Western Province.   It

cannot be stated without further research, that the
latter area realized a low output because of its com-
paratively low input.   The productive potential of
the area may be low in which case the Law of Limini-
shing Returns will set in at a lower level of costs
than in the case of, for instance, the Western Trans-
vaal.   The relatively insignificant differences in
the weighted average cost of production per pocket
between the various areas in spite of variations in
yield per tree, should not be attributed to mere
chance.

The weighted average cost of production,
excluding interest, for the Industry as a whole, on
the basis of the sample, amounted to 15.996 pence
per pocket during 1948, 18.732 pence during 1949
and 16.021 pence during 1950 with an average for the
three-year period of 16.795 pence per pocket.   The
variations in yield per tree which may be held re-
sponsible for the fluctuations in cost per pocket
during this period is indicated in the above summary.
It should be noted that the weighted average cost per
pocket of 16.795 pence was calculated on the basis of
a weighted average yield of 6.42 pockets per tree.
The mentioned weighted average cost of production
per pocket was based on the total crop covered by
the survey in each area during the period 1948 -
1950, and not on the total crop produced in each area
during this period.   This shortcoming will be adjust-
ed at a later stage when a combined cost figure for
small farms and estates is calculated.

The weighted average cost of interest per
pocket according to Table 173 varied between 6.685
pence in the Eastern Cape Coastal area and 10.327
pence in the North Eastern Cape.   The higher area

is shown up to a greater disadvantage by the survey
than the true cost of interest per pocket in the area
on account of severe drought during the period covered
by the investigation. The area was of necessity
equipped with capital according to its requirements
for normal production. As a fixed cost, the total
amount of interest per farm could not be reduced when
crop failures occurred. Little difference is, however,
noticeable between the cost of interest per pocket in
the six remaining areas. Once again it appears as if
the amount of capital invested per farm and/or the val-
uation of citrus orchard land was adapted by growers
to the normal level of crop yields in each area.
Whereas the Western Transvaal area was shown to have
by far the highest capital investment per morgen of
citrus orchard and the Western Province showed by far
the lowest capital investment per morgen of all the
areas, no significant difference existed between the
cost of interest per pocket in these two areas over
the period of three years. The weighted average
amount of interest per pocket in the Western Province
was 7.847 pence as against 8.764 pence in the Western
Transvaal.

The average total cost of interest per pocket
for all the areas combined, varied between 7.115
pence during 1948, 8.333 pence during 1949 and 7.416
pence during 1950 with an average for all the areas
for the three surveys combined of 7.576 pence per
pocket.

The weighted average total cost of production
including interest, per pocket for the three surveys
combined, varied between 21.920 pence in the Northern
Transvaal and 31.117 pence in the North Eastern Cape
with an average for all the areas combined of 24.371

pence. The average cost including interest per pocket
for all the areas combined for the individual surveys,
amounted to 23.111 pence during 1948, 27.065 pence
during 1949 and 23.437 pence during 1950.

It is of significance to note that of all the
areas which harvested reasonable crops during the three
year period i.e. excluding the North Eastern Cape, the
Western Province area incurred the highest cost both
including and excluding interest per pocket. This
fact is all the more significant in view of the know-
ledge that this area had both the lowest cost exclud-
ing interest as well as the lowest capital investment
per margen.

DISPERSAL OF FARMS ACCORDING TO COST OF PRODUCTION
PER POCKET: In view of the practical application of the
calculated weighted average cost of production per poc-
ket in fixing local market prices for citrus fruit, it
is desirable to determine the dispersal of the crop
according to various levels of cost of production in
order to demonstrate the implications of a price based
on average costs on the percentage of the Unions citrus
fruit crop which could be produced economically at
that price. In the ensuing Tables it will be endea-
voured to illustrate not only to which extent produc-
tion for the Industry as a whole, would be limited
by the application of average cost of production in
price fixing but also in which manner each indivi-
dual area would be affected by this procedure.

In Table 174 the dispersal of crops produc-
ed at various levels of cost of production, excluding
interest, per pocket is given for the Union for each
year of the period covered by the investigation. It
will be noted that a concentration of the crop occurs
in the cost groups within the margins of 9 to 18

pence during each one of the three years. Of the
total crop covered by the three surveys 58.6 percent
was produced at a cost between 9 pence and 1/6 per
pocket while a further 20.7 percent of the total crop
was produced at a cost between 1/6 and 2/- per pocket,
excluding interest. As much as 11.1 percent of the
mentioned crop was produced at a cost, excluding in-
terest per pocket, of 2/- and more. The data shown
in Table 174 was employed in constructing cumulative
graphs in which the significance of the figures is illus-
trated more effectively (See Figs 6 - 9). Reference
will be made to these graphs later.

In considering the implications of the average
cost to the Industry, the matter should be approached
from two points of view. Consideration should be
given to the effect of the price level on both the size
of crop which could be produced economically at that
level as well as on the percentage of growers who would
find it possible to maintain production at that level.
A comparison of Tables 174 and 175 reveals that a con-
siderable disparity existed between the latter two as-
pects of the matter. It is shown for instance that
whereas 20.1 percent of the crop produced during the
period 1948 - 1950 was produced at a cost between 9 -
12 pence per pocket, only 12.8 percent of growers pro-
duced their crops at this level of costs per pocket.
It is clear, from a study of these two Tables that a
relatively higher concentration of crops occurred in
the low-cost groups than was the position in the case
of growers. The curve representing the dispersal of
growers according to groups of cost of production per
pocket is to the right of and less peaked than the curve
representing the dispersal of crops according to cost

Fig 6: Accumulative percentages of pockets of citrus fruit produced at and of growers producing at various levels of cost of production excluding interest on 152 farms in the Union – 1948.

Cost per pocket in pence.

Percentage of growers

Percentage of pockets
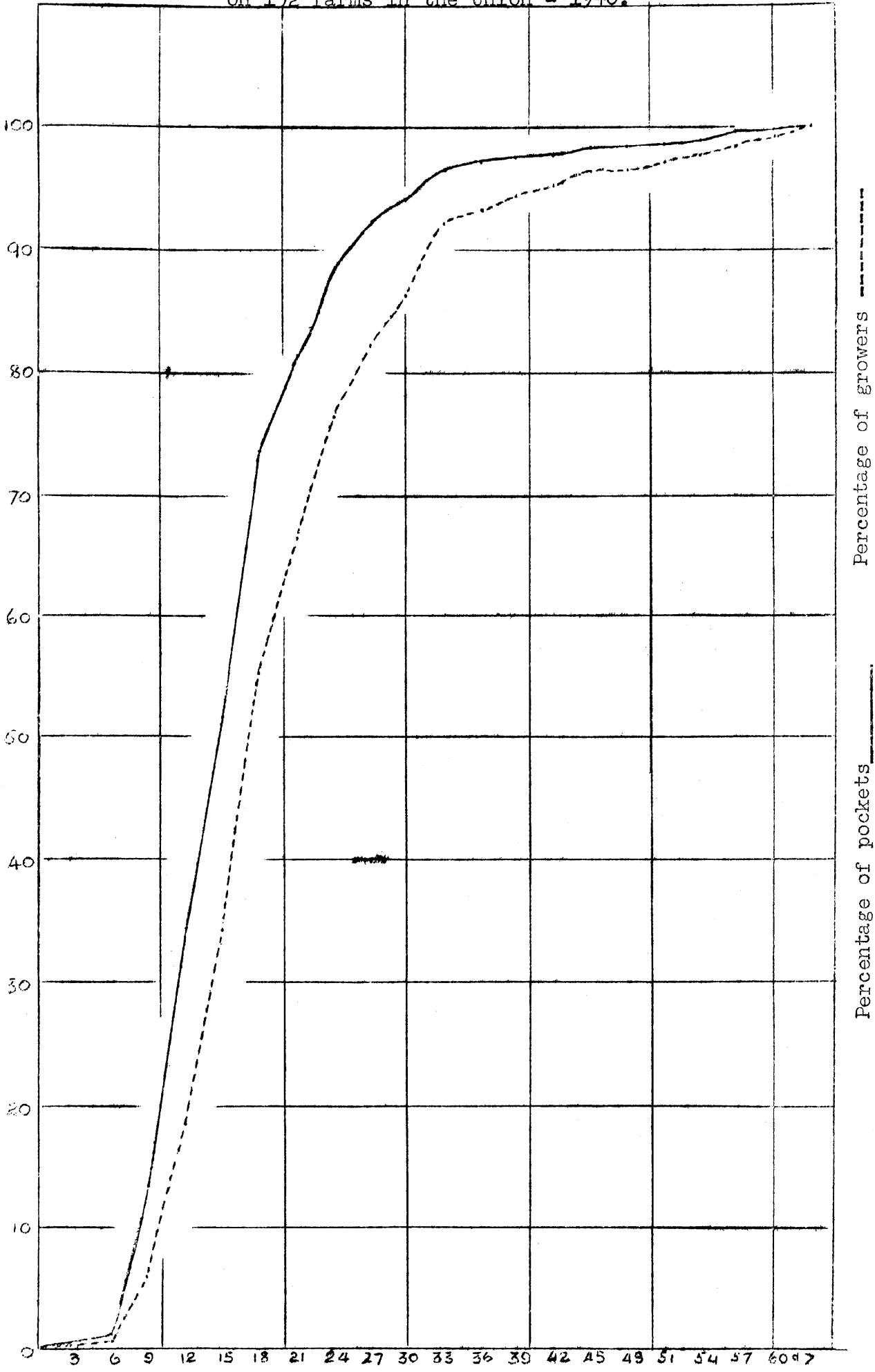
Fig 7: Accumulative percentages of pockets of citrus fruit produced at and number of growers producing at various levels of cost of production excluding interest on 180 farms in the Union - 1949.

Percentage of growers ----------

Percentage of pockets ——————

Cost per pocket - pence
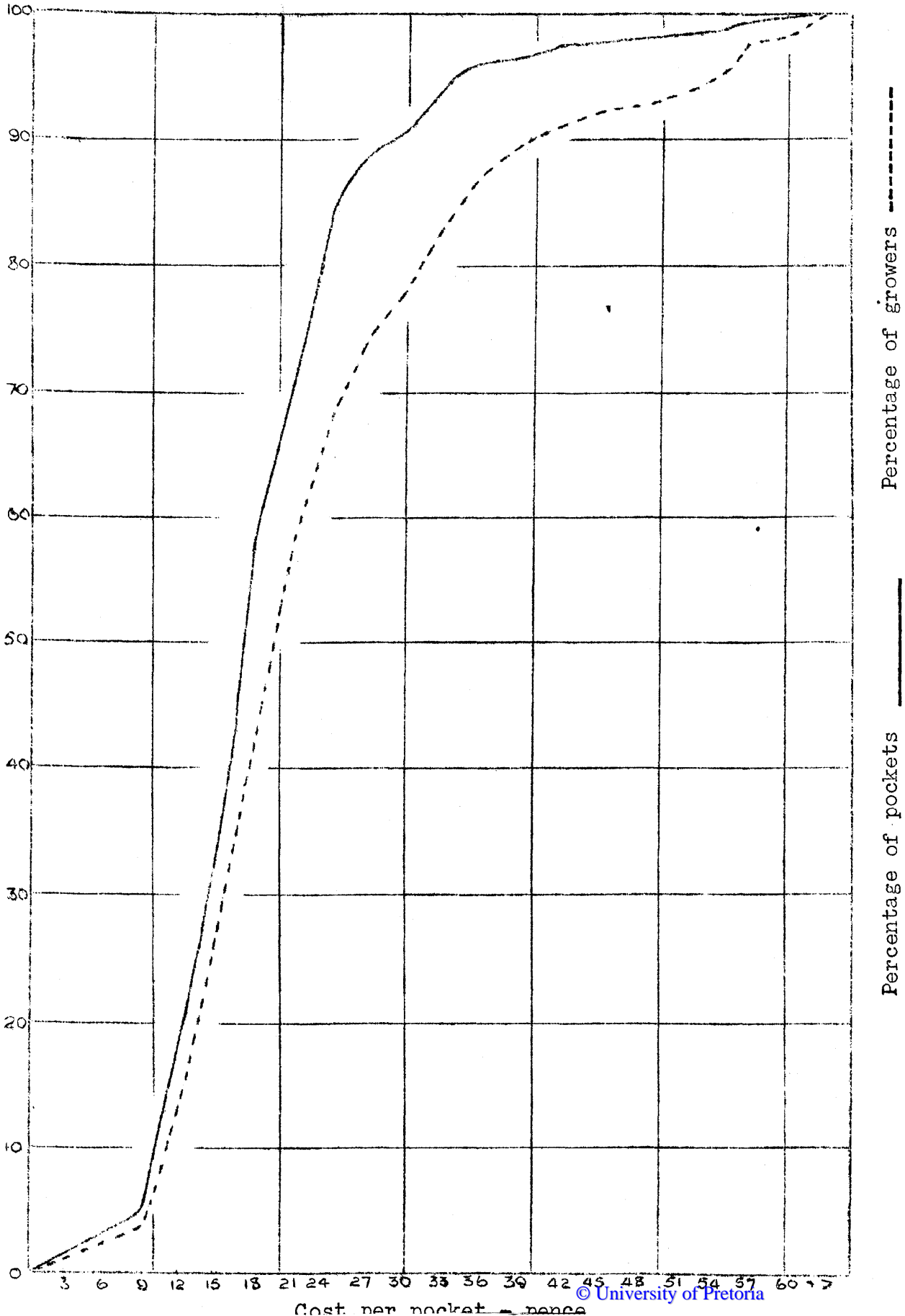
Fig: 8. Accumulative percentages of pockets of citrus fruit produced at and number of growers producing at various levels of cost of production excluding interest on 182 farms in the Union – 1950.
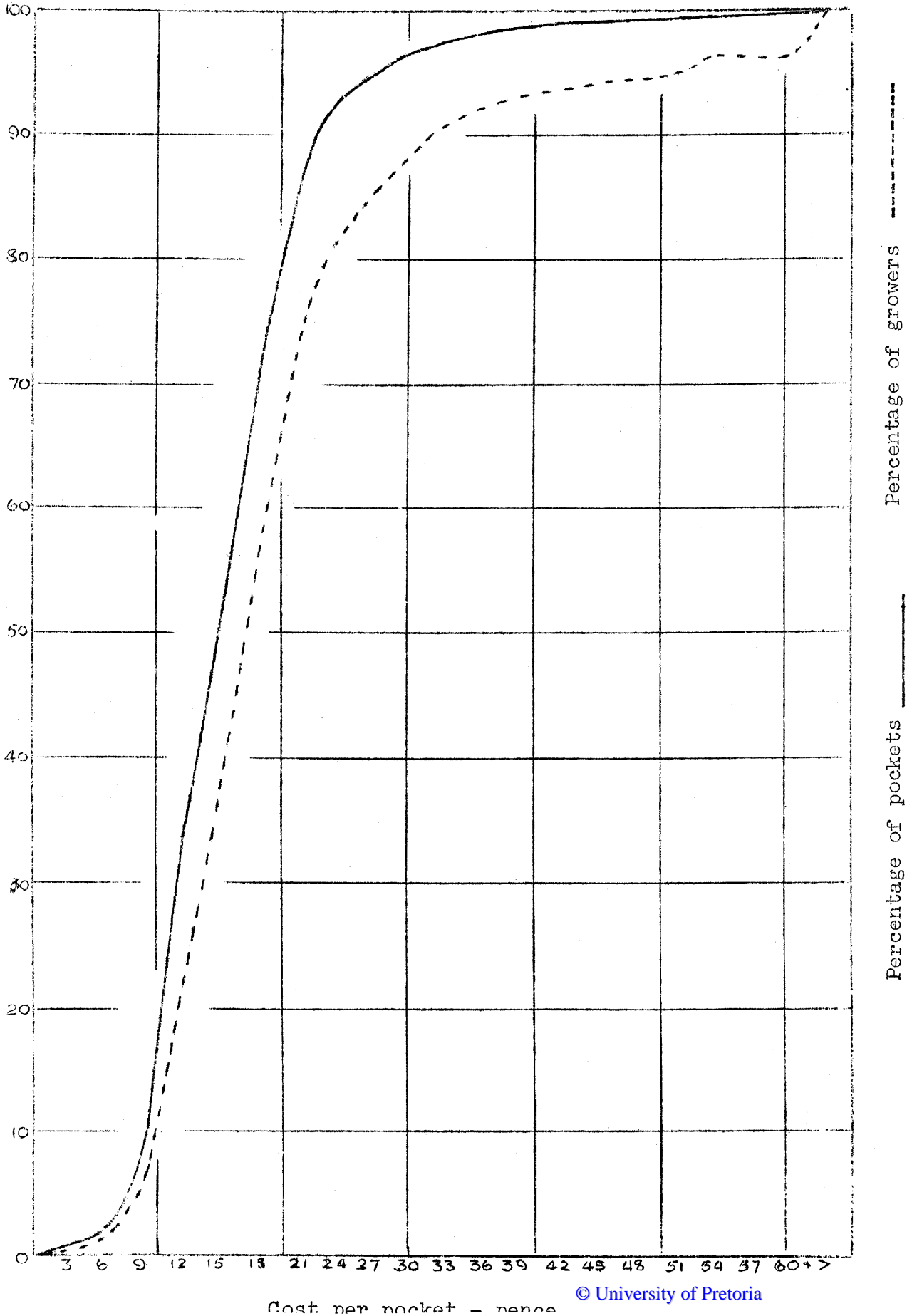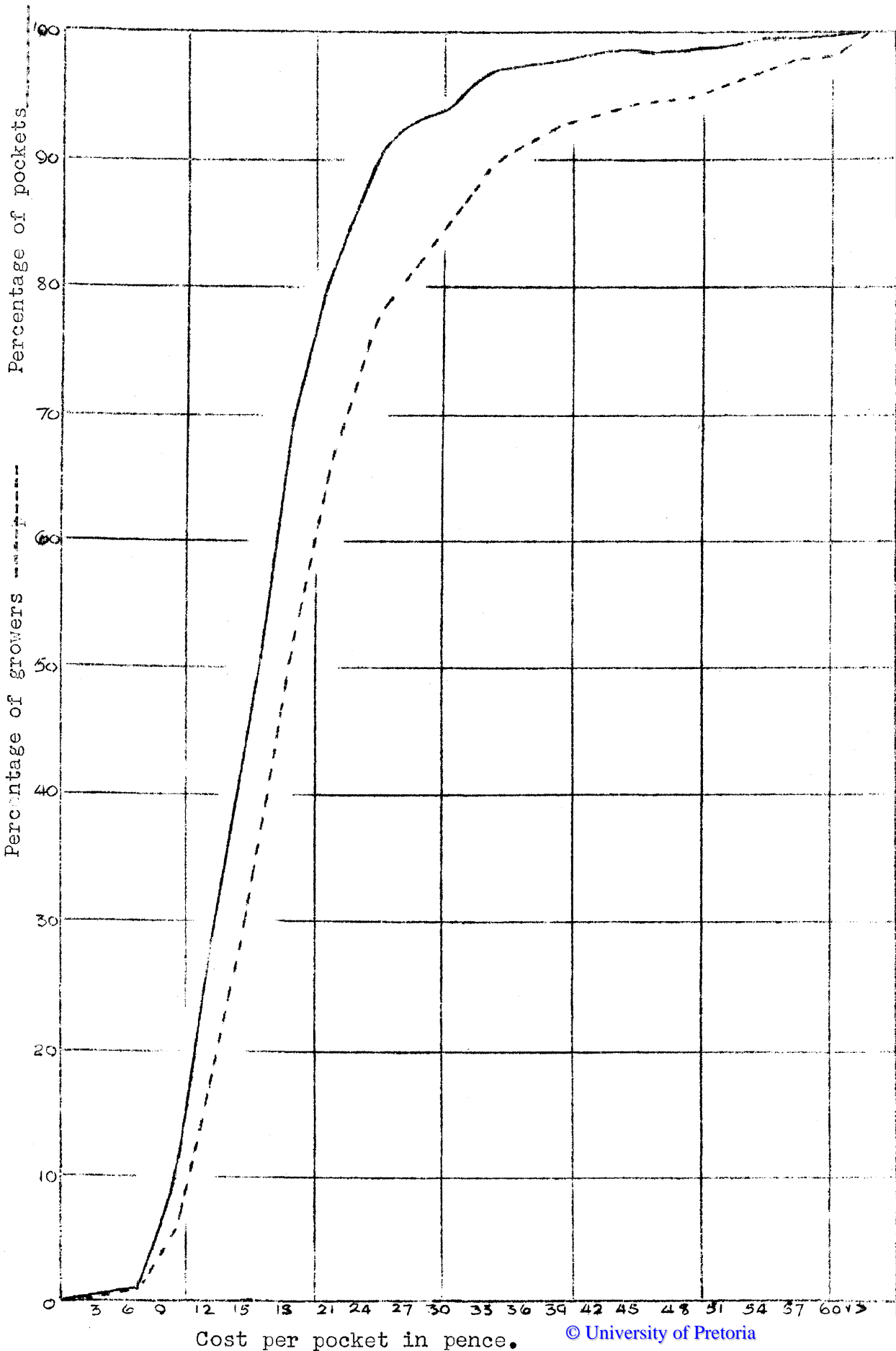
Fig 9: Accumulative percentages of pockets of citrus fruit produced at and of growers producing at various levels of cost of production excluding interest on 514 farms during the three years 1948 and 1950 combined.

Table: 174. Dispersal of crop according to number of pockets of citrus fruit produced at various levels of cost of production excluding interest. Union of South Africa 1948 — 1950.

| ITEM.	1948		1949		1950		Three Years Combined.	
Size groups of cost per pocket excluding interest.	Pockets	%	Pockets	%	Pockets	%	Pockets	%
(Pence) 6 and less	44744	1.1	0	0	76030	1.7	120774	1.0
6.1 – 9	508573	12.1	174208	5.0	347614	8.0	1030395	8.6
9.1 – 12	899527	21.4	457841	13.2	1070539	24.5	2427907	20.1
12.1 – 15	716720	17.1	575034	16.5	770795	17.6	2062549	17.1
15.1 – 18	910918	21.7	841393	24.2	826069	18.9	2578380	21.4
18.1 – 21	342284	8.1	442351	12.7	666244	15.3	1450879	12.0
21.1 – 24	308527	7.3	453452	13.0	283204	6.5	1045183	8.7
24.1 – 27	147162	3.5	152490	4.4	92740	2.1	392392	3.2
27.1 – 30	73540	1.8	55234	1.6	93123	2.1	221897	1.8
30.1 – 33	113687	2.7	137245	3.9	40859	0.9	291791	2.4
33.1 – 36	27436	0.6	53754	1.5	21719	0.5	102909	0.9
36.1 and more	108359	2.6	137457	4.0	78676	1.9	324492	2.8
T O T A L	4201477	100	3480459	100	4367612	100	12049548	100

Table 175: Dispersal of growers according to various
levels of cost of production excluding
interest at which crops were produced -
Union of South Africa 1948 - 1950.

| Item.	1948		1949		1950		Three Years Combined	
Size groups of cost per pocket excluding int.	Growers	%	Growers	%	Growers	%	Growers	%
(Pence) 6 and less	1	0.6	0	0	4	2.2	5	1.0
6.1 - 9	8	5.3	7	3.9	9	4.9	24	4.7
9.1 - 12	19	12.5	18	10.0	29	15.9	66	12.8
12.1 - 15	24	15.8	25	13.9	27	14.8	76	14.8
15.1 - 18	32	21.1	29	16.1	34	18.7	95	18.5
18.1 - 21	17	11.2	27	15.0	29	15.9	73	14.2
21.1 - 24	15	9.9	18	10.0	17	9.3	50	9.7
24.1 - 27	9	5.9	11	6.1	6	3.3	26	5.0
27.1 - 30	6	3.9	6	3.3	7	3.8	19	3.7
30.1 - 33	9	5.9	10	5.5	4	2.2	23	4.5
33.1 - 36	2	1.3	7	3.9	2	1.1	11	2.1
36.1 - and more	10	6.6	22	12.3	14	7.9	46	9.0
T O T A L	152	100	180	100	182	100	514	100

per pocket.   See figures 10 to 13.

In Table 176 an analysis is presented to
demonstrate the accumulative percentages of the crop
which were produced at increasing levels of cost of
production during each year of the period covered
by the investigation as well as for the three years
combined.   It is shown that 68.2 percent of the
entire crop covered by the survey during the three
year period, was produced at a cost per pocket ex-
cluding interest of less than 18 pence.   Similarly
it may be seen that 88.9 percent of the crop was
produced at a cost per pocket of 24.0 pence and
less.   The advantage of the above calculation

Fig 10: Dispersal of crop produced at and of growers who
produced at various levels of cost of production
excluding interest.   **All areas combined – 1948.**

Groups of cost per pocket (Pence)

Fig 11:

1949

Groups of cost per pocket (Pence)
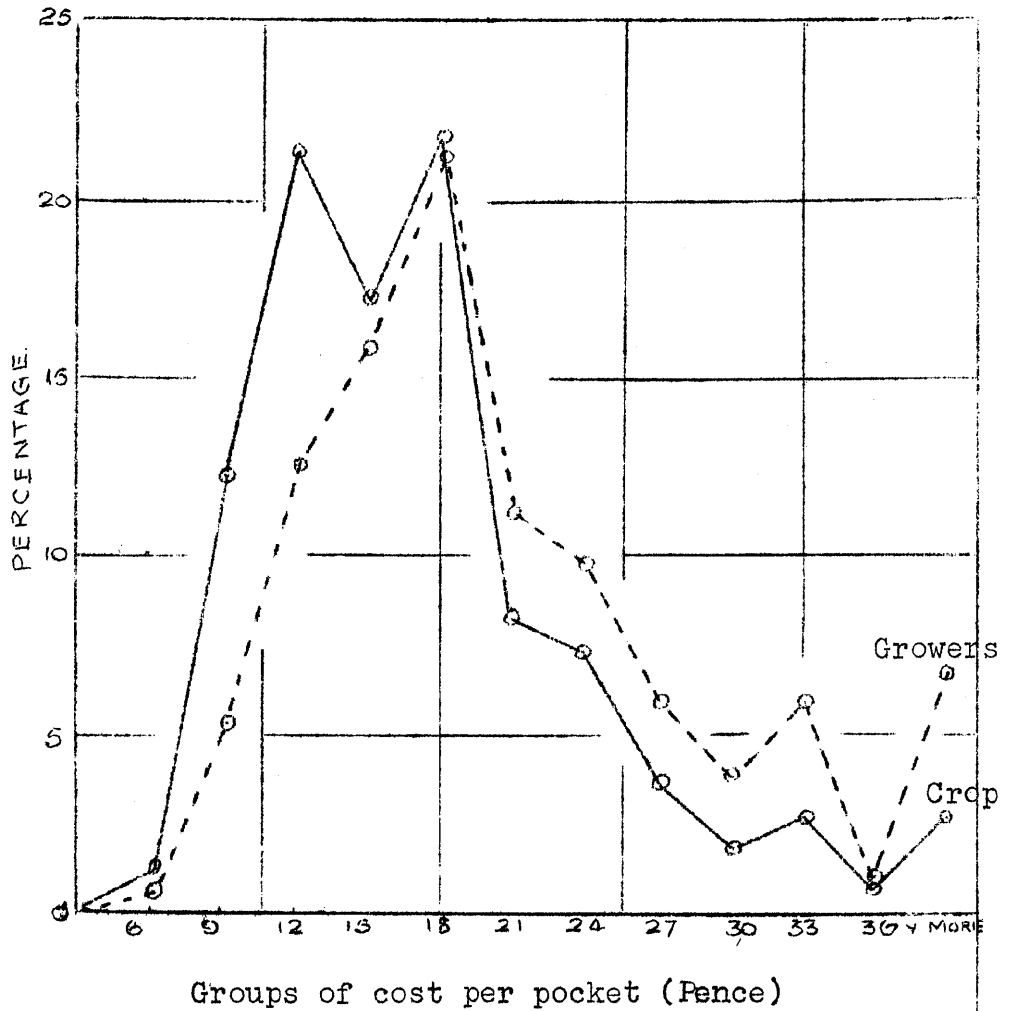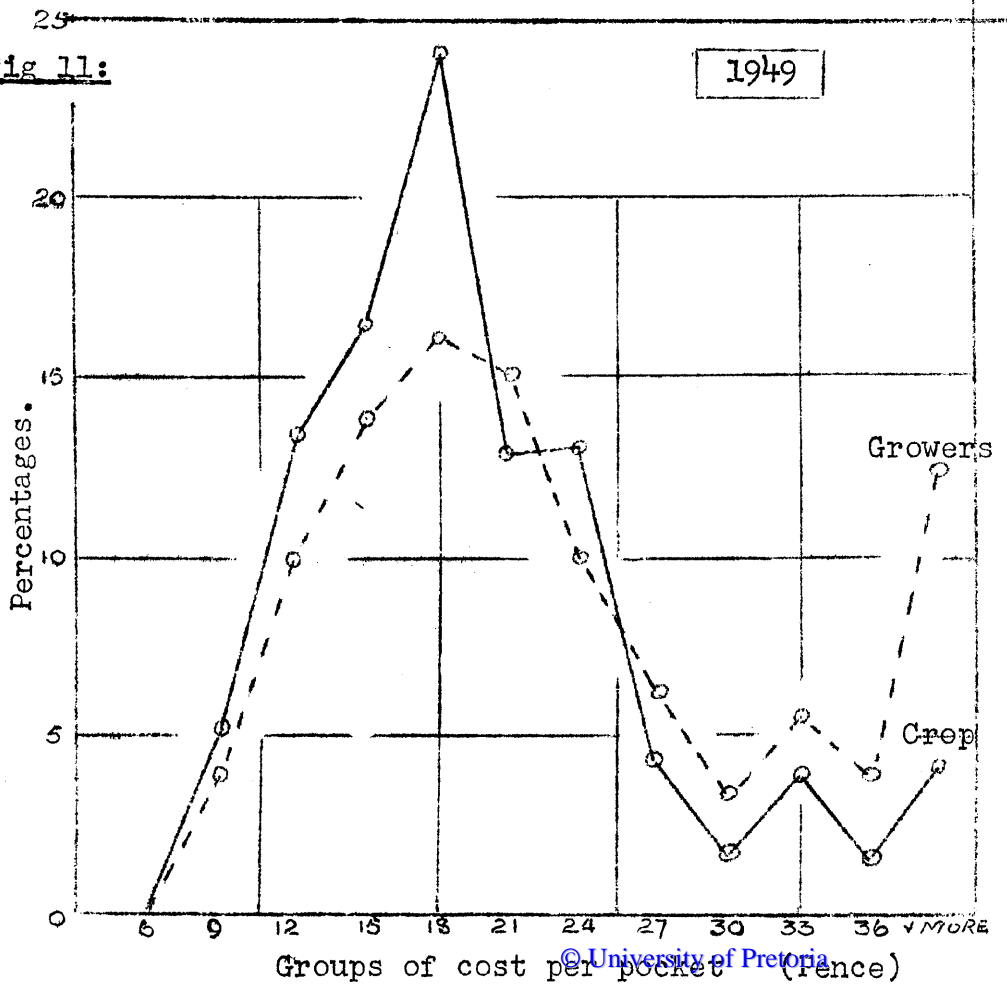
Fig 12: Dispersal of crops produced at and of growers who produced at various levels of cost of production excluding interest. All areas combined – 1950
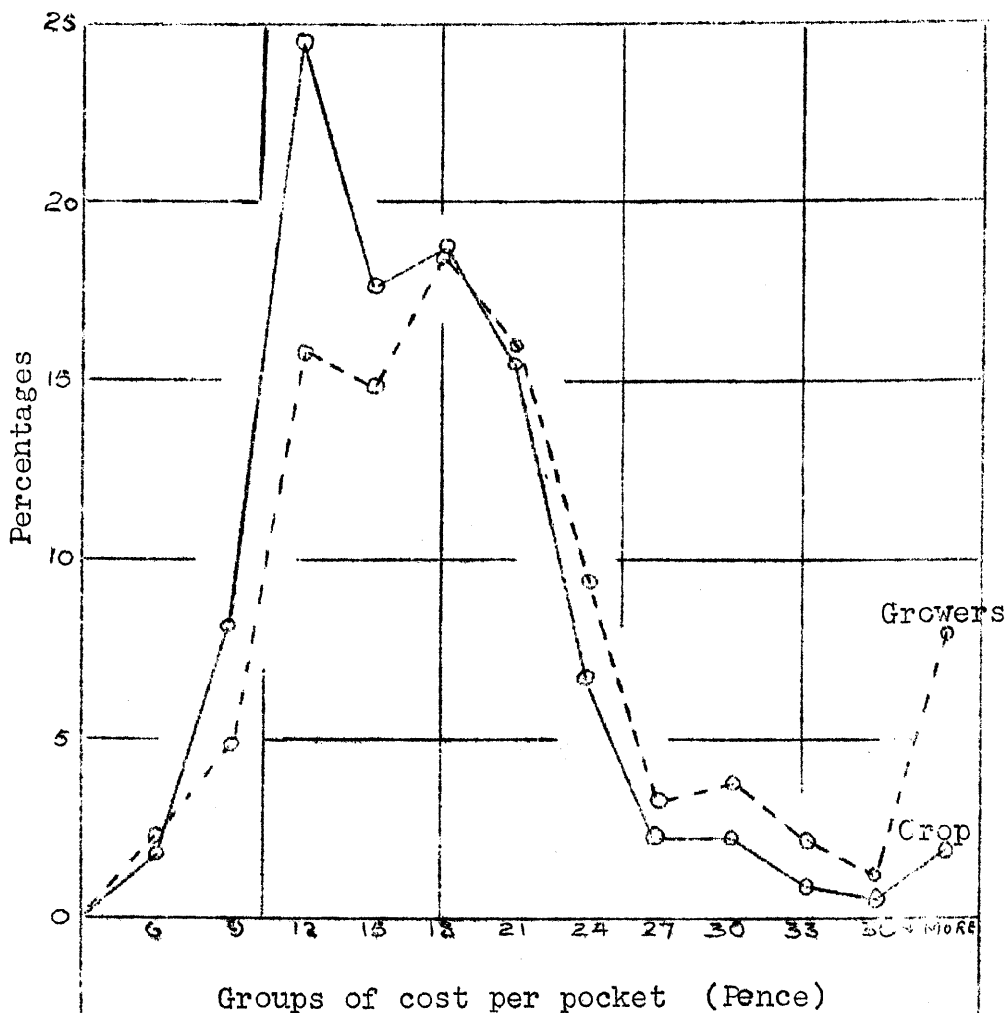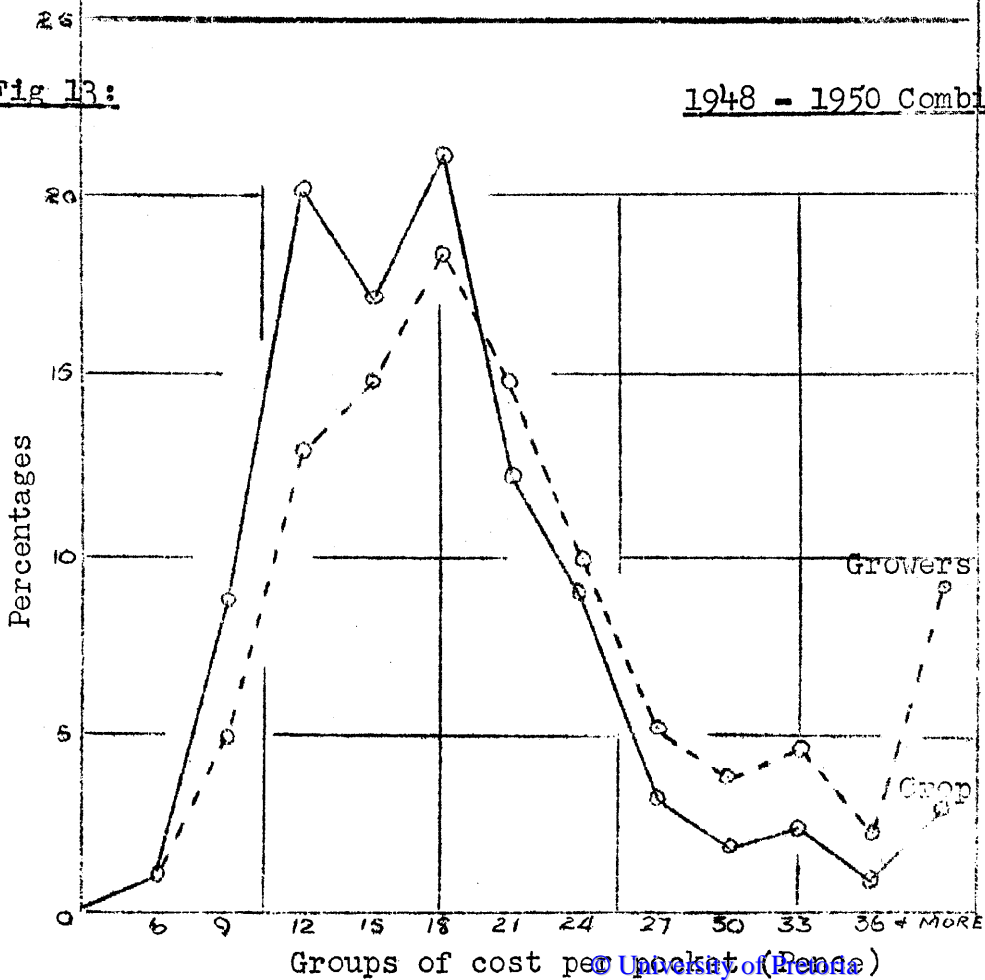

Fig 13: 1948 – 1950 Combined

Table 176: Calculation of accumulative number of pockets of citrus fruit produced at various levels of cost of production, excluding interest per pocket. Union of South Africa — 1948 to 1950.

ITEM.	1948		1949		1950		Three Years Combined.	
Size groups of cost excluding interest per pocket. (Pence)	Pockets	%	Pockets	%	Pockets	%	Pockets	%
6 and less	44744	1.1	0	0	76030	1.7	120774	1.0
9 " "	553317	13.2	174208	5.0	423644	9.7	1151169	9.6
12 " "	1452844	34.6	632049	18.2	1494183	34.2	3579076	29.7
15 " "	2169564	51.6	1207083	34.7	2264978	51.8	5641625	46.8
18 " "	3080482	73.3	2048476	58.9	3091047	70.8	8220005	68.2
21 " "	3422766	81.5	2490827	71.6	3757291	86.0	9670884	80.2
24 " "	3731293	88.8	2944279	84.6	4040495	92.5	10716067	88.9
27 " "	3878455	92.3	3096769	89.0	4133235	94.6	11108459	92.1
30 " "	3951995	94.1	3152003	90.6	4226358	96.8	11330356	94.0
33 " "	4065682	96.8	3289248	94.5	4267217	97.7	11622147	96.4
36 " "	4093118	97.4	3343002	96.0	4288936	98.2	11725056	97.3
39 " "	4108776	97.8	3363233	96.6	4307632	98.6	11779641	97.8
42 " "	4112961	97.9	3394508	97.5	4328459	99.1	11835928	98.2
45 " "	4132736	98.4	3406612	97.9	4332984	99.2	11872332	98.5
48 " "	4132736	98.4	3409323	98.0	4332984	99.2	11875043	98.6
51 " "	4152380	98.8	3421585	98.3	4335979	99.3	11909944	98.8
54 " "	4155356	98.9	3432619	98.6	4360400	99.8	11948375	99.2
57 " "	4169920	99.7	3468498	99.7	4360400	99.8	12018818	99.7
60 " "	4195222	99.9	3475454	99.9	4360400	99.8	12031076	99.8
60.1 and more	4201477	100	3480459	100	4367612	100	12049548	100

is that it may be determined at a glance which per-
centage of the crop could be produced economically
at any particular level of cost of production which
may be adopted for price fixing purposes.

The influence of the average yield per tree
realised by the Industry, on the level of cost per
pocket at which the Industry operated during any par-
ticular year, is clearly demonstrated by the above
analysis. It is shown for instance that during 1949,
which was a relatively poor year for the Industry as
a whole, only 58.9 percent of the crop was produced
at a cost per pocket of 18.0 pence and less. During
1948 and 1950, which were relatively successful years
for the Industry, 73.3 and 70.8 percent of the crop
respectively, were produced at a cost of 18.0 pence
and less. If it is borne in mind that this level
of cost coincides closely with the average cost per
pocket adopted for price fixing during these years,
it will be realised that local market prices were
unremunerative to a considerably higher percentage of
the crop during 1949 than during the preceding and
succeeding years.

It is of interest to note that the curve
reflecting the above accumulative percentages of the
crop, rises sharply with each increase in the level
of cost per pocket up to 2/-. From this level,
however, the increase is comparatively gradual, only
approximately 10% of the crop being produced at costs
ranging between 2/- and 5/- per pocket.

An analysis of the cumulative number of
growers who produced at various increasing levels
of cost of production, excluding interest, per pocket
is presented in Table 177. It may be seen that on
an average, for the three surveys combined, 51.8

Table 177: Calculation of accumulative number of growers producing at various levels of cost of production excluding interest per pocket - Union of South Africa 1948 - 1950.

Item.	1948		1949		1950		Three Years Combined.	
Size groups of cost per pocket excluding int.	Grow-ers.	%	Grow-ers.	%	Grow-ers.	%	Grow-ers	%
(pence) 6 and less.	1	0.6	0	0	4	2.2	5	1.0
9 " "	9	5.9	7	3.9	13	7.1	29	5.6
12 " "	28	18.4	25	13.9	42	23.1	95	18.5
15 " "	52	34.2	50	27.8	69	37.9	171	33.3
18 " "	84	55.3	79	43.9	103	56.6	266	51.8
21 " "	101	66.4	106	58.9	132	72.5	339	66.0
24 " "	116	76.3	124	68.9	149	81.9	389	75.7
27 " "	125	82.2	135	75.0	155	85.2	415	80.7
30 " "	131	86.2	141	78.3	162	89.0	434	84.4
33 " "	140	92.1	151	83.9	166	91.2	457	88.9
36 " "	142	93.4	158	87.8	168	92.3	468	91.0
39 " "	144	94.7	162	90.0	170	93.4	476	92.6
42 " "	145	95.4	164	91.1	171	94.0	480	93.4
45 " "	147	96.7	166	92.2	172	94.5	485	94.4
48 " "	147	96.7	167	92.8	172	94.5	486	94.6
51 " "	148	97.4	169	93.9	173	95.0	490	95.3
54 " "	149	98.0	171	95.0	175	96.2	495	96.3
57 " "	150	98.7	176	97.8	175	96.2	501	97.5
60 " "	151	99.3	177	98.3	175	96.2	503	97.8
60.1 and more	152	100	180	100	182	100	514	100

percent of growers produced citrus fruit at a cost of 18 pence and less per pocket. Similarly it is shown that 75.7 percent of the growers included in the three surveys, produced their crops at a cost of 24 pence and less per pocket during the period 1948 - 1950.

Approximately one-quarter of the total number of growers covered by the survey, had a cost excluding interest of 2/- per pocket and more and approximately one-tenth of growers exceeded a cost per pocket of 3/-.

An interesting feature brough to light by a comparison of Tables 176 and 177 is the fact that a considerable disparity existed between the percentage of the crop which was produced at relatively low costs and the percentage of growers who produced at the corresponding levels of cost. It may for instance be seen from the data for the three surveys combined, that although 46.8 percent of the crop was produced during the period 1948 - 1950 at a cost of 1/3 per pocket and less, only 33.3 percent of growers produced their crops below this level. Similarly, 68.2 percent of the crop was produced at a cost of 1/6 and less per pocket whereas only 51.8 percent of growers produced their crop below this level of cost. It is evident that the above disparity is caused by the fact that during the particular period under review, relatively large individual crops were produced at a lower level of cost per pocket than relatively small individual crops. Whereas the above conclusion is mentioned here prematurely without the support of further analyses, the tendency, which is indicated by a comparison of the above data, is obvious. The significance of the tendency will be pointed out in detail at a later stage.

The following analysis of the average size of the crops which were produced at various increasing levels of cost of production, excluding interest, per pocket, may however in the meantime provide proof of the validity of the statement.

The average size of crop per farm decreased

Table 178: Analysis of the average size of the crops which were produced at various levels of cost of production, excluding interest per pocket - all areas combined, 1948 - 1950.

Size group - cost /Pkt ex. interest (Pence)	Total number of pkts. produced at cost level shown.	Total number of growers producing at cost level shown.	Average size of crop per farm.
9.0 and less	1151169	29	39695
9.1 - 15.0	4490456	142	31623
15.1 - 21.0	4029259	168	23984
21.1 - 27.0	1437575	76	18915
27.1 - 33.0	513688	42	12231
33.1 and more	427401	57	7498

from 39695 pockets in the case of the cost group of 9.0 pence and less per pocket to 7498 pockets in the case of the cost group of 33.1 pence and more per pocket. As size of crop is one of the causal factors influencing cost per pocket, it must be stressed that the analysis in the above form is merely a demonstration of the average size of crops produced at various levels of cost. No conclusions should be formed from this analysis as regards the relationship between size of crop and cost per pocket.

The percentage of the crop of each year which was produced at various increasing levels of cost of production, excluding interest, per pocket as well as the percentage of growers who produced their crops at the corresponding levels of cost, may be read at a glance from the accompanying comparative graphs. (Figures 10 - 13)

DISPERSAL OF FARMS PRODUCING AT AND OF CROPS PRODUCED AT LEVELS ABOVE AND BELOW THE AVERAGE COST OF PRODUCTION: In view of the practical application which the average cost of production as determined by the surveys, may receive, an analysis is presented in Table 179 to indicate specifically the percentage of the crop of the Union which could be produced economically at a price based on the average cost of production for all the citrus areas in the Union.   In the same Table it is also shown which percentage of growers op-

Table 179: Analysis of the dispersal of farms producing at and of crops produced, above and below the average cost of production excluding interest per pocket for the Union during each year of the period 1948 - 1950.

Item.	1948	1949	1950	Three Years Combined.
Average cost of production (a) excluding interest per pkt.	15.996	18.732	16.021	16.795
Number of pockets produced at below average cost.	2444014	2145781	2680670	7146678
Number of pockets produced at above average cost.	1757463	1334678	1686942	4902870
Total number of pockets produced.	4201477	3480459	4367612	12049548
Percentage of crop produced at below average cost	58.2	61.6	61.4	59.3
Percentage of crop produced at above average cost.	41.8	38.4	38.6	40.7
Number of growers producing at cost P/pkt. below aver.	64	83	85	229
Number of growers producing at cost per pkt. above aver.	88	97	97	285
Total number of growers	152	180	182	514
Percentage of growers producing at cost below aver. cost per pocket.	42.1	46.1	46.7	44.6
Percentage of growers producing at cost above aver. cost per pocket.	57.9	53.9	53.3	55.4

Fig 14: Dispersal of crop produced in seven citrus areas of the Union during the period 1948 – 1950 above and below the weighted average cost of production excluding interest for all the areas for the three years 1948 – 1950 combined.
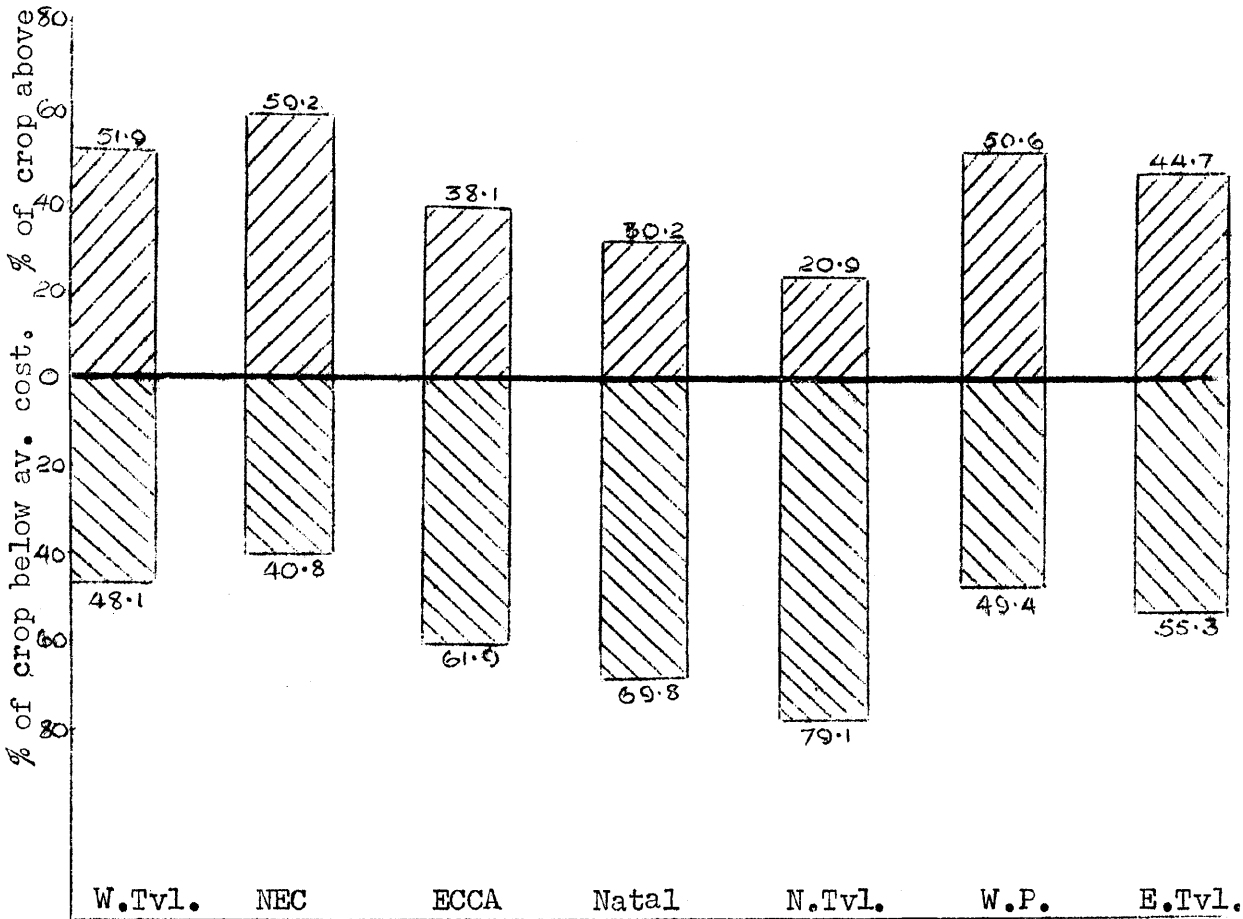
Fig 15 : Dispersal of growers in seven citrus areas of the Union according to the level of cost, above or below the average for all areas for the period 1948 – 1950 at which their crops were produced during the three years 1948 – 1950.
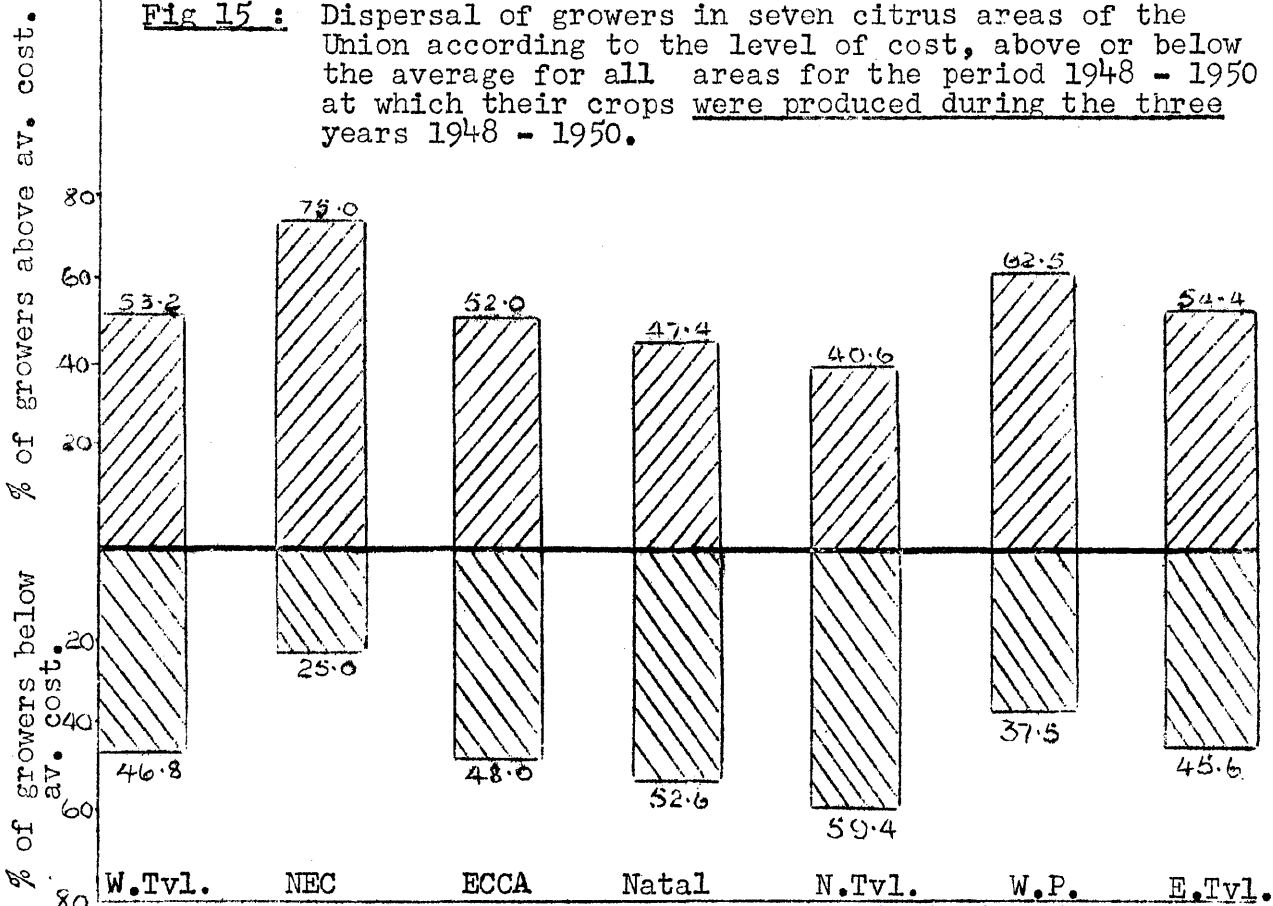
erated at a cost per pocket equal to and below the
average cost of production for the Industry as a whole.

According to the above analysis, 58.2 percent
of the 1948 crop was produced at a cost below the aver-
age cost of production, excluding interest, per pocket,
for the Union during the 1948 season. During 1949,
61.6 percent of the crop was produced below the aver-
age cost per pocket for the Union for the 1949 season.
During 1950, 61.4 percent of the crop was produced at
a cost below the average for that season. It is also
shown that 59.3 percent of the entire crop produced
in the Union during the three-year period 1948 - 1950,
was produced at a cost below the average for the Union
for the three years combined. It should be disturbing
knowledge to the Industry to realize that only 60 per-
cent of the entire crop produced in the Union would
show a profit under the policy of fixing prices on the
basis of the average cost of production for the Indus-
try as a whole. It should be even more perturbing to
the Industry to know that according to the above ana-
lysis, only 44.6 percent of growers would realize a
profit on fruit sold on the local market if the weigh-
ted average cost of production for the period 1948 -
1950 should provide the basis for price fixation.

As in the previous analysis, it is shown that
although more than half of the citrus crop of the
Union was produced at a level of cost of production be-
low the average for the Union, considerably less than
half the total number of citrus growers in the Union
produced their crops at a cost below the average for
the Union. The data reveals that only 40.7 percent
of the crop as against 55.4 percent of growers would
be affected adversely by a policy of local market price
fixation on the basis of average cost of production

per pocket for the Industry as a whole.

From the data presented in Table 180, an
indication may be obtained of the manner in which
the individual areas would be affected by a price
based on the average cost of production for all the
areas combined.   In this Table the dispersal of the
crop produced in each area during the period 1948 -
1950, according to the number of pockets produced at
a cost above and below the average cost per pocket
for all the areas combined, is shown.   It is also
shown which percentage of growers in each area pro-
duced their crops during the mentioned period at
cost levels above and below the average cost per pocket
for the entire sample.   It will be remembered that
the weighted average cost per pocket, excluding interest,
for the seven areas for the three- year period, amounted
to 16.795 pence.

According to the data, the Eastern Cape Coastal
area, Natal and the Northern Transvaal areas experienced
a comparative advantage over the remaining four areas
as regards the percentages of the crops produced below
average cost.   These three areas produced, respec-
tively 61.9 percent, 69.8 percent and 79.1 percent of
their crops during the period 1948 - 1950, at a cost
below the above average.   The Eastern Transvaal with
55.3 percent, the Western Province with 49.4 percent,
the Western Transvaal with 48.1 percent and the North
Eastern Cape with 40.8 percent of the crop produced
at a cost below the average were placed in relatively
less advantageous positions as regards the influence
of a price policy based on average costs, on the
total income of these areas from citrus fruit.

It is furthermore shown by the analysis that
a larger percentage of <u>growers</u> in the Northern Trans-

TABLE 180

Analysis of the dispersal of farms producing at, and of crops produced, above and below the combined weighted average cost of production excluding interest per pocket for the Union in each of the 7 citrus areas of the Union during the period 1948 – 1950

Item	Western Transvaal	North Eastern Cape	Eastern Cape Coastal Area	Natal	Northern Transvaal	Western Province	Eastern Transvaal
Average cost of production excluding interest per pocket for the Union = 16.795 pence							
Crop produced –							
Below average cost (pockets)	563670	441202	2577864	690371	1171592	407120	1294859
Above average cost (pockets)	608949	639399	1583418	298586	308989	416835	1046694
Total crop (pockets)	1172619	1080601	4161282	988957	1480581	823955	2341553
Percentage of crop produced –							
Below average cost	48.1	40.8	61.9	69.8	79.1	49.4	55.3
Above average cost	51.9	59.2	38.1	30.2	20.9	50.6	44.7
Growers producing –							
Below average cost	36	18	82	20	22	15	36
Above average cost	41	54	89	18	15	25	43
Total growers	77	72	171	38	37	40	79
Percentage growers producing –							
Below average cost	46.8	25.0	48.0	52.6	59.4	37.5	45.6
Above average cost	53.2	75.0	52.0	47.4	40.6	62.5	54.4

vaal and Natal would be favourably affected by the
application of average costs in price fixation than
in any of the other areas.   In the former area 59.4
percent and in the latter area 52.6 percent of growers
produced their crops during the three-year period at
a cost below the average.   In the five remaining
areas the following percentages of growers produced
their crops at a cost below the average: Eastern
Cape Coastal area - 48.0 percent, Western Transvaal
46.8 percent, Eastern Transvaal 45.6 percent, Western
Province 37.5 percent and North Eastern Cape 25.0
percent.   It is shown that in each of the five latter
areas, the cost of production per pocket of the majority
of growers exceeded the weighted average cost of produc-
tion for all the areas combined and these growers would
therefore be unfavourably affected by a price based on
this average.   A calculation of the average size of
crop per farm, for crops produced above and below the
average cost for the Union, in each of the seven areas,
revealed the following:

Area.	Average size of crop per farm.	
	Crops produced below the average cost for the Union.	Crops produced above the average cost for the Union.
Western Transvaal	15658 pockets	14852 pockets.
North Eastern Cape	24511 pockets	11841 pockets.
Eastern Cape Coast	31437 pockets	17791 pockets.
Northern Transvaal	34519 pockets	16588 pockets.
Natal	53254 pockets	20599 pockets.
Western Province	27141 pockets	16673 pockets.
Eastern Transvaal	35968 pockets	24342 pockets.

It is evident that in each of the seven citrus
growing areas the average size of crop per farm was
considerably higher in the case of crops produced at

a cost below the average cost for the seven areas combined than in the case of crops produced at a cost above the average. The underlying cause for this significant tendency has already been referred to under the discussion of the data contained in Table 178. The tendency revealed in the above calculation is explanatory of the fact that a considerable disparity existed between the percentage of the crop produced at a cost below the average for the Union and the percentage of growers who produced their crops at a cost below the average for the Union in each of the seven citrus areas.

CHAPTER VI.

COST OF PRODUCTION OF CITRUS FRUIT ON CITRUS ESTATES AND COMBINED COSTS OF ESTATES AND SMALL GROWERS.

As explained earlier, a distinction was made between Citrus Estates and small-scale growers in calculating the cost of production of citrus fruit in the Union. It was considered that the advantages which usually accompany large-scale production would also be in operation in the case of citrus production, causing a disparity in the level of cost at which the two types of producers operated. During the course of the period 1948 - 1950, detailed cost records were obtained annually from each of five citrus estates in the Union. In the analyses which follow, the average results of the costs incurred by these estates for citrus production, will be shown. The costs of estates and small growers will then be combined in order to present a weighted average cost of production for all citrus fruit grown in the Union. In conclusion the costs of growers and estates, as determined by the surveys, will be weighted on the basis of the total production of citrus fruit in each area by farms and estates respectively. In this weighted average cost figure, possible errors caused by over- and underweighting of the costs of the individual areas in calculating the average for all areas on the basis of the sample covered by the survey, will be eliminated .

COST OF PRODUCTION OF CITRUS ESTATES.

CAPITAL INVESTMENT FOR CITRUS PRODUCTION: In Table 181 a summary is given of the average capital in-

vestment for citrus production on the five citrus
estates covered by the survey. For obvious reasons
the estates could not be named in the analysis but
the differences in capital requirements which occurred
between the estates will nevertheless be indicated.

Table 181: Capital investment for citrus production
on estates during the period 1948 - 1950.

Capital investment per:	1948	1949	1950	Three Years Combined
Morgen £	595.2	602.3	591.4	596.3
Citrus Tree £	3.2	3.1	3.1	3.2
Bearing Tree £	3.4	3.4	3.4	3.4
Pocket of citrus fruit £	0.705[1]	0.477	0.498	0.543

It is shown that the average capital invest-
ment for citrus production on all the estates combined
during the three year period 1948 - 1950, amounted to
£596.3 per morgen £3.2 per citrus tree, £3.4 per
bearing citrus tree and £0.543 per pocket of citrus
fruit produced. To provide an indication of the
variations in capital investment between the five es-
tates, it was calculated that the investment per morgen
on each of the five estates amounted to £530.0, £557.4,
£606.8, £665.4 and £674.8 respectively. In a later
analysis it will be shown that estates and small citrus
farms were on very much the same level as regards
capital requirements for citrus production.

COST OF CITRUS PRODUCTION: In Table 182, the average
cost of production of citrus fruit on the five estates
during the period 1948 - 1950 is summarised.

[1] The high capital investment per pocket during
1948 was caused by an extremely low average
yield per tree viz. 4.8 pockets during this
year.

Table 182: Cost of production of citrus fruit on five citrus estates in the Union during the period 1948 - 1950.

Cost of production excluding interest per:		1948	1949	1950	Three years Combined.
Morgen	£	71.2	82.9	92.2	82.1
Citrus Tree	d	92.4	103.8	117.5	104.7
Bearing Tree	d	96.3	112.5	126.6	111.8
Pkt. of citrus fruit	d	20.2	15.8	18.6	17.9
Cost of production including interest per:					
Morgen	£	101.0	113.0	121.7	111.9
Citrus Tree	d	131.0	141.6	155.2	142.7
Bearing tree	d	136.6	153.4	167.2	152.4
Pkt. of citrus fruit	d	28.7	21.5	24.6	24.5

According to the data given above, the estates experienced a sharp increase in cost of production during the period 1948 - 1950. The average cost of production, excluding interest, per morgen increased from £71.2 during 1948 to £82.9 during 1949 and £92.2 during 1950. The average cost of production on estates for the three years combined, amounted to £82.1 per morgen, 104.7 pence per citrus tree, 111.8 pence per bearing tree and 17.9 pence per pocket of citrus fruit. The latter cost varied during the three year period between 20.2 pence during 1948, 15.8 pence during 1949 and 18.6 pence during 1950. These variations in cost per pocket were closely related to the average yield per tree harvested by estates during this period. During 1948 the average yield on the five estates was 4.8 pockets, during 1949 7.1 pockets and during 1950 6.8 pockets with an average for the three-year period of 6.2 pockets per bearing tree.

The average cost including interest on estates during the three-year period amounted to £111.9

per morgen, 142.7 pence per citrus tree, 152.4 pence per bearing tree and 24.5 pence per pocket of citrus fruit.

Considerable variations occurred between the five estates as regards the level of cost at which each one of the five operated during the period under review. The average cost of production, excluding interest, per morgen for the five estates for the three-year period, amounted to £68.2, £74.4, £76.6, £85.6 and £86.2 respectively. Variations in the average yield per tree, harvested during the three-year period by the five estates, accentuated or diminished the above disparity in the level of costs per morgen when the same costs were expressed per pocket of citrus fruit. The cost of production, excluding interest, per pocket for the five companies, in the same order as given above, was as follows: 12.4 pence, 14.9 pence, 24.1 pence, 15.9 pence and 19.6 pence. The respective average yield per tree during the three-year period for the five estates in the same order as above was 8.7 pockets, 6.8 pockets, 5.6 pockets, 7.7 pockets and 5.7 pockets.

COST OF PRODUCTION OF FARMS AND ESTATES COMBINED.

In Table 183 a comparative summary is presented of the capital investment for citrus production on small farms and estates respectively while the weighted average capital investment for farms and estates combined, is also shown. It is evident that relatively small differences occurred between farms and estates during the three years, as regards the capital requirements for citrus production per morgen and per citrus tree. The average capital

Table 183: Capital investment for citrus production on farms and estates combined during the period 1948 - 1950.

		Capital Investment per			
		Morgen	Citrus tree.	Bearing Tree.	pocket
		£	£	£	£
1948	Growers	625.5	3.5	4.0	0.592
	Estates	595.2	3.2	3.4	0.705
Growers and Estates		608.9	3.3	3.6	0.648
1949	Growers	571.6	3.3	3.9	0.694
	Estates	602.3	3.1	3.4	0.477
Growers and Estates		587.9	3.2	3.6	0.556
1950	Growers	584.6	3.4	4.2	0.618
	Estates	591.4	3.1	3.4	0.498
Growers and Estates		588.1	3.3	3.8	0.550
Three Years Combined.					
	Growers	593.0	3.4	4.1	0.631
	Estates	596.3	3.2	3.4	0.543
Growers and Estates		594.8	3.3	3.7	0.581

investment for citrus production in small farms, over the three year period, amounted to £593.0 per morgen and £3.4 per citrus tree as against £596.3 and £3.2 respectively in the case of estates. Estates did not enjoy an advantage over small farms in respect of capital requirements for citrus production mainly as a result of the extremely high percentage of the total capital investment for citrus production, comprised by the value of citrus orchards. Land was valued at consistent levels irrespective of whether it was privately owned or controlled by a company. Capital investment for citrus production amounted to £0.631 per pocket in the case of farms and £0.543 per pocket in the case of estates. These amounts were however related directly to the average yield per morgen on farms and estates respectively and should therefore be qualified by the yields on which bases they were calculated. These are shown in Table 186.

The average capital investment for citrus production for farms and estates combined during the three-year period 1948 - 1950, amounted to £594.8 per morgen, £3.3 per citrus tree, £3.7 per bearing tree and £0.581 per pocket. The above averages for the Union could not have been affected to any significant extent by the weights applied in calculating the averages as no significant disparity existed between the averages for farms and estates respectively.

In Tables 184 and 185, summaries are given of the average cost of production, excluding and including interest, respectively, of estates and farms during the three-year period 1948 - 1950. In each Table the cost of production of citrus fruit on estates and farms combined, is also shown.

Table 184: Cost of production of citrus fruit excluding interest on estates, farms, and estates and farms combined during the period 1948 - 1950.

	Cost of production per.			
	Morgen	Citrus tree.	Bearing tree.	Pocket.
	£	d	d	d
1948 Estates	71.2	92.4	96.3	20.2
Growers	70.3	93.4	108.0	16.0
Estates and Growers	70.8	92.8	101.2	18.1
1949 Estates	82.9	103.8	112.5	15.8
Growers	64.3	88.8	105.4	18.7
Estates and Growers	74.2	97.1	109.5	16.8
1950 Estates	92.2	117.5	126.6	18.6
Growers	63.2	88.7	110.0	16.0
Estates and Growers	78.1	104.2	119.5	17.5
Three Years Combined				
Estates	82.1	104.7	111.8	17.9
Growers	65.7	90.2	107.8	16.8
Estates and Growers	74.4	98.2	110.1	17.4

Contrary to what would be expected, the investigation revealed that on an average, the estates conducted citrus production at a higher level of costs per unit of the enterprise than small growers in spite

of their large-scale production. According to the
data shown in Table 184 the average cost of production
excluding interest on estates during the

Table: 185. Cost of production of citrus fruit including interest, on estates, farms, and estates and farms combined during the period
1948 - 1950.

	Cost of production per			
	Morgen	Citrus tree.	Bearing tree.	Pocket.
	£	d	d	d
1948. Estates	101.0	131.0	136.6	28.7
Growers	101.6	134.9	156.0	23.1
Estates and Growers	101.2	132.7	144.8	25.8
1949 Estates	113.0	141.6	153.4	21.5
Growers	92.8	128.3	152.3	27.1
Estates and Growers	103.6	135.7	153.0	23.5
1950 Estates	121.7	155.2	167.2	24.6
Growers	92.4	129.8	160.9	23.4
Estates and Growers	107.5	143.4	164.5	24.1
Three years combined.				
Estates	111.9	142.7	152.4	24.5
Growers	95.4	130.9	156.4	24.4
Estates and Growers	104.2	137.4	154.1	24.4

three years 1948 - 1950 combined, amounted to £82.1
per morgen, 104.7 pence per citrus tree and 111.8
pence per bearing citrus tree as against £65.7 per
morgen, 90.2 pence per citrus tree and 107.8 pence
per bearing tree in the case of growers. The corresponding costs, including interest, as shown in
Table 185 amounted in the case of estates to £111.9
per morgen, 142.7 pence per citrus tree and 152.4
pence per bearing tree as against £95.4 per morgen,
130.9 pence per citrus tree and 156.4 pence per
bearing tree as incurred by growers.

The above disparity in the levels of cost
of production of estates and growers, is considerably reduced when the same costs are expressed per

Table 186: Analysis of various factors causing disparities in costs per unit of the various measurements applied - yield per tree, number of trees per morgen, percentage of bearing trees and yield per morgen.

	1948	1949	1950	Three Years Combined.
Yield per tree (pockets)				
Estates	4.8	7.1	6.8	6.2
Farms	6.8	5.6	6.9	6.4
Estates and Farms	5.6	6.5	6.8	6.3
Number of trees per morgen				
Estates	185	192	188	188
Farms	181	174	171	175
Estates and Farms	183	183	180	182
Percentage of bearing trees				
Estates %	95.9	92.3	92.8	93.6
Farms %	86.4	84.2	80.7	83.7
Estates and Farms %	91.7	88.7	87.2	89.1
Yield per Morgen (Pkts)				
Estates	845	1263	1187	1099
Farms	1055	823	946	939
Estates and Farms	940	1057	1070	1024

pocket of citrus fruit. It is shown in Table 186 that the yield per morgen of citrus orchard in the case of estates considerably exceeded that on small farms. During the period 1948 - 1950 the average yield per morgen on estates was 1099 pockets as against 939 pockets per morgen on small farms. It is of interest to note that estates harvested a higher average crop per morgen than farms in spite of the fact that they showed an average yield per tree of 6.2 pockets compared with 6.4 pockets on farms during the three-year period. The position may be explained in the light of the data shown in Table 186 viz: that the estates had, on an average 188 citrus trees planted per morgen of which 93.6 percent were bearing trees as against only 175 citrus trees planted per morgen in the case of farms of which only 83.7 percent were bearing trees. The outcome of the above differences in

composition of the orchards of estates and farms re-
spectively, was that the cost of production excluding
interest, per pocket of citrus fruit, amounted to 17.9
pence in the case of estates as against 16.8 pence in
the case of farms. Although growers still enjoyed a
comparative advantage over estates as regards cost per
pocket, the advantage is considerably smaller than on
the basis of "per morgen" and "per citrus tree". The
cost of production, including interest, per pocket,
amounted to 24.5 pence in the case of estates and 24.4
pence in the case of growers.

The weighted average cost of production, ex-
cluding interest, for farms and estates combined during
the period 1948 - 1950, amounted to £74.4 per morgen,
98.2 pence per citrus tree and 17.4 pence per pocket.
The corresponding costs, including interest, amounted
to £104.2 per morgen, 137.4 pence per citrus tree and
24.4 pence per pocket of citrus fruit. These combined
costs for farms and estates were, however, calculated
on the bases of the weights for farms and estates re-
spectively, as determined by the sample covered by the
survey. It is highly probable that the estates were
overweighted and the growers underweighted in the above
calculation. Any probable error in the combined cost
of production per pocket will however be rectified in
the calculations which follow in which the two groups will be
weighted according to actual production of all farms and all
estates in the Union during the period 1948 - 1950.

In conclusion it should be pointed out that,
whereas a marked increase in cost of production was
revealed by the survey in the case of estates during
the period 1948 to 1950, no definite trend in the
costs of growers was determined. This may be attri-

buted to the fact that the costs of the same five
estates were obtained during the three consecutive
years (and that these costs were based on audited
book figures during each year) whereas a sample con-
stituted of different growers was taken during each
of the three years.   In this respect it may be of
interest to consider the cost analysis of 83 growers
who were included in each of the three surveys.   The
average cost of production of citrus fruit incurred
by these 83 growers during the period 1948 - 1950, is
shown in Table 187.   The data reveals in the first
instance that a slight increase in the average cost
of production per farm took place during this period.
The average cost, excluding interest, per farm increased
from £2049.5 during 1948, to £2059.6 during 1949 and
£2093.7 during 1950.   It is of significance to note
that major increases occurred in the cost of labour
(from £748.5 during 1948 to £851.1 during 1950) and
in the total amount of cash expenses per farm.   The
latter cost increased from £605.5 per farm during 1948
to £663.0 per farm during 1950.   These major increas-
es were off-set to a certain extent by a decrease
in the calculated cost of depreciation on capital
items.

The above increase in average cost of produc-
tion per farm was, however, accompanied by a certain
degree of expansion on the 83 farms under review.
The average area under citrus per farm increased
from 28.7 morgen during 1948 to 30.9 morgen during
1950 while the average number of trees per farm in-
creased from 5192 during 1948 to 5349 during 1950.
In spite of the increase in the average total cost
of production per farm, it may be seen that the aver-
age cost of production per morgen and per tree showed

Table 187: Comparative summary of the composition of the total cost of production of 83 growers who were included in each of the three cost surveys undertaken during the period 1948 - 1950.

Item. Average per farm:	1948	1949	1950	Three Years Combined.
Depreciation:	£	£	£	£
Improvements	77.7	41.1	52.7	57.2
General Equipment	58.1	56.3	57.7	57.4
Mechanical power equipment	130.6	104.9	92.2	109.2
Repairs:				
Improvements	27.9	15.1	30.9	24.6
General equipment	17.2	15.3	15.6	16.0
Mechanical power equipment	68.2	61.4	54.5	61.3
Running cost - Mechanical power equipment	158.2	161.2	168.6	162.7
Cost of draught animals	15.4	11.0	7.0	11.2
Labour	748.5	796.5	851.1	798.7
Cash expenses	605.5	649.2	663.0	639.2
Services by packhouse	142.2	147.6	100.4	130.1
Total cost excluding int.	2049.5	2059.6	2093.7	2067.6
Total interest @ 5%	867.2	870.2	907.0	881.5
Total cost including int.	2916.7	2929.8	3000.7	2949.1
Number of morgen citrus	28.7	29.6	30.9	29.7
Number of citrus trees	5192	5276	5349	5272
Cost excluding interest per:				
Morgen £	71.5	69.5	67.8	69.5
Citrus Tree d	94.7	93.7	93.9	94.1
Cost including int. per:				
Morgen £	101.7	98.8	97.1	99.2
Citrus Tree d	134.8	133.3	134.6	134.3

a declining tendency during the period 1948 - 1950. The average cost excluding interest, decreased from £71.5 per morgen and 94.7 pence per tree during 1948 to £67.8 per morgen and 93.9 pence per tree during 1950. A similar tendency is shown in respect of the cost of production including interest per morgen and

per citrus tree.

The analysis of the average costs of the abovementioned 83 growers bears out the observation made earlier viz: that the cost of production of growers did not increase during the same period when the costs of estates showed a considerable increase.

<u>CALCULATION OF WEIGHTED AVERAGE COST OF PRODUCTION PER MORGEN, PER CITRUS TREE AND PER BEARING TREE FOR FARMS AND ESTATES COMBINED ON THE BASIS OF THE ACTUAL OCCURRENCE OF THESE FACTORS ON FARMS AND ESTATES IN THE INDUSTRY</u>:   It was mentioned under the discussion of the contents of Tables 184 and 185 that the combined cost of production for farms and estates on the basis of the sample, would be adjusted in accordance with the actual occurrence of the various units of measurements on farms and estates in the entire Industry.   In effecting this adjustment, it is found, however, that no statistical information is available as regards the total number of morgen of citrus orchards, number of citrus trees and number of bearing trees controlled by farms and estates respectively. Accurate information is however available as regards the total crop produced by these two groups of producers and with the information supplied in Table 186 as regards average yield per tree, average percentage of bearing trees and average number of trees per morgen on farms and estates, the required information may be interpolated fairly accurately.

The respective weights to be applied to farms and estates in calculating the three-year average costs per morgen, per citrus tree and per bearing tree for the Industry as a whole, were calculated as follows: It was shown in Table 4 that the actual crops produced by farms and estates during

the period 1948 - 50, constituted 58.6 and 41.4 per-
cent respectively of the total crop produced in the
Union during this period.   It was furthermore shown
in Table 186 that farms harvested an average yield
per tree of 6.4 pockets during this period as against
6.2 pockets by estates.   By calculation it may now
be determined that the ratio of the number of bearing
trees on farms to bearing trees on estates was 57.8 :
42.2.

Similarly, by applying the percentages of
bearing trees on farms and estates (83.7% and 93.6%
respectively as shown in Table 186) to the ratio of
the number of bearing trees on farms and estates re-
spectively, it may be calculated that the ratio of
the number of citrus trees on farms to that on estates
was 60.5 : 39.5.   In the final instance, it is shown
in Table 186 that the average number of trees per morgen
on farms amounted to 175 as against 188 on estates.
By applying these planting distances to the ratio of
the number of citrus trees on farms and estates re-
spectively, it may be calculated that the ratio of the
number of morgen of citrus orchards on farms to that
on estates was 62.2 : 37.8.   When the above calculated
weights in respect of morgen of citrus orchards, number
of citrus trees and number of bearing trees for farms
and estates respectively, are applied to the calculated
average cost per morgen, per citrus tree and per bear-
ing tree as determined by the survey of a sample of
farms and estates, the following weighted average
costs for the entire industry may be calculated for
the three - year period 1948 - 1950:

According to the analysis presented in Table
188 the weighted average cost of production, excluding
interest, of all citrus fruit in the Union, amounted

Table 188: Calculation of weighted average cost of production of citrus for the entire industry per morgen, per citrus tree and per bearing tree during the period 1948 - 1950.

Cost per morgen.					
Group.	Weights.	Cost ex. int. as per survey.	Total.	Cost inc. interest as per survey.	Total
		£	£	£	£
Estates	37.8	82.1	3103.4	111.9	4229.8
Farms	62.2	65.7	4086.5	95.4	5933.9
All citrus	100		7189.9		10163.7
Weighted average cost per morgen			71.9		101.6
Cost per citrus tree.					
		(d)	(d)	(d)	(d)
Estates	39.5	104.7	4135.6	142.7	5636.6
Farms	60.5	90.2	5457.1	130.9	7919.4
All citrus	100		9592.7		13556.0
Weighted average cost per citrus tree.			95.9		135.6
Cost per bearing tree.					
		(d)	(d)	(d)	(d)
Estates	42.2	111.8	4718.0	152.4	6431.3
Farms	57.8	107.8	6230.8	156.4	9039.9
All citrus	100		10948.8		15471.2
Weighted average cost per bearing tree.			109.5		154.7

to £71.9 per morgen, 95.9 pence per citrus tree and 109.5 pence per bearing tree, during the period under review. The corresponding cost of production, including interest, amounted to £101.6 per morgen, 135.6 pence per citrus tree and 154.7 pence per bearing citrus tree. It will be noted that a relatively small difference occurred between the above costs and the corresponding costs calculated on the basis of the survey sample as shown in Tables 184 and 185.

CALCULATION OF THE WEIGHTED AVERAGE COST OF PRODUCTION PER POCKET OF ALL CITRUS FRUIT PRODUCED IN THE UNION DURING THE PERIOD 1948 - 1950:

In calculating the weighted average cost of production per pocket of all citrus fruit in the Union, as shown in Table 189, the average cost of production per pocket of each group and sub-group of citrus growers had to be weighted according to the total production of these groups during each year of the period 1948 to 1950. In determining the weighted average cost of production of all small growers, for instance, the average cost

Table 189: Weighted average cost of production per pocket of citrus fruit on farms, estates, and farms and estates combined on the bases of total production of citrus fruit in the Union.

	Farms.					
Year	Number of pockets.	Total cost ex. int. in pence.	Total cost inc. int in pence	Cost per pocket ex. int. (d)	Cost per pocket inc. int. (d)	Interest per pocket. (d)
1948	9592819	155804393	224869278	16.242	23.441	7.199
1949	8583867	166498045	240897352	19.397	28.064	8.667
1950	9879792	158743928	232667145	16.068	23.550	7.482
All three Years.	28056470	481046366	698433775	17.146	24.894	7.748

	Estates.					
1948	4955620	100262396	142167113	20.232	28.688	8.456
1949	7174501	112998393	154058666	15.750	21.473	5.723
1950	7666451	142887514	188732691	18.638	24.618	5.980
All three years.	19796582	356148011	484957364	17.990	24.497	6.507

	Farms and Estates combined.					
1948	14548449	256066699	367036391	17.601	25.228	7.627
1949	15758368	279496436	394955412	17.736	25.063	7.327
1950	17546243	301631442	421399836	17.191	24.016	6.825
All three Years	47853060	837194377	1183391639	17.495	24.730	7.235

per pocket as determined by the survey for each area, was weighted in accordance with the total production on small farms in each of the seven areas during each year of the period 1948 - 1950. Similarly the costs of estates were weighted according to the total production on all estates during the same period.

The results of the above calculations were as follows: The weighted average cost of production per pocket of citrus fruit produced on farms during the three-year period, amounted to 17.146 pence, excluding interest and 24.894 pence, including interest. Interest on capital for citrus production at the rate of 5%, amounted to 7.748 pence per pocket.

The weighted average cost of production excluding interest, on estates amounted to 17.990 pence per pocket as against 24.497 pence per pocket including interest. In the case of the citrus estates, interest amounted to an average of 6.507 pence per pocket.

The weighted average cost of production excluding interest per pocket of all citrus produced in the Union i.e. of farms and estates combined, amounted to 17.601 pence during 1948, 17.736 pence during 1949, 17.191 pence during 1950 and 17.495 pence for the three years combined. The corresponding costs per pocket including interest amounted to 25.228 pence during 1948, 25.063 pence during 1949, 24.016 pence during 1950 and 24.730 pence for the three years combined. Interest per pocket for the three year period amounted to 7.235 pence.

It will be noted that the weighted average costs per pocket calculated above, differed very slightly from the combined costs of farms and estates based on the sample crops, as shown in Tables 184 and 185.

SUMMARY OF TOTAL COSTS INCURRED BY GROWERS IN PRODUCING FOR AND MARKETING CITRUS FRUIT ON THE SOUTH AFRICAN MARKET DURING THE PERIOD 1948 - 1950.

In addition to calculating the cost of production of citrus fruit in the Union during the period 1948-1950, it was endeavoured to determine the average costs of picking the fruit, transport to packhouse, packing costs and packing material, railage to points of sale, selling charges and levies paid to the Citrus Board. In determining the total cost incurred per pocket of fruit sold on the local market, a distinction had to be made between costs which were applicable to the entire crop produced per farm and costs which were incurred only on fruit assigned for the local market. Cost of production, including interest on capital for citrus production, and the costs of picking and transport to the packhouse were calculated on the basis of the entire crop. Costs of packing and packing material and the pooled charges viz: railage, selling commission and levies were, however, calculated only on the quantity of fruit sold on the local market.

Before considering the summary of total costs presented in Table 190, a few notes on the method of calculation followed in determining the cost items other than cost of production are desirable.

It will be seen that the costs of picking, transport to packhouse and packing (including packing material) are combined in one figure amounting to 15.000 pence during 1948, 15.890 pence during 1949 and 17.237 pence during 1950 with a weighted average for the three years of 15.892 pence. The reasons for combining these costs were:

(a)   During the course of all the surveys the
calculation of these costs was undertaken by the Citrus
Exchange as the initial Departmental projects only
covered the cost of production of citrus fruit to
the stage when the fruit on the trees was ready to be
harvested.   During 1948 and 1949 the average cost
of picking, transport to packhouse and packing, cal-
culated by the Exchange, was based on information
supplied by seven of the main citrus co-operative
packhouses and four of the estate companies.   No
attempt was made at the time to segregate the indi-
vidual cost items and, indeed, it was found that in
the case of three of the estate companies, picking
and transport costs could not be segregated without
a great amount of unwarranted work to the companies.
During 1950, when the Exchange conducted the survey
on its own, it was endeavoured to determine the cost
of growers' own picking and transport to the packhouse
in cases where these services were not rendered co-
operatively.   In these respects a more representative
figure for the Industry was determined during 1950
than during the two earlier surveys.   In the case
of packing costs, however, it was found that growers
could not distinguish between packing costs incurred
on export and local market fruit.   Packing costs
of local market fruit incurred by co-operative pack-
houses and by the estates were therefore applied in
the calculations shown in Table 190.

(b)   In order to reduce the error of weighting of
the three individual cost items on farms and estates
respectively, to a minimum, the combined cost per
pocket of the three items was calculted for farms
and estates respectively and weighted on the bases of
the total number of pockets of citrus fruit sold by

farms and estates on the local market.

The costs determined in respect of picking, packing and transport by farms and estates during 1949 and 1950, were as follows:

Farms.		1949	1950
Picking	d	2.206	2.829
Transport to packhouse	d	1.149	1.903
Packing for local market	d	7.015	5.635
Packing material for local market	d	5.520	6.870
Total per pocket	d	15.890	17.237
Estates			
Picking and Transport	d	3.861	3.901
Packing for local market	d	5.448	5.287
Packing material for local market	d	5.520	6.870
Total per pocket	d	14.829	16.058

The average costs per pocket shown in respect of railage, selling charges and levies, were the actual costs incurred by the pools run for each of these items. It should be noted that the averages were calculated on the basis of all fruit disposed of in South Africa and not only the quantity of fruit sold on markets and by depots. The implication of this procedure would be to lower the actual average cost of railage, selling charges and levy per pocket as some of these costs, (i.e. selling commission) were not incurred on fruit supplied to factories, government institutions and mining compounds, whereas a lower rate of railage also applied in the latter cases. The averages shown, however, present a true reflection of the over-all costs incurred in producing and marketing citrus fruit on the local market. In annexure 4 a summary will be shown of the actual costs incurred in producing for and marketing fruit

Table 190. Summary of all costs incurred by growers
in producing and marketing citrus fruit
on the South African market.

Small growers.	1948	1949	1950	Three Years Combined.
	(d)	(d)	(d)	(d)
Cost of production excluding interest.	16.242	19.397	16.068	17.146
Interest on capital @ 5% .	7.199	8.667	7.482	7.748
Cost of picking, transport to P/house and packing[1] .	15.000	15.890	17.237	15.982
Railage	4.552	6.122	6.128	5.594
Selling charges	1.746	1.986	2.137	1.955
Levy: advertising	0.150	0.191	0.754	0.365
administrative	1.230	1.178	1.491	1.300
Total cost per pocket	46.119	53.431	51.297	50.090
Estates				
Cost of production excluding interest.	20.232	15.750	18.638	17.990
Interest on capital @ 5% .	8.456	5.723	5.980	6.507
Cost of picking, transport to P/house & packing[1] ...	15.000	14.829	16.058	15.310
Railage	4.552	6.122	6.128	5.594
Selling Charges	1.746	1.986	2.137	1.955
Levy: advertising	0.150	0.191	0.754	0.365
administrative	1.230	1.178	1.491	1.300
Total cost per pocket	51.366	45.779	51.186	49.021
Growers & Estates Combined.				
Cost of production excluding interest	17.601	17.736	17.191	17.495
Interest on capital @ 5% .	7.627	7.327	6.825	7.235
Cost of picking, transport to P/house & packing[1] ...	15.000	15.404	16.731	15.710
Railage	4.552	6.122	6.128	5.594
Selling Charges	1.746	1.986	2.137	1.955
Levy: advertising	0.150	0.191	0.754	0.365
administrative ...	1.230	1.178	1.491	1.300
Total cost per pocket	47.906	49.944	51.257	49.654

[1]Including packing material.

through the markets and depots employed by the Citrus Board.

From Table 190 it may be seen that the weighted average total cost per pocket including interest to the grower (for farms and estates combined) amounted to 47.906 pence during 1948, 49.944 pence during 1949, and 51.257 pence during 1950. The combined weighted average cost per pocket, including interest, for the three years 1948 - 1950, amounted to 49.654 pence. The level of the annual average cost per pocket incurred by growers and estates respectively, varied in relation to the average yields harvested. During the period 1948 - 1950, however, small growers incurred an average cost of 50.090 pence, including interest, per pocket as against 49.021 pence in the case of estate growers. Small growers enjoyed an advantage over estates, over the period of the three surveys, in respect of cost of production (17.146d as against 17.990d per pocket). In respect of picking packing and transport (15.982 d as against 15.310d) and interest on capital per pocket (7.748 d as against 6.507 d) the estate growers effected a saving over small growers resulting in a nett advantage in total cost of production and marketing of 1.069 pence per pocket by estates over small growers. The percentage composition of the total cost of production and marketing of citrus fruit in South Africa, incurred by small growers during 1950 was as follows:

182 Small growers - 1950.

	Cost P/pkt. (d)	% of total cost.
Cost of production excluding int.	16.068	31.3
Interest on capital @ 5%	7.482	14.6
Cost of picking	2.829	5.5
Cost of transport to P/house	1.903	3.7
Cost of packing	5.635	11.0
Cost of packing material	6.870	13.4
Railage to points of sale	6.128	11.9
Selling commission	2.137	4.2
Levy: advertising	0.754	1.5
administrative	1.491	2.9
Total cost per pocket.	51.297	100

According to the above analysis, which may be assumed to be representative of the approximate composition of the total costs incurred by all citrus growers in the Union, cost of production constituted 31.3 percent of the total cost per pocket. Interest on capital comprised 14.6 percent of the total cost. The entire cost of production, including interest, therefore constituted 45.9 percent of the total cost per pocket incurred by growers.

Picking and transport of fruit to the packhouse comprised 5.5 and 3.7 percent of the total cost per pocket respectively. The cost of packing fruit for the local market and of packing material (i.e. the container and tag, rubber stamps and ink) amounted to 12.7 and 11.7 percent of the total cost respectively i.e. a total of 24.4 percent.

Railage constituted an important item of cost and amounted to 11.9 percent of the total cost. The three pooled charges combined, comprised 20.5 percent of the total cost. It is evident from an examination of the above cost items that 54.1 percent

of the total cost per pocket is above serious criticism as the information was obtained from properly audited accounts. Any criticism of the above total cost figure will therefore be restricted to cost of production and interest on capital only.

SUMMARY OF AVERAGE FINANCIAL RESULTS OF PRODUCTION OF CITRUS FRUIT FOR THE SOUTH AFRICAN LOCAL MARKET 1948 - 1950.

Table 191: Average gross prices realised and average costs incurred by growers in producing for and selling citrus fruit first hand on the South African market 1948 - 1950.

	Items per pocket	1948.	1949.	1950.	All three Years.
		(d)	(d)	(d)	(d)
All citrus	Av. gross price realized	36.341	38.180	43.508	39.336
Small Growers.	Av. total cost incurred	46.119	53.431	51.297	50.090
	Loss per pocket	9.778	15.251	7.789	10.754
Estates.	Av. total cost incurred	51.366	45.779	51.186	49.021
	Loss per pocket	14.995	7.599	7.678	9.685
All citrus	Av. total cost incurred	47.906	49.944	51.257	49.654
	Loss per pocket	11.565	11.764	7.749	10.318

The gross prices shown above in Table 191 were the averages realised by all citrus fruit sold on the local market at the maximum fixed prices during the period 1948 - 1950. As a high percentage of the first grade crop produced in the Union was exported, the proportion of second grade fruit in the crop sold locally, was higher than the actual proportion of second grade fruit in the total crop produced annually. The average gross price realised on the local market was therefore lower than the weighted average price which would have been realised if the

entire crop had been sold at the maximum fixed prices.
Adjusting the average gross price realised in accord-
ance with the actual composition by grades of the total
crop produced during the period 1948 - 1950, the com-
parison between costs and average gross prices realised
would be as follows:

Table 192: Comparison between adjusted average gross
prices realised and average costs incurred
by growers in producing for and marketing
citrus fruit on the South African Market
1948 - 1950.

	Items per pocket.	1948.	1949.	1950.	All three Years.
		(d)	(d)	(d)	(d)
All citrus	Av. gross price realised	41.203	44.327	52.391	46.313
Small Growers.	Av. total cost incurred	46.119	53.431	51.297	50.090
	Profit or loss	-4.916	-9.104	+1.094	-3.777
Estates	Av. total cost incurred	51.366	45.779	51.186	49.021
	Profit or loss	-10.163	-1.452	+1.205	-2.708
All citrus	Av. total cost incurred	47.906	49.944	51.257	49.654
	Profit or loss	-6.703	-5.617	+1.134	-3.341

It is evident from Tables 191 and 192 that the
average maximum fixed prices did not cover cost of pro-
duction for the local market during the years 1948 and
1949 when, according to Table 192 losses of an average
of 6.703 pence and 5.617 pence per pocket respectively
were sustained on all citrus fruit sold in the Union.
During 1950 a profit of 1.134 pence per pocket was
shown.   During the period 1948 - 1950, the average
loss per pocket of citrus fruit disposed of in the
Union, amounted to 3.341 pence per pocket.

The financial returns as shown in Table 191
would be the actual losses incurred by exporter growers
on fruit sold locally. The statement as shown in
Table 192 would apply to non-exporter growers who sold

all their fruit on the local market.

In considering the financial summaries pre-sented in the above tables, it should be borne in mind that no allowance was made to growers, as a cost item, for their managerial function, and risk involved in the citrus undertaking. As explained earlier, even the actual labour of growers was included at a conserva-tive rate only where considered essential.

CHAPTER VII.

S U M M A R Y   O F   F I N A N C I A L   R E S U L T S
O F   T H E   C I T R U S   E N T E R P R I S E.

In Table 193 a summary is presented of the
average financial results of the citrus enterprise,
realised by growers in each of the seven citrus areas
of the Union during 1950. The total income from citrus
in each of the areas was constituted of the proceeds
paid out by the Citrus Board on local market and export
fruit after deduction of all the pooled charges incurred
in respect of railage, selling charges, levy and the
various costs of shipping, distributing and selling the
fruit on overseas markets. It should be noted that
the various charges in respect of picking, transport
and packing of the fruit have been added to the cost
of production of growers.

In order to determine the total cost to the
grower, picking, transport of fruit to the packhouse,
packing material and packing were calculated separately
for each grower whether a member of a co-operative
packhouse or not. In the case of members of packhouses
the pooled co-operative charges were applied and in the
case of non-members, these calculations were based on
information obtained from growers during the course
of the final survey.

The average profit on the citrus enterprise
per farm, which represents the difference between the
total income from citrus fruit and the total amount
of cost (including interest) incurred by growers in
producing and marketing the fruit, varied between
£1192.4 in the North Eastern Cape and £6470.8 in the
Northern Transvaal with an average per farm for all
the areas combined of £3820.5.

Table: 193. Summary of financial results of the citrus enterprise on farms in 7 citrus areas of the Union 1950.

Item.	Western Transvaal.	North Eastern Cape	Eastern Cape Coastal Area.	Natal.	Northern Transvaal	Western Province.	Eastern Transvaal.	Average for all Areas.
No. of cases.	28	22	67	12	12	14	27	182
Total income from citrus	7461.1	4419.2	8833.8	9491.7	14692.9	7679.6	12016.3	8933.6
Cost of production ex.int.	1067.8	1248.6	1365.7	1376.3	2705.6	1650.3	2393.5	1601.9
Cost of picking	140.8	127.2	297.9	203.7	381.4	313.5	392.3	267.6
Cost of transporting fruit to packhouses.	73.0	116.1	203.1	110.2	214.5	225.0	257.7	177.0
Cost of packing material	1204.7	717.1	1595.7	1993.3	2695.1	1504.9	2319.3)	2325.0
Cost of packing	469.8	305.3	820.7	639.6	1352.5	666.3	689.4)	
Interest on capital @ 5%	449.2	712.6	639.9	800.3	1075.0	752.9	1140.5	741.6
Total cost including int.	3405.3	3226.8	4923.0	5629.4	8422.1	5112.9	7192.7	5113.1
Profit on the citrus enterprise	4055.8	1192.4	3960.8	3862.3	6470.3	2566.6	4823.6	3820.5

It will be noted that a considerable disparity occurred between the areas in respect of the ratio between total costs incurred on and total income realised from the citrus enterprise. In the following summary in which income, cost and profit are expressed per bearing tree, it is shown to which extent costs were more productively incurred in some of the areas than in others.

Area.	Av. Bearing trees per farm.	Income per bearing tree.	Cost per bearing tree.	Profit per bearing tree.
Western Transvaal	1649	4.5	2.1	2.4
North Eastern Cape	4574	1.0	0.7	0.3
Eastern Cape Area	3129	2.8	1.6	1.2
Natal	3654	2.6	1.5	1.1
Northern Transvaal	4510	3.3	1.9	1.4
Western Province	4599	1.7	1.1	0.6
Eastern Transvaal	4353	2.8	1.6	1.2
Av. for all areas.	3496	2.6	1.5	1.1

DISPERSAL OF FARMS ACCORDING TO PROFIT ON THE CITRUS ENTERPRISE.

In Table 194 the dispersal of farms is shown according to the amount of profit realised on the citrus enterprise by the individual growers in each of the areas. Of the 182 growers included in the survey during 1950, 21 (11.5 percent) failed to show a profit on the citrus enterprise. Of this number, 9 occurred in the North Eastern Cape and their failure may to a large extent be ascribed to adverse climatic conditions. In the remaining areas where normal conditions were enjoyed during the year under review, it is surprising to find that a total of 12 growers conducted citrus farming at a loss. Of the total number of farms 29.8 percent realised £2000 profit and less, 34.0 percent realised between £2001 and £5000 and 24.7 percent

Table: 194. Dispersal of farms according to profit on the citrus enterprise on farms in 7 citrus areas of the Union 1950.

Item.	Western Transvaal.	North Eastern Cape.	Eastern Cape Coastal Area.	Natal.	Northern Transvaal	Western Province	Eastern Transvaal.	Average for all areas.	% of Total
No. of cases	28	22	67	12	12	14	27	182	100
Size groups Profit on citrus £.									
0 and less	1	9		1	2	2	6	21	11.5
0 - 500	1	4	5	3	1		1	15	8.3
501 - 1000	2	1	11	1		2		17	9.4
1001 - 1500			7				1	8	4.4
1501 - 2000	4	1	6	1		2		14	7.7
2001 - 2500	2	2	7	1	2	3	1	18	9.9
2501 - 3000	3	2	4	1	1		2	13	7.1
3001 - 3500	3	1	4					8	4.4
3501 - 4000	1		5	1	1	2		10	5.5
4001 - 4500			2		1	1	2	6	3.3
4501 - 5000	4		2				1	7	3.8
5001 and more	7	2	14	3	4	2	13	45	24.7
Average £	4055.8	1192.4	3960.8	3862.3	6470.8	2566.6	4823.6	3820.5	

realised £5001 and more.

It is evident that the average amount of profit on the citrus enterprise per farm, for all areas combined (£3820.5) was considerably above the profit realised by the majority of growers included in the survey. Only 31.8 percent of growers showed a profit on the citrus enterprise of £4000 and more. The average profit per farm was influenced considerably by the extremely high returns of 45 growers who realised profits exceeding £5000 per farm. The average profit per farm shown for the Western Transvaal, Eastern Cape Coastal area, Natal and Northern Transvaal areas was similarly above the profits shown by the majority of individual farms in each of the areas for the same reason.

Although the tendency existed for small growers
in general to plant more trees to the morgen than large
growers, it was found that some small growers planted
a relatively small number of trees per morgen while
some large growers planted a relatively large number
of trees per morgen.   In order to eliminate the influence
of size of orchards, which was related to the factor of
planting distance, the relationship between the number
of trees planted per morgen and cost per morgen and per
tree was determined within various size groups of orchards
in morgen.

It may be seen from Table 207 that growers who
planted a relatively larger number of trees per morgen
did not incur higher costs per morgen than growers who
planted a relatively smaller number of trees per morgen.
On the contrary it is shown in fact, that in two of the
three groups a lower cost per morgen was incurred on
those farms where a larger number of trees was planted
per morgen than on the farms in the same size groups
where a smaller number of trees was planted per morgen.
In the exceptional group, cost per morgen was approximately
the same for distantly and closely spaced trees.   Referring
to the data, it is shown that in the case of orchards
of 10 morgen and less in size, a cost of £59.6 per
morgen was incurred on those farms with less than 185
trees per morgen as against £60.7 on farms with more
than 185 trees per morgen.   In the case of orchards
of between 10.1 and 20.0 morgen in size, a cost of
£60.2 per morgen was incurred on orchards with less
than 185 trees per morgen as against £58.8 on orchards
with more than 185 trees per morgen.   In the final
instance, on orchards of 20.1 morgen and larger in size,
£67.0 was incurred in cost on orchards with less than
185 trees per morgen as against £52.8 on orchards with

Table 207: Analysis of the relationship between the number of trees per morgen and cost per morgen and per citrus tree on 67 farms in the Eastern Cape Coastal area during 1950.

Size Group. Morgen of citrus orchards.	Size Group. No. trees per morgen.	No. Cases.	Av. Size of Orchards. (Morgen.)	Av. No. trees per morgen.	Cost excluding interest per tree.[1]	Cost excluding interest per morgen.[1]
					£	£
10 and less	185 and less	9	8.2	157.3	0.379	59.6
	185 and more	10	6.8	202.6	0.300	60.7
10.1 - 20.0	185 and less	15	14.3	162.8	0.370	60.2
	185 and more	13	15.4	198.4	0.296	58.8
20.1 and more	185 and less	13	52.2	156.3	0.429	67.0
	185 and more	7	34.7	195.1	0.270	52.8

[1] Interest on capital was omitted to eliminate the possible influence of artificially created differences in capital investment. The object of the analysis is to demonstrate the relationship between planting distance and cultural costs.

more than 185 trees per morgen.

In citrus production, where a considerable percentage of the costs should be incurred on a "per tree" basis e.g. fertilizers, manure, insect and disease control and labour, it would have been expected that if a larger number of trees per morgen was to be cared for properly, cost per morgen would have exceeded the cost of maintaining a smaller number of trees per morgen. In view of the facts revealed by the analysis however, it is evident that within each size group, those orchards with a large number of trees per morgen would show a considerably lower cost per tree than in the case of orchards with a relatively smaller number of trees per morgen. The respective average costs per tree for orchards with less than 185 and orchards with more than 185 trees per morgen, amounted to £0.379 and £0.300 in the case of orchards of 10 morgen and less in size, £0.370 and £0.296 in the case of orchards between 10.1 and 20.0 morgen in size and £0.429 and £0.270 in the case of orchards of 20.1 morgen and more in size.

It is of significance to note that whereas an increase in cost per morgen was effected, in the case of orchards with less than 185 trees per morgen, by an increase in the size of orchards, the cost per morgen decreased in the case of orchards with more than 185 trees per morgen, with each successive increase in size of orchards. Referring to the data it may be seen that in the case of orchards with less than 185 trees per morgen i.e. with a wide planting distance, cost per morgen increased from £59.6 to £60.2 and £67.0 as the average size of orchards increased from 8.2 to 14.3 and 52.2 morgen. In the case of orchards with more the 185 trees per morgen i.e. with a narrow planting distance, cost per morgen decreased from £60.7 to £58.8 and £52.8 as the average size of orchards in-

creased from 6.8 to 15.4 and 34.7 morgen. It is
evident that the larger growers with a relatively small
number of trees per morgen, incurred higher costs per
morgen than the smaller growers with the same number of
trees per morgen. It is shown, however, that the larger
growers with a relatively large number of trees per
morgen, incurred considerably lower costs per morgen
than smaller growers with the same number of trees per
morgen.

The implications of the above differences in
cost will be shown later in an analysis of factors
influencing yield per morgen and per tree.

ANALYSIS OF FACTORS CAUSING OR RELATED TO VARIATIONS IN YIELD PER TREE.

The rate of yields harvested per tree or per
morgen during any particular season, depends as much on
prevailing climatic conditions, particularly during
the critical periods for citrus production, as on the
cultural care bestowed on orchards. In examining
the influence of various factors causing variations in
yield per tree, it may be assumed that in a limited
locality such as the area covered by the survey in the
Eastern Cape, climatic conditions were more or less the
same on all the farms studied. Variations which occurred
between farms in respect of yield per tree may therefore
to a large extent be attributed to factors controlled
directly or indirectly by growers.

RELATIONSHIP BETWEEN COST PER TREE AND YIELD PER TREE:
From the analysis presented in Table 208, it may be seen
that an increase in the average amount of cost of
production, excluding interest, from 49.3 to 135.9
pence per tree, was accompanied by an increase in
average yield per tree from 5.0 to 9.7 pockets. The

relationship is of significance only as a demonstration of the influence which could be exercised by the grower on yield per tree.   It should be borne in mind that the relationship demonstrated, was between cost of production excluding interest and yield per tree. Interest was intentionally excluded to eliminate the influence of variations in the value of orchards and by doing so, to reflect more significantly the influence of cash costs such as labour, insect and pest control, fertilizers and cultivation.

Caution should be expressed that no conclusions should be formed from the analysis as regards the desirability of obtaining relatively high yields at relatively high costs.   It would also be fallaceous to consider that increasingly higher costs per tree would result indefinitely in increasing yields per tree. The financial aspect of the mentioned relationship will be discussed fully at a later stage.

It will be noted from the data and from Fig.16 that the average level of yield per tree was still increasing at a considerable rate even at the relatively highest cost per tree.   It is clear that orchards in the Eastern Cape lent themselves to considerable exploitation by growers who were in the position to incur high costs.   The analysis reveals, at the same time, that results can only be achieved in citrus production at a relatively high outlay of costs.

Table 208/...........

Fig 16: Relationship between cost of production per tree and yield per tree on 67 farms in the Eastern Cape Coastal area - 1950.

Cost of production per tree (Pence)

Equation log y = - .3901 ÷ .6312 log x.
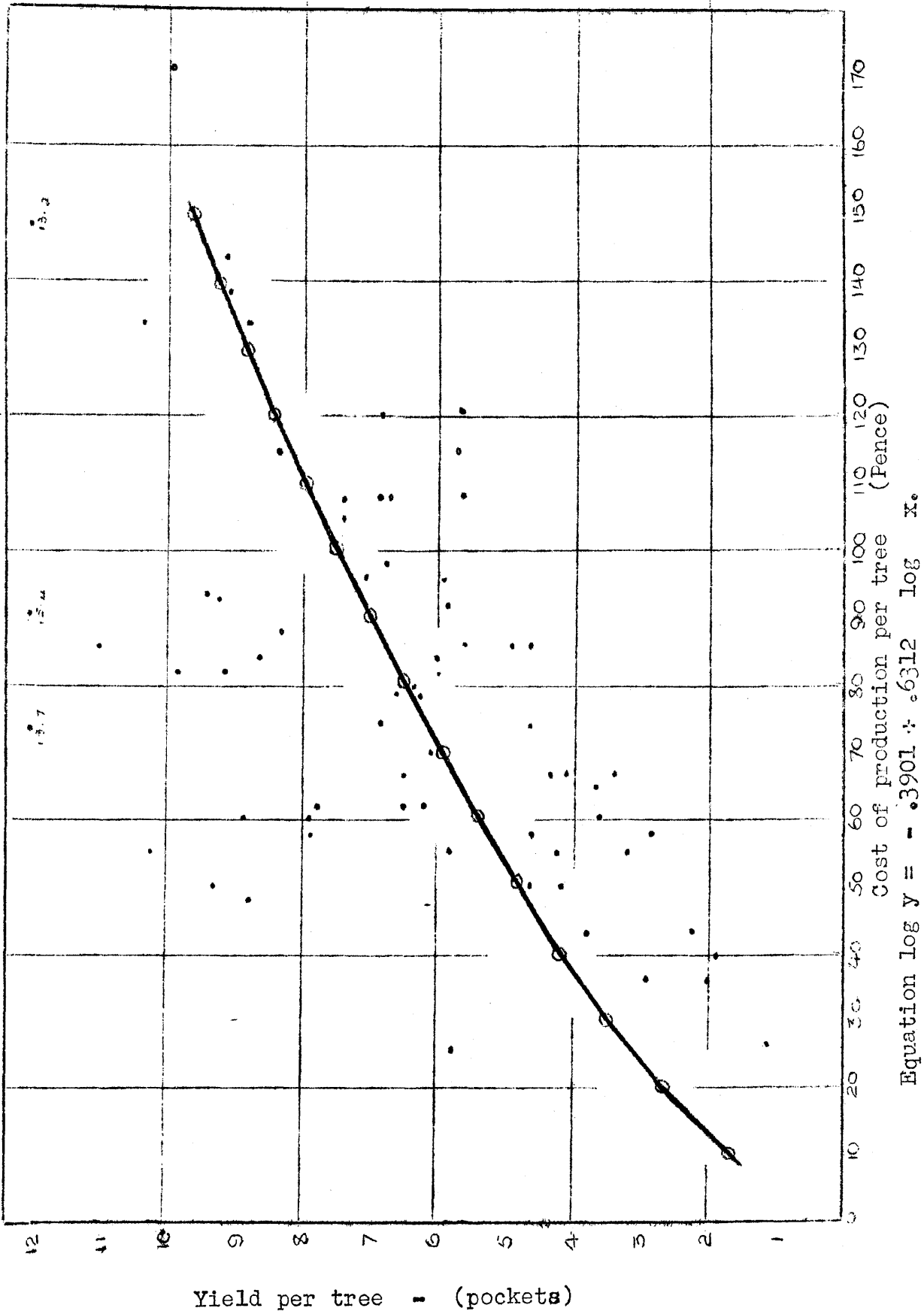
Yield per tree - (pockets)

Table 208: Relationship between cost of production[1] per tree and yield per tree on 67 farms in the Eastern Cape Coastal area - 1950.

Size Groups. Cost per tree £.	No. of Cases.	Av. Cost per tree. (d)	Av. yield per tree (pockets)
0.25 and less	19	49.3	5.0
0.26 - 0.35	20	73.2	6.9
0.36 - 0.45	17	93.5	7.1
0.46 and more	11	135.9	9.7

[1] It should be noted that "cost of production" refers only to costs incurred prior to picking of the fruit i.e. excluding picking, packing and transport of the fruit.

COST PER MORGEN AND YIELD PER MORGEN: It was shown earlier that owing to variations in the number of trees per morgen some farms which showed a relatively high cost per morgen, had only a relatively low cost per tree and vice versa. By considering the relationship between cost per morgen and yield per morgen, the influence of the number of trees per morgen may be eliminated.

It may be seen from Table 209 that an increase in the average amount of cost per morgen from £36.4 to £90.7 was accompanied by an increase in yield per morgen from 741.1 to 1339.2 pockets. The relationship confirms the influence exercised by the level of costs incurred on the level of yield per tree harvested.

An anomaly is presented by the fact that on an average the smallest farms harvested the lowest yields per tree whereas it has been shown that the smallest farms did not incur the lowest cost per morgen. On the contrary, the average level of cost per morgen on the smallest farms was only slightly lower than the level of costs on the largest farms. The problem may be explained by studying the crop returns of farms

grouped according to cost per morgen within various

size groups of orchards.   It should be pointed out

Table 209:   Analysis of the relationship between cost
of production per morgen and yield per
morgen on 67 farms in the Eastern Cape
Coastal area during 1950.

Size Group. Cost excluding interest per morgen. £	45.0 & less.	45.1 - 57.5.	57.6- 70.0	70.1 & more.
No. of Cases.	16	21	14	16
Av. cost of production per morgen. £	36.4	51.2	64.8	90.7
Av. size of crop[i] (Pockets)	12423	21724	22129	34107
Av. No. bearing trees[ii]	2424	3396	2714	3846
Av. Yield per tree. (Pockets)	5.12	6.40	8.15	8.87
Av. Yield per morgen (Pockets)	741.1	861.3	1136.9	1339.2

[i]To the nearest pocket.
[ii] To the nearest bearing tree.

that in spite of the average tendency determined between
size of orchards and cost per morgen, some growers incurred
higher costs per morgen than others irrespective of the
size of orchards.

It may be seen from Table 210 that higher yields
were obtained from those orchards, within any of the size
groups, on which a relatively high cost per morgen was
incurred than from orchards on which a low cost per
morgen was incurred.   In the case of the smallest
orchards, the average yield per tree amounted to 6.1
pockets in those cases where an average cost per morgen
of £41.8 was incurred as against 7.2 pockets when cost
per morgen amounted to £85.8.   In the case of medium-
sized orchards, an average cost of £44.3 per morgen was
accompanied by a yield per tree of 6.3 pockets as
against 7.2 pockets in the case of orchards where cost

Table 210: Relationship between cost per morgen, at constant size groups, and yield per tree on 67 farms in the Eastern Cape Coastal area during 1950.

Size Groups (Morgen)	Size Groups Cost per Mgn.	No. of Cases	Av. Size of Orchards(Mgn)	Av. Cost per morgen.	Av. Size of Crops.	Av. Yield per tree.
	£			£	(Pockets)	
10 and less	£55.0 and less	10	8.2	41.8	7820.4	6.1
	£55.1 and more	9	6.6	85.8	7124.3	7.2
10.1 – 20.0	£55.0 and less	15	14.2	44.3	11875.7	6.3
	£55.1 and more	14	14.4	75.6	15249.1	7.2
20.1 and more	£55.0 and less	10	46.8	47.2	36885.0	5.8
	£55.1 and more	9	50.4	79.9	67522.0	9.1

per morgen amounted to £75.6.   In the final size group
i.e. on the largest farms, an average cost per morgen
of £47.2 was accompanied by a yield per tree of 5.8
pockets as against 9.1 pockets when cost per morgen
amounted to £79.9.

The anomaly which was mentioned, was apparently
caused by the fact that large growers obtained a relative-
ly higher yield per tree as a result of high costs per
morgen than small growers.   At a cost per tree of £85.8
small growers obtained a yield per tree of only 7.2
pockets whereas large growers obtained 9.1 pockets per
tree at a cost of £79.9 per morgen.   Although the
previously determined relationship between cost per morgen
and yield per tree is confirmed by the analysis of each
individual size group of orchards, it is evident that
the benificial influence of high cost on yield was more
pronounced in large orchards than in small orchards.
Hence the occurrence that, on an average, higher yields
were obtained from large orchards than from small
orchards although the average level of costs per morgen
was approximately the same.

In the following two Tables more specific analyses
are presented to indicate the relationship between cost
of labour and cost of manure and fertilizers respectively
on the one hand and yield per tree on the other hand.
These two cost items not only constitute a major
percentage of the total cost of production, but will
be shown to be required in above average proportions for
successful citrus production.

RELATIONSHIP OF VARIOUS COMPONENT ITEMS OF THE TOTAL
COST OF PRODUCTION TO YIELD PER TREE: In Tables 211
and 212 the relationship is shown which existed between
cost of labour per tree and cost of manure and fertilizers
per tree, respectively, and yield per bearing citrus tree.

Labour, it is known, constituted the major single cost
item in citrus production. Manure and fertilizers on
the other hand are directly related to the healthy
growth of trees and as such may be expected to exercise
an influence on the crop under normal climatic conditions.
In interpreting the analyses shown in these two tables,
the effect of variations in the causal factors on yield
per tree should not be attributed to variations in other
factors which is known also to influence yield per tree
and which may have coincided with the variations in
the above factors. Increases in cost of labour per tree
would, for instance, be accompanied by increases in total
cost per tree. Farms with the highest cost of labour
per tree need however, not necessarily have had the
highest total cost per tree. This serves to prove
that both cost of labour as well as cost of manure and
fertilizers per tree should be regarded as independent
causal factors in the ensuing analyses.

It may be seen from Table 211, that an increase
in the average cost of labour per tree from £0.063 to
£0.272 was accompanied by an increase in yield per tree
from 5.0 to 8.9 pockets. Each successive increase in
labour cost per tree, resulted in higher yields per
tree. The fact that the above tendency was established
in the first three groups of farms which had approximately
the same number of bearing trees per farm, adds to the
significance of the relationship demonstrated.

The average relationship between cost of labour
per tree and yield per tree, as shown by the accompanying
curve in Figure 17 is represented by the equation:

$\log y = .4012 + .3714 \log x.$

It should be realised that labour alone cannot
produce any crop. Increases in cost of labour can only
result in increased yields if the entire balance of all

Fig 17: Relationship between cost of labour per tree and yield per tree on 67 farms in the Eastern Cape Coastal area - 1950.

Cost of labour per tree in £

Equation $\log y = .4012 + .3714 \log x.$
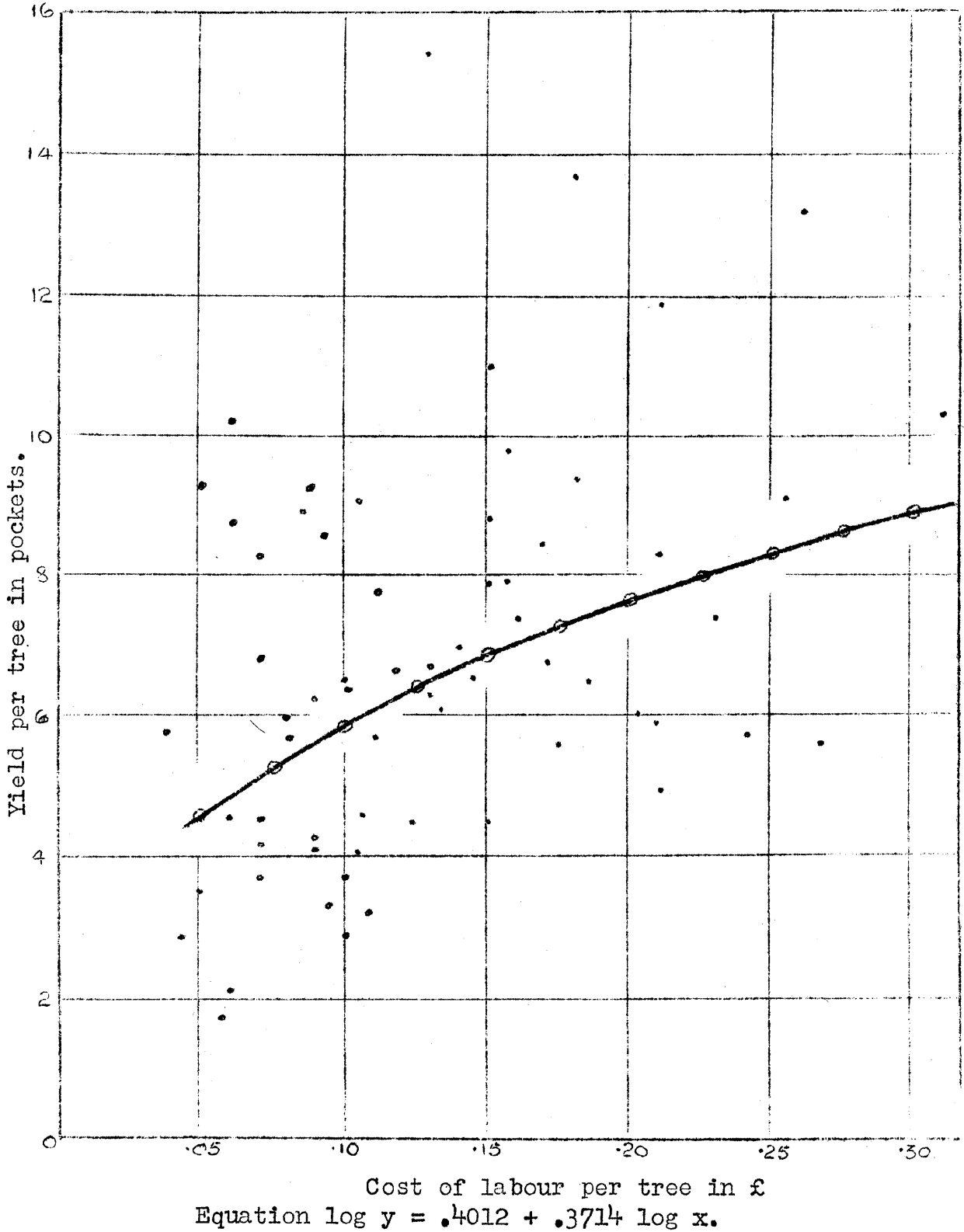
the factors of production are favourable to higher yields.

Whereas the analysis illustrates that insufficient labour

Table 211: Relationship between cost of labour per tree and yield per bearing tree on farms in the Eastern Cape Coastal area - 1950.

Size Group: Labour per tree	£0.081 & less.	£0.081 - 0.14	£0.141- 0.20	£0.201 & more.
No. of cases.	16	23	15	13
Av. Labour per tree.	£0.063	£0.106	£0.158	£0.272
Av. Bearing trees per farm	2476.6	2958.3	2885.4	4514.5
Av. Pkts. per farm.	12487.8	17659.2	25374.5	40301.0
Pokts. per bearing tree...............	5.0	6.0	8.8	8.9
Nett increase in Yield per £1 nett increase in labour (Pockets)		23.2	53.8	0.9

may be the cause of low yields it also provides an indication that above a certain level in cost of labour per tree, further increases in cost would be accompanied by a diminishing rate of increase in yield per tree. A stage would be reached, when the labour requirements of the orchard were satisfied, and increased labour activities would not result in any further increase in yield. It is shown in Table 211 that the first in-crease in cost of labour per tree was accompanied by a nett increase in yield per £1 nett increase in cost of labour of 23.2 pockets while the second increase in cost of labour resulted in a nett increase in yield of 53.8 pockets per £1 nett increase in labour cost. The final increase in cost of labour per tree resulted in practically no increase in yield per tree.

In this respect again, the optimum intensity of the cost of labour which should be incurred, will be determined by the ratio between cost

which results in the maximum net return.   As the
major individual cost item in citrus production,
labour should receive the closest supervision by growers
both in respect of its contribution towards expenses
as well as in its relationship to the size of the crop
through yield per tree.

In Table 212 an equally significant relationship
is demonstrated between the cost of manure and fertilizers
per tree and yield per tree.   For the sake of convenience
the cost of manure and fertilizers was expressed per
100 trees.   It is shown that an increase in the average
cost of manure and fertilizers per 100 trees from £0.77
to £9.44 was accompanied by an increase in yield per
tree from 5.98 to 7.88 pockets.   Each successive
increase in the cost of manure and fertilizers per 100
trees resulted in an increased yield per tree.

As in the case of labour, it should be noted
that there are two extremes in the relationship between
manure and fertilizers and yield per tree.   In the
first instance low yields may be due to insufficient
fertilizing of trees.   An occurrence of this nature
should be attributed either to bad management or the
scarcity of fertilizers.   In the second instance it
should be noted that diminishing returns may result
after a certain limit in the cost of manure and fertilizers
had been reached.   An increase in the above cost from
£3.72 to £9.44 per 100 trees resulted in an increase
in yield per tree of only 0.04 pockets compared with
considerably higher increases in the two previous
groups.   It is obvious that in the case of fertilizers
successive increases in application per tree above
the optimum intensity, would not only result in a
diminishing rate of increase of yields per tree but
might cause an actual decrease in yield by creating

Table 212:   Analysis of the relationship between the cost of manure and fertilizers per tree and yield per tree on 67 farms in the Eastern Cape Coastal area during 1950.

Size Groups - Manure and fertilizers per 100 trees	£1.5 & less.	£1.51 - 3.0	£3.01 - 4.5	£4.51 & more.
No. of Cases	17	14	16	20
Av. Manure & Fertilizers per 100 trees	£0.77	£2.45	£3.72	£9.44
Av. Size of crops. (pockets)	13985.8	16454.2	26471.2	30942.0
Av. Bearing trees per farm	2338.5	2662.1	3378.2	3928.1
Av. Yield per bearing tree (pockets)	5.98	6.18	7.84	7.88

unfavourable chemical conditions in the soil. In view of the cost of manure and fertilizers, its application has become a highly scientific task. It is the combined task of the horticulturist and the economist to determine the ideal composition of fertilizers for citrus trees and the intensity of application in order to obtain the optimum yield per tree which would result in the most favourable nett return per tree.

RELATIONSHIP BETWEEN YIELD PER TREE AND QUALITY OF CITRUS FRUIT PRODUCED: It is of importance to know whether the quality of citrus fruit was not impaired by the efforts of growers to increase yield per tree. In Table 213 an analysis is shown of the percentage of first grade fruit which occurred in crops produced at various levels of yield per tree. It will be noted that although crops produced at an average yield of 3.2 pockets per tree, were constituted of 91.2 percent first grade fruit as against a considerably lower percentage of first grade fruit in the crops produced at higher yields per tree, the declining tendency in

quality did not continue throughout with increasing
yields. Crops produced at an average yield per tree
of 5.5 pockets showed the same percentage of first grade
fruit as crops produced at an average yield of 10.3
pockets.

Rather than to attach any significance to the
decrease in the percentage of first grade fruit which
occurred between the first and the other three groups
of farms, it may be more correct to state that the
percentage of first grade fruit in the crops produced
at very low yields was exceptionally high by the normal
standard of the analysis of crops in the area.

Table 213: Relationship between yield per tree and
percentage of first grade fruit produced
on 67 farms in the Eastern Cape Coastal
area - 1950.

Size groups: Yield per tree (Pkts)	No. of Cases.	Av. Yield per tree.	Av. % of 1st grade fruit.
4.5 and less	13	3.2	91.2
4.6 - 6.5	20	5.5	85.6
6.6 - 8.5	15	7.4	83.5
8.6 and more	19	10.3	85.7

From this point of view it may be concluded that practices
devised to increase yield per tree did not exercise a
detrimental influence on the quality of fruit in the
Eastern Cape during 1950.

Two other factors more indirectly related
to yield per tree, should be mentioned under the present
discussion. These are viz: the influence of planting
distance and of the composition of orchards by varieties
of citrus trees on yield per tree.

RELATIONSHIP BETWEEN NUMBER OF TREES PER MORGEN AND
YIELD PER TREE: It has been determined earlier that

growers who planted a relatively large number of trees
per morgen did not, on an average, incur higher costs
per morgen in order to provide for the individual
requirements of the larger number of trees. It was shown
that as a result of this policy, lower costs per tree
were incurred on farms where a large number of trees
was planted per morgen than on farms where a relatively
smaller number of trees was planted per morgen.

In Table 214 the effect of the abovementioned
factor is shown in its relationship to yield per tree.
With the exception of the smallest group of farms,
where a higher yield per morgen and per tree was obtained
with closer planting of trees, a decrease in the average
planting distance of trees was accompanied by a decrease
in the average yield both per tree and per morgen.
Referring to the data, it may be seen that, in the case
of orchards of between 10.1 and 20.0 morgen in size,
those orchards with an average of 162.8 trees per morgen
produced yields of 6.59 pockets per tree and 1072.7
pockets per morgen. Orchards with an average of 198.4
trees per morgen produced an average of only 4.06
pockets per tree and 805.5 pockets per morgen. In the
group of orchards of 20.1 morgen and larger in size,
orchards with an average of 156.3 trees per morgen
produced 7.50 pockets per tree and 1172.7 pockets
per morgen as against only 3.82 pockets per tree and 744.3
pockets per morgen in the case of orchards with an
average of 195.1 trees planted per morgen.

It should be noted that an increase in yield
per tree and per morgen accompanied an increase in the
size of orchards on those farms where 185 and less
trees were planted per morgen. On farms where 185
and more trees were planted per morgen, however, an
increase in the size of orchards was accompanied by a

Table 214: Analysis of the relationship between the number of trees per morgen and yield per tree and pér morgen on 67 farms in the Eastern Cape Coastal area during 1950.

Size Group Morgen of orchards	Size Group. No. trees per morgen.	No. of Cases	Av. Size of orchards (morgen)	Av. No. of trees per mgn.	Av. Yield per tree (pockets)	Av. Yield per morgen. (pockets)
10.0 and less	185 and less	9	8.2	157.3	5.51	867.6
	185 and more	10	6.8	202.6	5.71	1157.3
10.1 - 20.0	185 and less	15	14.3	162.8	6.59	1072.7
	185 and more	13	15.4	198.4	4.06	805.5
20.1 and more	185 and less	13	52.2	156.3	7.50	1172.7
	185 and more	7	34.7	195.1	3.82	744.3

decrease in yield per tree and per morgen. It may
be seen from the data that, in the former instance,
an increase in the average size of orchards from 8.2
to 14.3 and 52.2 morgen resulted in an increase in
yield per tree from 5.51 to 6.59 and 7.50 pockets. In
the latter case, however, an increase in the average
size of orchards from 6.8 to 15.4 and 34.7 morgen resulted
in a decrease in yield per tree from 5.71 to 4.06
and 3.82 pockets.

The significance of the above analysis is
that the trends determined in yield per tree both as
a result of differences in planting distance at constant
size groups as well as of differences in size of orchards
at constant planting distances, conformed in detail to the
trend in cost per morgen as shown in Table 207. The
analysis proves beyond doubt that the organisation of
orchards as regards the planting distances adopted and
the subsequent management of orchards as regards costs
incurred per tree in orchards planted at specific
planting distances, exercised an extremely important
influence on the yields obtained from those trees.
The influence of planting distance on the financial
returns of citrus farming will be shown at a later
stage in this study.

RELATIONSHIP BETWEEN THE PERCENTAGE OF BEARING VALENCIA
TREES OF THE TOTAL NUMBER OF BEARING ORANGE TREES AND
YIELD PER TREE FOR ALL CITRUS FRUIT: It is a well-known
fact that Valencia trees produce, on an average, higher
yields per tree than, for instance, Navel trees.   Mid-
season varieties are also high-yielding but these
varieties constitute only a small percentage of the
total number of trees per farm in the Eastern Cape and
would not have exercised any significant influence on
the average yield per tree obtained for the entire citrus

Table 215: Relationship between the percentage of bearing Valencia trees of the total number of bearing orange trees and yield per tree for all citrus fruit harvested on 67 farms in the Eastern Cape Coastal area during 1950.

% Bearing Valencia trees of total bearing orange trees.	% 35.0 & less.	% 35.1 - 50.0	% 50.1 - 65.0	% 65.1 & more.
No. of Cases	14	21	17	15
Av. % Bearing Valencia trees	% 29.7	% 42.5	% 54.6	% 74.4
Av. Bearing citrus trees per farm	2401.9	3571.2	4049.0	2145.4
Av. Size of citrus crop per farm (Pkts)	14995.6	25432.3	30496.6	16535.8
Av. Yield per tree for all citrus fruit	Pkts 6.24	Pkts 7.12	Pkts. 7.53	Pkts. 7.71

crop.   In Table 215 an analysis is presented to demonstrate the effect of a relatively high percentage of Valencia trees of the total number of orange trees, on the average yield of all citrus fruit per tree.

It may be seen from the data that an increase in the percentage of bearing Valencia trees from 29.7 percent to 74.4 percent was accompanied by an increase in the average yield per bearing citrus tree from 6.24 to 7.71 pockets. Each successive increase in the percentage of bearing Valencia trees, resulted in an increased yield per tree for all citrus fruit. The tendency determined is of even greater significance if it is borne in mind that wide variations occurred in the percentage of Grapefruit trees of the total number of citrus trees per farm and that Grapefruit yields per tree exceeded the average yield of Valencia oranges per tree during the year under review.

The abovementioned factor, which is also a matter of organisation by the grower should undoubtedly exercise an influence on the nett returns realised per

farm if it is considered that cost of production per tree is approximately the same for all varieties.

TENDENCIES DETERMINED IN FACTORS RELATED TO COST OF PRODUCTION PER POCKET OF CITRUS FRUIT.

In the preceding analyses it has been endeavoured to determine some of the most important trends which occurred in the organisation and management of a sample of citrus orchards in the Eastern Cape Coastal area during 1950. The information which has become available as a result of the analyses will now be applied in an explanation of the variations which occurred between farms as regards cost of production per pocket of citrus fruit. It will be shown that cost per pocket on individual farms, is not the incidental result of costs incurred and crops harvested. Both these factors are subject to the management of the grower who may, within the limits allowed by climatic conditions, exercise a considerable influence on the level of cost per pocket at which crops are produced. It will be shown that various factors are in operation which, although conducive to higher yields, should be controlled rationally in order to avoid increased costs per pocket and a consequent decrease in nett returns. The analysis which follows may serve a useful purpose in providing a basis on which the horticulturist may devise schemes for the achievement of greater all-round efficiency in citrus production.

THE RELATIONSHIP BETWEEN YIELD PER BEARING TREE AND COST PER POCKET:

In Table 216 an analysis is presented to demonstrate the general relationship which existed on the sample of farms, between yield per bearing tree and cost per pocket of citrus fruit. It is shown that an increase in the average yield per

Table 216: Relationship between yield per bearing tree and cost per pocket and per morgen on farms in the Eastern Cape Coastal area — 1950.

Size Groups Yield per tree (pockets)	No. of Cases.	Av. Yield per tree. (pockets)	Av. No. of pockets	Av. No. of Bearing trees.	Av. No. of morgen citrus.	Av. Cost excl. int. (£)	Av. cost per morgen citrus. (£)	Av. cost excl. int per pkt. (pence)
4.5 and less	13	3.2	7224.7	2252.2	15.4	642.2	41.6	21.3
4.51 — 6.5	20	5.5	20232.2	3701.2	25.2	1416.4	56.2	16.8
6.51 — 8.5	15	7.4	14005.7	1894.9	13.3	819.8	61.7	14.0
8.51 and more	19	10.3	42202.4	4100.5	30.2	2238.3	74.1	12.7

tree from 3.2 to 10.3 pockets was accompanied by a decrease in the average cost of production, excluding interest per pocket from 21.3 to 12.7 pence. The average relationship between yield per tree and cost per pocket is demonstrated by the curve in the accompanying Figure 18 which is represented by the equation:

$$\log y = 1.6080 - .5332 \log x.$$

As would be expected, in view of the results of an earlier analysis, an increase in yield per tree was also accompanied by an increase in cost per morgen. It may be seen from the data shown in Table 216 that an increase in the average yield per tree from 3.2 to 10.3 pockets, coincided with an increase in average cost of production from £41.6 to £74.1 per morgen.

Caution should be expressed that it should not be concluded from the average relationship between these various factors, that an increase in cost per morgen would consequently be related to a decrease in cost per pocket. Both these factors are related to yield per tree but not to one another in the above analysis. It will indeed be shown that the relationship between cost per morgen and cost per pocket is somewhat involved owing to the varying levels of yield per tree occurring at different levels of cost per morgen.

RELATIONSHIP BETWEEN COST PER TREE AND COST PER POCKET:
It is shown in Table 217 that in actual fact, an increase in cost per tree was accompanied by an increase in cost per pocket. It may be seen that the average cost of production per pocket of citrus fruit increased from 12.7 pence to 13.4 pence and 16.6 pence when the average cost per citrus tree increased from 49.0 pence, to 79.4 pence and 124.1 pence. It should be noted that the increase in cost per pocket occurred in spite of an increase in yield per tree from 5.1 to 7.8 and 8.6

Fig 18: Relationship between yield per tree and cost per pocket on 67 farms in the Eastern Cape Coastal area – 1950.

Yield per tree (pockets)
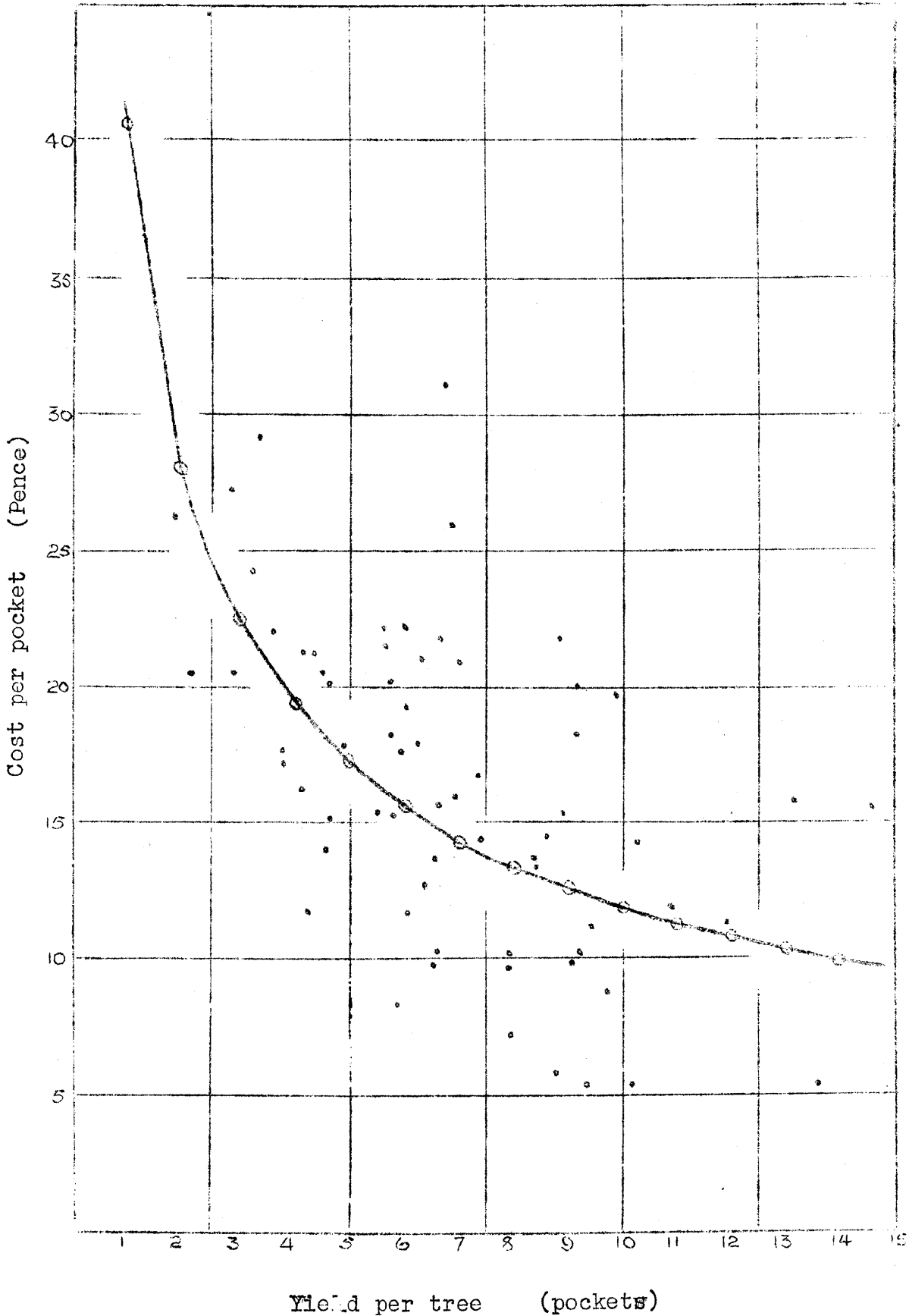
Equation : log y = 1.6080 – .5332 log x.

pockets.   It is evident that in the low-cost-per-tree group a more favourable relationship was established between cost incurred and crops produced per tree than in the case of the group of farms with the highest cost per tree.   The average number of pockets produced per £1 cost incurred, decreased from 18.9 to 14.5 when the average cost per tree increased from 49.0 pence to 124.1 pence.   It is evident that an intensification of costs per tree was accompanied by diminishing returns in respect of yields per unit of cost incurred; hence the increase in cost per pocket.   From a financial point of view, however, the above intensification of costs would be justified as the relative increase in yields obtained at the higher level of cost per tree more than compensated for the relative increase in cost per pocket at which the higher yield was produced.   The limit to which cost per tree could be increased profitably would be determined from season to season by the current price level per pocket of citrus fruit.   The financial aspect of this matter will be discussed in detail at a later stage.

Table 217:   Relationship between cost per tree and cost per pocket on 67 farms in the Eastern Cape Coastal area - 1950.

Cost per tree groups.		£0.25 & less	£0.25-0.39	£0.40 & more
Number of Cases.		18	30	19
Av. Cost per tree.	d	49.0	79.4	124.1
Av. Cost per farm.	£	645.9	1285.1	2174.7
Av. No. Bearing trees.		2405	3224	3665
Av. No. of Pockets.		12213	23096	31462
Av. Yield per tree(Pkts)		5.1	7.2	8.6
Av. pkts. per £1 cost		18.9	18.0	14.5
Av. cost per pocket	d	12.7	13.4	16.6

RELATIONSHIP BETWEEN COST PER TREE AND YIELD PER TREE COMBINED, AND COST PER POCKET: The relationship between cost per tree and yield per tree was by no means perfect and it did occur that high yields per tree were obtained on some farms at a low cost per tree whereas low yields per tree were obtained on other farms at a high cost per tree. This occurrence naturally caused variations in cost per pocket within specific size groups of cost per tree. As would be expected, it is shown in Table 218 that increased yields resulted in lower costs per pocket within various ranges of cost per tree.

Table 218: Relationship between cost per tree and yield per tree combined and cost per pocket on 67 farms in the Eastern Cape Coastal Area - 1950.

Groups Cost per tree (£)	Groups Yield per tree (pockets)	No. of Cases.	Av. Cost per tree. (d)	Av. Yield per tree. (pockets)	Av. Cost per pkt. (d)
.27 & less	6.5 & less	13	47.3	3.8	17.0
	6.5 & more	9	59.4	7.8	9.0
.271-.37	6.5 & less	9	70.9	4.7	18.6
	6.5 & more	9	82.7	9.8	10.6
.371 & more	6.5 & less	9	93.3	5.4	19.0
	6.5 & more	18	124.9	9.7	15.3

On farms with a cost per tree of £0.27 and less, an increase in yield per tree from 3.8 pockets to 7.8 pockets resulted in a decrease in cost per pocket from 17.0 pence to 9.0 pence. Similarly, in the case of farms with a cost per tree between £0.271-0.37 an increase in yield per tree from 4.7 to 9.8 pockets was accompanied by a decrease in cost per pocket from 18.6 to 10.6 pence. Finally, in the case of farms with a cost per tree of £0.371 and higher, an increase in average yield per tree from 5.4 to 9.7 pockets was accompanied by a decrease in cost per

pocket from 19.0 to 15.3 pence.

It should be realised that variations in
yield per tree and cost per pocket within each size
group of cost per tree might have exercised a neutra-
lising influence on the general tendency in the
relationship between cost per tree on the one hand and
yield per tree and cost per pocket on the other hand
as shown in Table 217.   It is significant, though,
that a general relationship existed between cost per
tree, as the causal factor, and cost per pocket in
spite of variations in cost per pocket within various
ranges of cost per tree.   The influence of these
latter variations is eliminated in Table 218.   It is
shown that an increase in cost per tree at constant
levels of yield per tree, still resulted in an increase
in cost per pocket.

With an increase in the average cost per tree
from 47.3 pence to 93.3 pence at yields per tree of
6.5 pockets and less, the average cost per pocket
increased from 17.0 pence to 19.0 pence.   Similar
increases are shown to have occurred in cost per pocket
as a result of increases in cost per tree at levels of
yield per tree above 6.5 pockets.   It should be noted
that cost per pocket in orchards with a high cost as
well as a high yield per tree was actually lower than
the cost per pocket of growers with a low cost as well
as a low yield per tree.   Referring to the data it
may be seen that growers with an average cost per tree
of 124.9 pence and an average yield per tree of 9.7
pockets, showed an average cost per pocket of 15.3
pence as against 17.0 pence in the case of growers
with an average cost per tree of only 47.3 pence and an
average yield per tree of only 3.8 pockets.

The above discussion revealed some of the

extremely complicated relationships which arose
between cost per tree, yield per tree and cost per pocket.
The position becomes even more involved when the
influence of variations in these factors are combined
with the influence of variations in prices realised
by various growers, in determining nett returns per
farm.   The problem may be summarised by stating that
the level of cost of production per citrus tree which
may be profitably incurred and the consequent optimum
yield per tree, are subject to the price level of citrus
fruit during any particular year.   The immense risk
involved for growers to organise their production
machinery during times of prosperity in order to secure
maximum yields and profits, is clearly demonstrated.
Citrus production involves a high percentage of fixed
costs which cannot be reduced at a moment's notice.
Growers operating at a diminishing rate of increase in
yield per tree in relation to costs incurred will be affected
adversely to a greater extent than growers operating
at a relatively lower level of costs, should prices
decline considerably, in spite of their relatively
high level of yields per tree.   As shown earlier,
yield per tree should be a means to an end and not
an end in itself.   If during a price decline profit
per tree could be maintained at a lower rate of cost
per tree, yield per tree and cost per pocket, all those
factors which are now known to be conducive to both
higher yields and increased costs should be modified
to ensure the maximum profit under changing conditions
of the price level.

RELATIONSHIP BETWEEN SIZE OF CITRUS CROP AND COST OF
PRODUCTION PER POCKET: In an earlier analysis it
was shown that a positive relationship existed between

Table 219: Relationship between size of citrus crop and cost of production per pocket on farms in the Eastern Cape Coastal area - 1950.

Size Groups (No. Pkts.)	No. of Cases.	Av. No. Pkts.	Av. Size orchards (Mgn)	Av. Yield per tree (Pkts)	Cost per pocket.	
					Incl. int. (pence)	Excl. int. (pence)
7500 & less	15	5306.7	8.3	4.5	27.5	18.8
7501-12500	19	10042.5	15.6	4.8	27.2	18.0
12501-17500	11	15105.4	13.2	7.8	21.2	14.4
17501 & more	22	48815.0	41.5	8.2	19.9	13.6

the size of   citrus orchards and yield per tree. According to the analysis shown in Table 219 an increase in the average size of crop per farm was accompanied by a decrease in the average cost of production per pocket of citrus fruit.   It may be seen that the average cost of production excluding interest, per pocket decreased from 18.8 pence to 13.6 pence when the average size of crop per farm increased from 5306.7 to 48,815.0 pockets. The corresponding costs, including interest, per pocket decreased from 27.5 pence to 19.9 pence.   It is evident that the rate of increase in yield per tree which accompanied an increase in the size of crop per farm, exceeded the rate of increase in cost per tree at which increasingly larger crops were produced.

The relationship determined by the analysis given in Table 219 should be attributed to the fact that the smallest crops occurred either on the smallest orchards or on orchards which produced a very low yield. The largest crops were, on the contrary, produced either on the largest farms or on farms which showed a very high yield per tree.   In both instances yield per tree would have exercised a neutralising influence on the relationship between size of crop and cost per pocket as high as well as low yields occurred on both small and large farms.   It has, however, been shown in an

earlier analysis that, on an average, large farms
produced a considerably higher yield per tree than
small farms.   It appears, therefore, as if the
influence of the yield factor would be to increase cost
per pocket on small farms and to decrease cost per
pocket on the larger farms.

In the following Table the influence of yield
per tree on cost of production per pocket is studied
within various size groups of orchards in order to
eliminate the neutralising influence of yield per tree
as mentioned above.

RELATIONSHIP BETWEEN SIZE OF ORCHARDS AND YIELD PER TREE
COMBINED AND COST OF PRODUCTION PER POCKET: It will be
noted that an increase in yield per tree within each
of the size groups of orchards, was accompanied by a

Table 220:   Relationship between size of orchards and
yield per tree combined and cost of pro-
duction per pocket on 67 farms in the
Eastern Cape Coastal area - 1950.

Groups size of orchards (morgen)	Groups yield per tree (Pkts)	No. of Cases.	Av. size of orchards (morgen)	Av. yield per tree (pockets)	Av. cost per tree excl. int. (£)	Av. cost per pkt. excl. int. (d)
11.0 & less	6.5 & less	9	7.6	4.6	0.29	18.3
	6.51 & more	12	7.9	8.1	0.37	13.1
11.1-19.0	6.5 & less	12	15.0	4.8	0.28	17.7
	6.5 & more	10	13.4	9.5	0.41	12.6
19.1 & more	6.51 & less	12	38.0	4.9	0.30	17.5
	6.51 & more	12	45.4	9.8	0.44	13.1

decrease in cost of production per pocket.   The
relationship shown is in conformation with the general
relationship between yield per tree and cost per pocket
as determined earlier and need not be discussed in
any further detail.

It is demonstrated in Table 220 to which extent

both high and low yields occurred on small and large citrus undertakings. It is of significance to note that remarkably small differences occurred between small and large farms in respect of cost of production per pocket for crops produced at approximately the same level of yield per tree. Cost per pocket amounted to 18.3 pence in the case of crops produced at 6.5 and less pockets per tree in orchards of 11.0 morgen and less in size as against 17.5 pence in the case of orchards of 19.1 morgen and more in size. In the instance of crops produced at 6.5 pockets and more per tree, cost of production per pocket amounted to 13.1 pence both in the case of orchards of 11.0 and less and 19.1 and more morgen in size. It should be noted that the indicated average cost per pocket was based on varying levels of cost per tree and yield per tree in each of the groups of farms shown in Table 220.

In view of the facts revealed by the above analysis, it is evident that the decline in cost per pocket at which increasingly larger crops were produced (See Table 219) should be attributed primarily to the weighted influence of high yields in the group of farms with relatively large crops as against the weighted influence of low yields in the group of farms with relatively small crops.

to it.

Relationship between total farm income and
operators earnings on 67 farms in the Eastern
Cape Coastal area - 1950.

Size Groups: Total income per farm £	3500 & less	3501 - 6000	6001 - 8500	8501 & more.
No. of Cases.	15	19	14	19
Av. Income per farm £	2362.3	4529.8	7205.6	22065.1
Profit per morgen citrus £	86.0	116.1	185.5	211.1
Op. Earnings per £100 income £	27.3	32.6	36.7	40.1
Av. Op. Earnings per farm £	644.6	1479.1	2648.0	8850.2

In Table 239 it is shown that an increase in
total farm income from £2362.3 to £22,065.1 was accompanied
by an increase in average operators earnings per farm
from £644.6 to £8850.2.   It will be observed that
operators earnings per £100 gross farm income increased
from £27.3 in the case of the smallest income group to
£40.1 in the case of the largest income group. Similarly
profit per morgen citrus increased from £86.0 to £211.1
from the smallest to the largest income groups.   The
rate of increase in operators earnings per farm was
therefore proportionally higher than the rate of increase
of total farm income from which it was derived. Growers
having the largest turnover per farm experienced a
double advantage over smaller growers viz: in respect
of the multiplying of profit per unit of income as
well as in the rate of profit per unit of income.

TOTAL EXPENDITURE: In view of variations which
occurred in the costs incurred by growers per unit of
area or per citrus tree, the total expenditure per
farm represents a unit of measurement of the size of
the farm business entirely different to any of the

units of measurement considered previously. A small
farm intensively operated at a high level of costs may,

Table 240: Relationship between total expenditure, per
farm and operators earnings on 67 farms in
the Eastern Cape Coastal area during 1950.

Size Groups: Total expenditure per farm. £	No. Of Cases.	Av. Expenditure per farm. £	Av. Operators Earnings per farm. £
2000 and less	17	1413.5	774.5
2001 - 3000	18	2438.2	1741.9
3001 - 4000	9	3341.2	2844.9
4001 & more	23	9913.0	7516.2

from a business point of view, be equal in size (and in
returns) to a relatively larger farm which is less
intensively operated at a lower level of costs. In
citrus production, it has been shown, a remarkable
relationship existed between cost per morgen or per tree
and yield per tree. If it may be assumed that the group
of farms with the lowest total expenditure per farm
included not only the smaller farms but also larger
farms with a relatively low cost per morgen and vice
versa in the case of the largest total cost per farm
group, this unit of measurement receives increased
significance. As a reflection of the extent or
intensity of farming activities, the total amount of
expenditure per farm may serve as an indication of the
size of the farm business.

In Table 240 it is shown that an increase in
total expenditure per farm from an average of £1413.5
to £9913.0 was accompanied by an increase in average
operators earnings per farm from £774.5 to £7516.2.
The relationship between total expenditure per farm
and productivity of expenditure will be examined later.

TOTAL COST OF LABOUR: As a final unit of measurement
of the size of the farm business, the total cost of
labour per farm will be examined in its relationship
towards operators earnings.   The total cost of labour
is applied as a reflection of the quantity of labour
employed on farms, in the absence of reliable information
as regards the physical quantity of labour or the number
of man days employed in production.   The effectiveness
of total cost of labour as a means of measuring the
quantity of labour employed per farm is impaired by
variations which might have occurred between farms in
rates of payment of labour of the same type and by the
fact that on some farms more European labour was employed
than on other farms.   In spite of these deficiencies
in cost of labour as a standard of measurement of the
quantity of labour employed per farm, the latter factor
is of so much significance in measuring the size of
farming activities, that it had to be considered in its
relationship towards the financial results of farms in
the area.

Table 241: Relationship between cost of labour and operators
earnings on 67 farms in the Eastern Cape Coastal
area - 1950.

Size Group: Cost of labour per Farm £	No. of Cases.	Av. cost of labour per farm £	Av. Operators earnings per farm £
350 and less	17	239.7	1441.6
350.1 - 650	17	495.0	1645.1
650.1 - 950	12	748.9	3032.0
950.1 and more	21	2588.8	7339.9

It is shown in Table 241 that an increase in
the average total cost of labour per farm from £239.7
to £2588.8 was accompanied by an increase in operators
earnings per farm from an average of £1441.6 to £7339.9.
Whereas it would be fallacious to conclude from the above

analysis that the financial results of any farm could
be improved by employing more labour, the relationship
determined, proves that on the basis of labour as a
reflection of the size of the farming organisation,
those farms employing more labour showed more favourable
results than smaller farms employing relatively less
labour. Whether the rate of increase of operators
earnings per farm was in proportion to the rate of increase
of the cost of labour per farm will be determined in
the following section.

RELATIONSHIP BETWEEN VARIOUS SIZE FACTORS AND THE PRODUCTIVITY OF COST ITEMS.

In considering the relationship between various
units of measurement of the size of the farm business
and operators earnings on citrus farms, it was shown that
in all instances an increase in the size of the
particular unit of measurement employed, was accompanied
by an increase in the financial results achieved. Under
favourable price conditions this is what would be
expected. The question arises, however, whether under
the same conditions of price, increases in the quantity
or volume of the factors of production employed by the
grower in conjunction with his soil, are utilised so
efficiently that the productivity of these factors is
maintained. It should be borne in mind that a partial
explanation for the inception of the Law of Diminishing
Returns in agriculture is to be found in the knowledge
that the size of any particular agricultural undertaking
which could be managed efficiently, is limited. When
this limit is exceeded the efficiency of management
decreases and waste occurs in the productivity of the
various factors of production.

Another aspect of citrus production which,

particularly during the present time of prosperity, may exercise a considerable influence on the efficiency of management and the resulting productivity of factors of production, is the general level of citrus prices. It is obvious that the necessity to maintain the highest degree of efficiency in management will be less urgent when returns are high than when the farm income is relatively small and expenses have to be considered carefully. As large undertakings were more liable to realise exceptionally high returns per farm than small farms, it is evident that the argument in respect of price has a particular bearing on the productivity of the various factors of production which are employed to an increasing extent with expansion of the size of the farming undertaking. Some of these factors will now be examined.

TOTAL FARM INCOME AND PRODUCTIVITY OF CAPITAL, LABOUR AND TOTAL EXPENDITURE: In Table 242 an analysis is shown of the average relationship between total farm income and the productivity of capital, labour and total expenditure on farms in the Eastern Cape during 1950.

Table 242: Relationship between total farm income and productivity of capital, labour and total expenditure on 67 farms in the Eastern Cape Coastal area during 1950.

	Size Groups.			
Total farm income	£3500 & less	3501-6000	6001-8500	8500 & more
No. of Cases	15	19	14	19
Av. Farm income . £	2362.3	4529.8	7205.6	22065.1
Av. Capital per farm £	6832.1	12575.3	18399.2	44928.0
Av. labour cost per farm .... £	309.5	541.1	720.9	2675.0
Av. Total expenditure .... £	1376.1	2422.0	3637.7	10968.5
Rate of Capital turnover (Yrs)	2.89	2.78	2.55	2.04
Income per £100 Capital .... £	34.6	36.0	39.2	49.1
Income per £1 labour cost ..... £	7.6	8.4	10.0	8.2
Income per £1 total expenditure £	1.72	1.87	1.98	2.01

It may be seen, in the first instance, that an increase in the average total income per farm from £2362.3 to £22,065.1 was accompanied throughout by an increase in the productivity of capital. The rate of capital turnover (i.e. the number of years required for total farm income to equal total farm capital) increased from 2.89 to 2.04 years while income per £100 capital increased from £34.6 to £49.1. Although increased prices are usually capitalised in agriculture in the form of higher land values, it is evident that an increase in total farm income exercised a beneficial influence on the productivity of capital in citrus production.

In the case of labour, however, an increase in total farm income was accompanied by an increase in the productivity of labour only up to a certain stage, after which it decreased sharply. It is shown that an increase in the average total income per farm from £2362.3 to £7205.6 was accompanied by an increase in income per £1 labour cost from £7.6 to £10.0. When total farm income increased to £22065.1, however, income per £1 labour cost decreased to £8.2. It is evident that the decrease in productivity of labour in the case of the largest group should be attributed to an undue increase in the cost of labour in proportion to the total income per farm. The high cost of labour on the largest group of farms may be attributed to:

(a) the necessity to employ European managers and foremen on account of the size of the farm business which could not be handled by the owner himself.

(b) possible inefficiency in management of labour owing to the large number of workers to be supervised and the fact that supervision was done by hired foremen and not by the owner himself.

Whether the absence of urgent necessity to economise, exercised an influence on this aspect of the matter is difficult to determine.

In the final instance it may be seen from Table 242 that an increase in total farm income from £2362.3 to £22065.1 was accompanied by a general increase in the productivity of total expenditure from £1.72 to £2.01 income per £1 expenditure.

With the exception of labour which showed a tendency to decline in productivity in the case of the highest income group, it appears as if an increase in gross income per farm, exercised a beneficial influence on the productivity of factors of production on farms in the Eastern Cape during the year under review.

TOTAL COST AND PRODUCTIVITY OF EXPENDITURE: The relationship determined between total cost and productivity of expenditure, as shown in Table 243, may appear

Table 243: Relationship between total cost per farm and productivity of expenditure on 67 farms in the Eastern Cape Coastal area during 1950.

Size Group: Total expenditure per farm. £	No. of Cases.	Av. Expenditure per farm £	Av. Total income per farm £.	Av. income per £1 cost £
2000 and less	17	1413.5	2562.1	1.81
2001 - 3000	18	2438.2	4787.7	1.96
3001 - 4000	9	3341.2	6904.6	2.07
4001 and more	23	9913.0	19553.9	1.97

controversial to the relationship, previously determined, between total gross income and productivity of expenditure. It is shown that an increase in total cost per farm was accompanied by increased productivity of expenditure only up to a certain stage, after which the productivity of expenditure decreased. Referring to the data, it will be seen that an increase in the average total cost per farm from £1413.5 to £2438.2 and £3341.2

was accompanied by an increase in the average income
per £1 cost from £1.81 to £1.96 and £2.07.   On farms
with an average total cost of £9913.0, however, the
income per £1 cost decreased to £1.97.

An explanation for the decrease in productivity
of expenditure in the final group, may be found in
the fact that the group of farms with the highest
total cost per farm, included not only the largest
farms but also smaller farms on which a high cost per
unit of area was incurred.   Although the two factors
are usually related, the highest income per farm need
not necessarily be obtained on farms showing the
highest total cost.   The decrease in productivity of
expenditure in the final group in Table 243 may be
attributed to one or all of the following factors:

(a) If, as stated above, this group included farms
     operating at a high cost structure, the possibility
     exists that total expenditure could have been sub-
     ject to the application of diminishing returns per
     unit of expenditure.

(c) Part of the expenditure incurred by this group of
     growers was in respect of non-citrus enterprises.
     As it was shown earlier that the largest farms
     incurred a higher percentage of the total farm
     expenditure on enterprises other than citrus, which
     was relatively less remunerative, the influence of
     this factor has to be considered.

(c) A possible decrease in the efficiency of supervision
     and management which accompanied large-scale
     agricultural undertakings.

If the above tendency in respect of the
productivity of expenditure was established during
the present period of exceptionally remunerative prices,
it should serve as a warning to growers as to the
importance of becoming cost conscious.   The stage
at which decreased productivity of expenditure sets
in, will be lowered with a declining price level.
The present time of relative prosperity would entail
future hardships to growers if it serves in any respect

as an incentive to slacken in efficiency of production.

CAPITAL INVESTMENT AND PRODUCTIVITY OF CAPITAL: In
Table 244 an analysis is shown of the relationship be-
tween total capital investment and productivity of
capital.

Table 244: Relationship between size of capital invest-
            ment and productivity of capital on 67 farms
            in the Eastern Cape Coastal area - 1950.

Size Groups: Capital investment per farm £	7500 & less	7501- 12500	12501 - 17500	17501 & more.
No. of Cases.	13	18	13	23
Av. Capital per farm £	5452.7	9387.2	14562.8	44498.4
Rate of Capital turn-over (Years)	1.83	1.91	2.16	2.40
Income per £100 Capital £	54.5	52.4	46.3	41.7
% return on Capital	16.1	19.1	16.0	14.4

It is shown that an increase in average total
capital per farm from £5452.7 to £44498.4 was accom-
panied throughout by a decrease in the productivity
of capital.   The average rate of capital turnover
decreased from 1.83 to 2.40 years while income per
£100 capital decreased from £54.5 to £41.7.   Read
in conjunction with the relationship determined
between total income and the productivity of capital
some significant conclusions are suggested by the
above analysis.

In the first instance it is obvious that
total income per farm is the product of size, yield
and price factors.   Particularly as a result of
the yield factor as well as of variations in the
percentage of the total farm area comprised by citrus,
the highest income group of farms need not correspond
with the highest total capital group of farms.   This
knowledge should be borne in mind in interpreting the

relationships between total income and capital
productivity and between total capital and productivity
of capital.

Secondly, it is evident that a lag occurred
in the rate of increase of total farm income when the
average total farm capital increased from £5452.7 to
£44,498.4, resulting in a decrease in income per unit
of capital. The following factors may have influenced
the relationship either jointly or independently.

(a) It was shown earlier that the total capital invest-
ment per morgen of citrus land was considerably
higher on large farms than on small farms mainly
owing to a higher valuation of orchards. With
income from citrus per morgen of citrus orchard
approximately the same on small and large farms,
a disparity was created in favour of small farms
as regards the ratio of income to capital.

(b) It was also shown that the largest group of farms with the
highest capital value per farm, consisted of a relatively small per-
centage of citrus land as against a relatively large percentage of
other land per farm. As the latter portion of the
farm contributed, on an average, a smaller percent-
age towards the total farm income than it comprised
of the total farm capital, the ratio of income to
capital on increasingly larger farms may be expected
to decrease in favourability.

(c) The possibility has to be considered that with the
predominating importance of the citrus enterprise
as the revenue producing branch on these farms,
other potential resources are not exploited as
efficiently or effectively as could be done.

Growers should not allow their profits from
the citrus enterprise to be minimised by undue losses
on other enterprises or by failure to recover where
possible at least the cost of interest on the value
of farm land not chargeable to citrus. This applies
particularly in the case of larger farms where citrus
orchards comprised a relatively small percentage of
the total farm area.

The tendency shown in Table 244 for percentage
return on capital to increase with an increase in
capital investment per farm from £5452.7 to £9387.2,
demonstrates the more favourable ratio of costs to

income which cculd be established on farms of a higher
capital value. The decline in percentage return on
capital which accompanied an increase in total capital
investment per farm frcm £9387.2 to £14562.8 and
£44498.4 was evidently caused by the increasing percent-
age of the total farm capital which was shown previously
to contribute little towards the total farm income.

COST OF LABOUR AND PRODUCTIVITY OF LABOUR: In the
analysis shcwn in Table 245, of the relationship between
total cost of labour and the productivity of labour,

Table 245:   Relationship between cost of labour and
              productivity of labour on 67 farms in the
              Eastern Cape Coastal area during 1950.

Size Groups: Cost of labour per farm £.	No. of Cases.	Av. Cost of labour per farm £	Av. income per farm. £	Av. income per £1 labour cost. £
350 and less	17	239.7	3506.0	14.6
350.1 - 650	17	495.0	4549.1	9.2
650.1 - 950	12	748.9	7340.3	9.8
950.1 and more	21	2588.8	19837.9	7.7

it is shown that an increase in the average total cost
of labour per farm from £239.7 to £2588.8 was accompanied
by a decrease in the average income per £1 labour cost
from £14.6 to £7.7.

In explaining this relationship, reference
need be made to an earlier statement is which the
increasing difficulty of maintaining efficient
utilisation and supervision of an increasing number
of labourers, was mentioned. This may be one of the
factors influencing the above relationship.

Another aspect of the matter to be considered
is that on small farms the owner himself supervises
labour, saving the cost of a manager or foreman while
perhaps deriving fuller employment from his labourers.

With increasing sizes of the farm business initially
a forman and ultimately both managers and several
foremen are required at much higher cost than native
labourers.   It will be noted from Table 245 that
the declining tendency in income per £1 labour cost
should be attributed to a relatively high rate of
increase of labour cost per farm from the first to the
last group as against a relatively lower rate of increase
of the accompanying total farm income.

Although a decrease in the productivity of labour
cost with increasing size of the farm business seems
to be an inevitable aspect of the type of farming
practised in the area and in view of the significance
of labour as one of the major cost items in citrus
production, it should be of prime importance to all
growers to achieve the highest possible efficiency
in the supervision and employment of labour.

RELATIONSHIP BETWEEN PRODUCTIVITY OF FACTORS OF PRO-DUCTION AND OPERATORS EARNINGS.

In the preceding analyses it was demonstrated
that increases in the total amount of various factors
of production employed per farm, were accompanied by
variations in the degree of productivity of these
factors.   It will now be endeavoured to determine
in which manner a higher degree of productivity of
certain factors of production was related to the
financial results achieved on farms in the Eastern
Cape during 1950.

PRODUCTIVITY OF CAPITAL: In Table 246 the relationship
between productivity of capital, measured in terms of
the rate of capital turnover, and operators earnings
on the entire farm business, is examined.

It is shown by the analysis that a more rapid

Table 246: Relationship between rate of capital turn-
over and operators earnings on 67 farms in
the Eastern Cape Coastal area during 1950.

Size Groups: Rate of Capital turnover (Yrs)	1.75 & less.	1.76 - 2.50	2.51 - 3.25	3.26 & more.
No. of Cases.	18	15	19	15
Av. Rate of capital turnover (Years)	1.41	2.06	2.81	4.22
Av. Capital per farm £	13019.8	39237.4	17664.4	19606.1
Av. Income per farm £	9259.9	19048.6	6289.0	4647.9
Av. Income per £100 Capital £	71.1	48.5	35.6	23.7
Av. Operators earnings £	4494.4	7541.3	1799.0	986.4

rate of capital turnover was generally accompanied by
a higher financial return per farm than a relatively
slower rate of turnover. Farms with an average rate
of capital turnover of 1.41 years realised on an average
£4494.4 operators earnings as against £986.4 in the
case of farms with an average turnover of 4.22 years.
The regularity of the tendency between these two factors
is impaired by the inclusion, in the second group, of
three large farms on which citrus orchards comprised
a relatively small portion of the total farm area.
The large area not occupied by citrus on these farms,
while contributing towards the total farm capital
did not produce any considerable farm income. The
effect of the relatively large area of unproductive
land was to retard the rate of capital turnover on
these farms.

When the same analysis is applied only to
the citrus enterprise, the above irregularity in the
relationship between rate of capital turnover and
operators earnings does not occur. In the case of
citrus production as shown in Table 247 a decrease

Table 247: Relationship between rate of capital turn-over in citrus production and profit on the citrus enterprise on 67 farms in the Eastern Cape Coastal area during 1950.

Rate of capital turn-over (years)	Size Groups.			
	1.0 & less	1.01-1.5	1.51-2.0	2.01 &more
No. of cases	13	19	22	13
Av. Rate of turnover (Years)	0.86	1.29	1.76	2.60
Av. Total capital £	12339.6	12848.8	11144.7	15977.6
Av. total income £	14384.9	9960.8	6322.7	6142.6
Av. No.of mgn.citrus	22.9	21.7	19.2	26.6
Av. income per £100 capital £	116.6	77.5	56.7	38.4
Av. Capital per mgn.£	539.8	591.5	580.3	601.2
Av. income per mgn. £	629.2	458.6	329.2	231.1
Av. Profit from citrus £	7380.8	4506.5	2721.0	1841.5

in the average rate of capital turnover from 0.86 to 2.60 years was accompanied by a decrease of profit on the citrus enterprise from £7380.8 to £1841.5. It is evident that irrespective of the size of the capital lay-out for citrus production, a higher degree of productivity of capital i.e. a more favourable ratio of income per farm to capital investment, was a character-istic of the farms which realised the most favourable financial results.

PRODUCTIVITY OF LABOUR AND OPERATORS EARNINGS: As shown in Table 248, no relationship could be established from the data, between productivity of labour, measured in terms of income per £1 labour cost, and operators earnings. It would have been expected that an increase in income per £1 cost of labour would have exercised a beneficial influence on the financial result of citrus

Table 248: Relationship between income per £1 cost of labour and operators earnings on 67 farms in the Eastern Cape Coastal area 1950.

Groups: Income per £1 labour (£)	7.0 & less	7.1 - 10.0	10.1 - 13.0	13.1 & more.
No. of Cases.........	19	16	16	16
Av. Income per £1 labour (£)	5.5	8.3	11.0	15.4
Av. cost of labour (£)	2044.5	879.8	590.8	841.5
Av. farm income (£)	11188.1	7313.7	6522.7	12978.7
Av. size of orchards (morgen)	25.5	21.9	16.3	24.0
Citrus Profit per morgen (£)	161.3	117.7	272.2	267.3
Av. Op. earnings per farm (£)	3318.0	2435.0	2556.3	6255.9

farms. The relationship could have been diffused by two factors viz:

(a) That cost of labour was not a true reflection of the quantity of labour employed, particularly on the larger farms where European labour was employed generally at a high cost. The quantity of labour employed on small and large farms respectively, measured in man-days per farm, would not have been in the same proportion as reflected by the relative cost of labour on small and large farms. If an allowance is made for the higher average rate of payment per unit of labour on large farms (owing to the employment of European labour) the total income per man-day of labour on large farms may have been proportionally higher and in a more favourable ratio to the income per man-day on small farms, than would be suggested on the basis of income per £1 cost of labour.

(b) That a decrease in income per £1 cost of labour on the largest group of farms coincided with an increase in operators earnings which was shown to be related to various size factors.

Productivity of labour is an essential requirement in any agricultural undertaking and particularly in citrus production where labour constituted 27.3 percent of the total cost of production. It is most important that the conclusion should not be formed from Table 248 that because some of the

largest growers realised a relatively high operators
earnings in spite of not having the highest income
per £1 cost of labour, the significance of the above
statement is impaired. It is clear, on the contrary
that the importance of achieving the most favourable
ratio of income to cost of labour will be accentuated
by a decline in the price level of citrus fruit.

YIELD OF CITRUS FRUIT PER TREE: Yield of citrus fruit
per tree is discussed under the heading of productivity
factors although it differs from the two preceding
factors in being a primary causal factor influencing
the financial result and not being merely related to
it.

In a preceding section it has been shown that
various means were applied by growers to increase the
financial results of their farming operations. Most
of these means were aimed at procuring a higher yield
per unit of area. In Table 249 the relationship which
was established in the area during 1950, between yield
per tree and operators earnings, is shown.

Table 249: Relationship between yield per tree and the
financial results of 67 citrus farms in the
Eastern Cape Coastal area during 1950.

Yield per tree (Pkts)	Size Groups.			
	5.0 & less	5.1 - 7.0	7.1 - 9.0	9.1 and more.
No. of Cases.	18	22	12	15
Av. Yield per tree (Pkts)	3.9	6.1	8.0	10.4
Av. No. of pockets	12195.4	15950.9	15745.9	50073.9
Av. No. of Bearing trees.	3137.5	2616.4	1957.2	4807.5
Av. Operators earnings per farm £	1471.0	2421.2	2516.1	8870.5
Operators Earnings (d)	28.9	36.4	38.4	42.5

It will be noted that an increase in average yield per tree from 3.9 to 10.4 pockets was accompanied by an increase in operators earnings per farm from £1471.0 to £8870.5. It should be noted that the above relatively large increase in operators earnings which occurred with each successive increase in yield per tree, was effected in spite of the fact that the average number of bearing trees per farm decreased from the first to the third size groups. It will also be noted that the difference in operators earnings per farm between the largest and smallest size groups of yield per tree was proportionally larger than the difference in the average number of bearing trees per farm in the two groups of farms.

SIZE OF ORCHARDS AND YIELD PER TREE COMBINED: In preceding analyses it has been shown that both size of orchards and yield per tree, as independent factors, exercised a strong influence on the financial results achieved on citrus farms in the Eastern Cape area during 1950. In considering the influence of each of these factors on operators earnings, no account was kept with the coinciding influence of the other. It will be remembered that it was shown in Table 198 that an increase in the average size of orchards was accompanied by a significant increase in yield per tree. An increase in either of these factors tended, therefore, to influence the financial result of citrus farming beneficially within the limits prescribed earlier. As high yields may have been obtained on small farms and vice versa, it is evident that any one of these factors would have exercised a neutralising effect on the influence exercised by the other in the analyses of the relationship between each of these two factors and operators earnings. In order to eliminate this neutralising effect, an

analysis is presented in Table 250 of the combined
influence of size of orchards and yield per tree on
the financial result of citrus farming in the area.
In the analysis, farms were grouped, in the first

Table 250: Relationship between size of orchards and
yield per tree combined and operators
earnings on 67 farms in the Eastern Cape
Coastal area - 1950.

Size of Orchards (morgen)	Yield per tree (Pkts)	No.of Cases	Av.size of orchards (morgen)	Av. Yield per tree (Pkts)	Op.earnings per farm £.
11.0 and less	6.5 & less	9	7.6	4.6	738.4
	6.51 & more	12	7.9	8.1	1603.2
11.1 - 19.0	6.5 & less	12	15.0	4.8	1683.1
	6.51& more	10	13.4	9.5	3132.1
19.1 and more	6.5 & less	12	38.0	4.9	3677.0
	6.51& more	12	45.4	9.8	10122.6

instance, according to size of citrus orchards in morgen
while each group was in the second instance sub-divided
on the basis of yield per tree. The advantage of the
analysis in this form is that the influence of increases
in size of orchards on operators earnings could be
determined at approximately constant levels of yield
per tree. Similarly the influence of increases in
yield per tree on operators earnings could be studied
on farms of approximately the same size.

Referring to Table 250, it will be observed
that an increase in yield per tree from an average
of 4.6 to 8.1 pockets on farms with orchards of 11.0
morgen and less in size, was accompanied by an
increase in the average amount of operators earnings
per farm from £738.4 to £1603.2. The same tendency
occurred on farms with orchards between 11.1 - 19.0
morgen in size as well as on farms with orchards of
19.1 morgen and more in size. In the latter group,

the influence of the size factor could not be
eliminated entirely owing to the fact that it was
an open-class group which covered farms varying
extensively in size of orchards. The analysis never-
theless confirms the significance of yield per tree as
an individual profit determining factor in citrus pro-
duction.

The data reveals at the same time that an
increase in the average size of orchards from 7.6 to
15.0 and 38.0 morgen, on farms producing 6.5 and less
pockets per tree, was accompanied by an increase in
the average amount of operators earnings per farm from
£738.4 to £1683.1 and £3677.0. The same relationship
holds true between increasing sizes of orchards and
operators earnings on farms producing yields of 6.51
pockets and more per tree. The significance of size
as a profit determining factor per farm is equally
conclusively demonstrated by the analysis.

The combined influence of the size and yield
factors provided significant results. It will be seen
that small farms with orchards of 7.9 morgen in size
but with the relatively high yield of 8.1 pockets per
tree, realised an average operators earnings of £1603.2 per
farm as against £1683.1 on farms with orchards of 15.0 morgen in size
producing a yield of only 4.8 pockets per tree. In spite of
the larger size of orchards, the latter group of farms
realised approximately the same operators earnings
per farm as the former group owing to a lower yield
per tree.

The combined influence of size of orchards
and yield per tree on operators earnings per farm,
explains not only why farms of varying sizes achieved
approximately the same financial results but also
why operators earnings varied extensively on farms with

the same size of orchards.

It should be stressed, once again, that the beneficial influence of increases in both size and yield on operators earnings, as demonstrated by the analysis, is qualified by the present general level of citrus fruit prices. Under the current circumstances, growers found it paying to exploit the productive capacity of orchards even to the extent where increases in yields were obtained at an increasing rate of cost of production per pocket. At the high level of prices, considerable increases in cost per pocket were still off-set by relatively small increases in yield. With an unfavourable cost-price ratio, however, particularly the larger growers who were in the position to pursue the highest yields at an increasing rate of cost per pocket, run the risk of losing more than smaller growers, who did not operate at diminishing returns per unit of cost incurred. Should prices decline to an uneconomic level, loss per pocket would be multiplied in exactly the same proportion, according to size of orchards and yield per tree as was the case in respect of profit per pocket.

RATIO OF COST OF LABOUR TO TOTAL FARM COST.

In an earlier discussion it was pointed out that although labour was one of the major cost items in citrus production, no relationship could be determined between the productivity of labour cost and operators earnings in citrus production owing to various influences which were mentioned. It has, however, been determined that a definite tendency existed between the ratio of labour cost to total farm expenditure, and the financial result of

citrus farming in the area during 1950.

Table 251:   Relationship between labour as a percentage
of total farm costs (excluding picking,
transport, packing and packing material) and
operators earnings on 67 farms in the
Eastern Cape Coastal area - 1950.

Size Groups: % labour of total cost.	24.0 & less	24.1 - 30.0	30.1- 36.0	36.1 & more.
No. of Cases	20	21	13	13
Av. % labour of total cost	20.9	27.1	33.3	44.1
Av. cost of labour .£.	412.2	1074.0	1227.2	2237.6
Av. total cost of production £	1969.8	3966.6	3687.9	5069.6
Av. income per £1 labour cost £	11.8	10.2	8.9	6.0
Av. Operators Earnings £	1709.2	4101.9	4359.1	5077.3

In Table 251 an analysis is presented of the
relationship between labour as a percentage of total cost
of production only (i.e. excluding costs of picking,
transport and packing) and operators earnings on
citrus farms in the Eastern Cape area.   It is shown
that an increase in the percentage of labour of total
cost of production from 20.9 to 44.1 percent was
accompanied by an increase in operators earnings per
farm from £1709.2 to £5077.3.

It should be noted that in the analysis shown
above, a relatively high percentage of labour of the
total cost of production per farm was a characteristic
of the organisation of the most successful citrus farms
and should not be regarded as the cause of success.
Although it is implied by the analysis, it would be
fallacious to come to the conclusion that an indefinite
increase in the percentage of labour cost would result
in indefinite increases in operators earnings per
farm.   The analysis rather proves the importance of

establishing a proper balance between labour and other
items of cost in citrus farming.   In the case of the
less successful groups of farms the relatively lower
percentage of labour cost may be ascribed either to
an excessive amount of other costs incurred or to an
insufficient supply of labour.

Although not indicated by the data, a stage
would be reached with further increases in the percentage
of labour cost, when the labour employed would be in
excess of the farm requirements (or other expenses
deficient for efficient farming) with a consequent
decrease in efficiency and the profitability of the
undertaking.

It will be noted that an increase in the
percentage of labour cost of the total cost of production
per farm, was accompanied by a decrease in the amount of
income per £1 labour cost.   The fact that operators
earnings per farm increased throughout in spite of this
accompanying tendency implies the possibility of two
factors viz:

(a)   That the labour employed on the first group of farms
      was deficient for efficient operation of the farm
      business.   The relatively low operators earnings
      per farm warrants the conclusion that although the ratio
      of income to cost of labour was high, both factors
      were relatively low.   The ratio only proves that
      of the two factors, cost of labour was proportionally
      the lowest and should therefore be regarded as the
      limiting factor which influenced the financial
      result of the farm business adversely.

(b)   That on the final group of farms in the Table an
      increase in operators earnings was obtained at a
      rapidly diminishing rate of return on labour cost
      incurred.   The relatively high average amount of
      operators earnings per farm proves that with the
      low ratio of income to labour cost, both factors
      must have been high with labour proportionally
      higher.   Although an increase in operators earn-
      ings per farm was still obtained at the relatively
      high ratio of labour to total cost of production,
      it is obvious that further decreases in the
      productivity of labour would narrow the margin
      of profit per farm.   The extent to which the
      percentage of labour of the total cost for citrus
      production could be increased is limited, firstly,
      by the optimum balance between the various factors

of production and, secondly, by the inception of the
Law of Diminishing Returns which is applicable to
every one of these factors.

BALANCE IN THE ORGANISATION OF CITRUS FARMS.

VARIATIONS IN PERCENTAGE OF FARM INCOME OBTAINED FROM THE CITRUS ENTERPRISE:

On an average, the 67 growers who were included
in the sample of farms taken in the Eastern Cape Coastal
area, obtained 92.8 percent of their total farm income
from the citrus enterprise. It was shown earlier that
the size of farms exercised little influence on the
percentage of the total farm income derived from citrus -
the percentage being approximately the same in the case
of small and large farms respectively. In order to
provide a more effective insight into this aspect of
the organisation of farming in the area, a dispersal of
farms according to the percentage of the total farm
income derived from citrus during 1950, is shown in Table
252.

Table 252:   Dispersal of 67 farms in the Eastern Cape
Coastal area according to the percentage
of the total farm income derived from citrus
1950.

Group. % income from citrus	No. of Cases.	% of total.
85.0 and less	12	17.9
85.1 - 90.0	9	13.4
90.1 - 95.0	16	23.9
95.1 - 100	30	44.8
T O T A L	67	100

From the above analysis it may be seen that
68.7 percent of growers obtained more than 90 percent
of their total farm income from citrus while 44.8 percent
obtained more than 95 percent of their total income

from citrus.   Only 17.9 percent of the total number
of growers obtained less than 85 percent of their
total farm income from the citrus enterprise.

Table 253:   Relationship between percentage of total
farm income derived from citrus and operators
earnings on 67 farms in the Eastern Cape
Coastal area - 1950.

Size Groups: % of total farm income derived from citrus	85.0 & less	85.1 - 90.0	90.1 - 95.0	95.1& more.
Number of Cases.	12	9	16	30.
Av. income from citrus £	5756.6	4066.2	9832.2	11074.1
Av. total farm income £	7525.9	4649.7	10561.3	11349.2
Av. % of income from citrus %	76.5	87.5	93.1	97.6
Av. Operators earnings per farm £	1687.8	1862.7	3951.7	4758.3

While the survey was confined to predominantly
citrus growers, it is shown in Table 253 that those
growers who obtained a relatively larger percentage of
their total farm income from citrus, showed a more
favourable financial result on the entire farm business
than those who received a relatively smaller percentage
of their total income from this source.   An increase
in the percentage of the total farm income, contributed
by citrus, from 76.5 to 97.6 percent, was accompanied
by an increase in operators earnings per farm from
£1687.8 to £4758.3.   The conclusion may be formed
that profits on enterprises other than citrus, practised
in the area, were considerably lower than profits on
the citrus enterprise.   It was indeed shown in Table
224 that whereas, on the basis of allocated costs,
the citrus enterprise showed a considerable profit
on costs incurred for citrus production, the income
derived from enterprises other than citrus was insufficient
to cover the balance of the farm costs.

VARIATIONS IN THE RATIO OF FIXED TO FLOATING CAPITAL:

On an average, the total capital investment on the farms surveyed, was comprised of 90.8 percent fixed capital as against 9.2 percent floating capital. The former type of capital includes the value of all immovable capital items such as land and permanent improvements thereto i.e. fruit trees, windbreaks, irrigation and drainage facilities, roads, fencing and farm buildings excluding the homestead of the owner. Floating capital includes the value of movable and less durable items such as equipment and livestock. In several branches of agriculture it has been determined that an optimum balance is required between the two types of capital for the most efficient utilisation of available resources. The optimum balance would of course vary from farm to farm in accordance with local conditions. Generally speaking, though, a lack of sufficient floating capital may hamper efficient farming either in respect of the proper cultivation of land or care of the orchards or in respect of incomplete utilisation of grazing facilities. Farms may, on the other hand, be over-capitalised in respect of floating capital. Excess capacity in equipment and implements would entail incomplete utilisation of these capital items and undue costs would be loaded on the farm business as regards interest and depreciation.

Efficient citrus farming may also be hampered by lack of fixed improvements such as proper farm buildings and the essential orchard improvements. Excessive investments in these capital items, above the normal farm requirements, would, however, serve no beneficial purpose and merely increase total farm costs.

In Table 254 an analysis is presented of the

Table 254: Relationship between percentage fixed capital of total capital investment and operators earnings on the farm business - 67 farms in the Eastern Cape Coastal area - 1950.

	Size Groups.			
% fixed capital	87.5 & less	87.6 - 90.0	90.1 - 92.5	92.6 & more.
Number of cases	14	14	18	21
Av. % fixed capital ..	83.3	89.0	91.5	94.2
Av. % floating cap.	16.7	11.0	8.5	5.8
Av. fixed capital per farm £	13084.3	15229.1	25581.7	21995.6
Av. floating capital per farm £	2617.6	1874.7	2373.9	1344.0
Av. total capital per farm £	15701.9	17103.8	27955.6	23339.6
Av. Operators earnings per farm £	1989.5	2563.9	3979.4	5124.7

relationship between the percentage of fixed capital of the total capital investment in citrus farms, and the financial results achieved on these farms during 1950. It should be noted that 21 of the 67 growers had more than 92.6 percent of their total farm capital invested in the form of fixed capital while 39 of these growers had more than 90 percent of fixed capital invested in their farms. It is furthermore shown that an increase in the percentage of fixed capital of the total capital investment, was accompanied by increasingly favourable financial results in citrus farming during 1950. Operators earnings per farm increased from £1989.5 on farms with only 83.3 percent fixed capital, to £5124.7 on farms with an average of 94.2 percent fixed capital.

Although it cannot be expected that further increases in the percentage of fixed capital would indefinitely be accompanied by increases in the financial results of citrus farms, it is nevertheless

demonstrated by the analysis that the most successful
citrus farms in the Eastern Cape Coastal area were
characterised by a relatively low percentage of floating
capital as against a predominating percentage of fixed
capital of the total capital investment per farm.   It
is shown in the Table that on the least successful farms,
an average amount of £2617.6 floating capital as against
£13084.3 fixed capital was found whereas on the most
successful group of farms, floating capital amounted to
only £1344.0 per farm as against £21995.6 fixed capital.
Although the total capital investment per farm amounted
to £23339.6 on the latter group of farms as against
£15,701.9 on the former group, floating capital on the
latter group amounted to only approximately 50 percent
of the floating capital shown by the least successful
farms.

The significance of the analysis is increased
by the knowledge that the tendency shown between the two
related factors was not impaired by the counter action
of the size factor which did not follow the same trend.
It was determined by separate analysis that the percentage
of fixed capital on farms of 17.8, 38.5, 74.8 and
595.5 morgen in size respectively, amounted to 89.8,
89.2, 91.8 and 91.2 percent respectively.   The relation-
ship demonstrated in Table 254 need without doubt,
not be associated with possible coinciding influences
of the size factor.

CHAPTER X.

ANALYSIS OF THE INFLUENCE OF VARIOUS FACTORS ON THE FINANCIAL RESULTS OF THE CITRUS ENTERPRISE.

In the preceding analyses, it was endeavoured to determine the relative importance of the citrus enterprise in the organisation of farms in the Eastern Cape Coastal area. Various factors were shown to have influenced or to have been related to the financial result of the entire farming organisation in the area during 1950. In spite of citrus occupying a predominating position in the organisation of all t'e farms included in the investigation, the entire farm business was subjected to an analysis to determine some of the most important factors influencing financial results as it would have occurred to growers from a personal accounting point of view.

As the initial objective of the investigation was, however, mainly to determine the cost of production of citrus fruit and secondly, to determine the most important efficiency factors related to higher profits in citrus production, the analysis will now be confined to this enterprise only. Several of the factors which were shown earlier to have exercised an influence on the financial result of the entire farming organisation, must of necessity, in view of the relative importance of citrus on the farms studied, have applied to the citrus enterprise. In most cases the factors examined earlier were related more closely to the financial results of the citrus enterprise than to the results of the entire farming organisation. This aspect of the matter has been expanded upon earlier during the course of the discussions.

SIZE OF ORCHARDS IN MORGEN AND THE FINANCIAL RESULTS OF CITRUS FARMING.

In Table 255 an analysis is presented of the relationship which existed between size of citrus orchards and the financial results of the citrus enterprise on a sample of 67 farms in the Eastern Cape during 1950. It is shown that an increase in the average size of orchards from 6.8 to 55.7 morgen, was accompanied by an increase in the amount of profit on the citrus enterprise from £1330.5 to £10672.7 per farm.   It should be

Table 255: Relationship between size of citrus orchards in morgen and the financial returns of the citrus enterprise on 67 farms in the Eastern Cape Coastal area - 1950.

Size Groups: Size of orchards (morgen)	No.of Cases.	Av.Size of orchards morgen.	Total cost inc.int.	Gross income from citrus	Profit from citrus.
Average returns per farm. (£)					
9.0 and less	15	6.8	1582.2	2912.7	1330.5
9.1 - 18.0	27	13.2	2804.2	4999.8	2195.6
18.1 - 27.0	11	21.8	4354.4	7692.6	3338.2
27.1 and more	14	55.7	13035.2	23707.9	10672.7
Average returns per morgen (£)					
9.0 and less	15	6.8	231.6	426.3	194.7
9.1 - 18.0	27	13.2	212.8	379.3	166.5
18.1 - 27.0	11	21.8	200.0	353.3	153.3
27.1 and more	14	55.7	233.9	425.5	191.6
Average returns per citrus tree (£)					
9.0 and less	15	6.8	1.23	2.27	1.04
9.1 - 18.0	27	13.2	1.19	2.12	0.93
18.1 - 27.0	11	21.8	1.15	2.04	0.89
27.1 and more	14	55.7	1.41	2.57	1.16
Average returns per pocket (d)					
9.0 and less	15	6.8	52.2	96.1	43.9
9.1 - 18.0	27	13.2	53.3	95.1	41.8
18.1 - 27.0	11	21.8	54.0	95.5	41.5
27.1 and more	14	55.7	51.6	93.9	42.3

noted that profit in this instance denotes the favourable
balance between total income from citrus and total costs[i],
including interest on capital, incurred on the citrus
enterprise. With the favourable cost : price ratio
experienced by growers during 1950, large growers secured
a considerable advantage over small growers in respect
of the balance of revenue over costs on the citrus enter-
prise.

By expressing the relationship between size of
orchards and the financial returns of the citrus enter-
prise in terms of various physical units, certain obscured
tendencies are revealed. In the first instance it is
shown that on the smaller farming units i.e. with 27
morgen of orchards and less per farm, an increase in the
average size of orchards from 6.8 to 21.8 morgen
was accompanied by :- a decrease in cost per morgen
from £231.6 to £200.0; a decrease in income per morgen
from £426.3 to £353.3, and a decrease in profit per
morgen from £194.7 to £153.3. It is noteworthy that
a decrease in cost per morgen of £31.6 as shown above,
was accompanied by a decrease in income per morgen of
£73.0 and a decrease in profit per morgen of £41.4.
In view of the relationship, demonstrated earlier,
between cost per tree and yield per tree, it is evident
that to "save" on expenditure proved false economy to
those growers in the second and third size groups.

An interesting feature of citrus farming in
the area, is brought to light by a comparison of the
extremely small and the extremely large groups of farms.
In the first instance both costs, income and profit
per morgen were on approximately the same level although
profits were slightly in favour of the small farms. It

[i]No allowance was made for operators management
in calculating total costs.

was shown earlier that small farms apparently endeavoured
to obtain the maximum income from their undertakings
(in which the area of land was the limiting factor) by
practising a close planting distance and by planting a higher
percentage of the high yielding varieties of citrus trees.
That they succeeded in achieving the desired results on
a per morgen basis, (which is the essential basis for
them) is proved by the analysis. On a tree basis,
however, the results were different. In spite of
having the same level of cost per morgen, large farms
showed a higher cost per tree than small farms owing
to the smaller number of trees planted per morgen on
large farms than on small farms. Cost per tree on small
and large farms amounted to £1.23 and £1.41 respectively.
The influence of a high level of costs on yield is
demonstrated once again in this case. On large farms
the higher cost per tree resulted in a total income
per tree of £2.57 and profit per tree of £1.16 as against
£2.27 and £1.04 respectively on the smallest farms where
a relatively lower cost per tree was incurred.

Although the largest farms benefited in respect
of profit per tree by incurring higher costs per tree
in comparison with the smallest farms, and consequently
added to the advantage they already held in respect of
the larger number of trees per farm, it will be seen that
the smallest farms realised a profit per pocket of 43.9
pence as against 42.3 pence on the largest farms. It
appears as if the largest farms lost the advantage they
enjoyed on a tree basis either owing to a decline in
the relative percentage of first grade fruit produced
or to the fact that they produced a higher percentage of
the relatively lower priced fruit which resulted in
relatively lower returns per pocket. In an earlier
analysis it was indeed shown that the largest farms
produced 21.9 percent of citrus fruit other than oranges

as against only 15.5 percent on the smallest farms.
It has also been determined by separate analysis that
the smallest farms produced 87.3 percent first grade
fruit of the total crop as against 84.8 percent first
grade fruit on the largest farms.   It should be noted
that the increased costs incurred per tree on the largest
farms, in relation to the smallest, was accompanied by
a decrease in cost per pocket from 52.2 to 51.6 pence
which implies, that a favourable ratio was still
maintained between the increase in costs and the increase
in yields resulting from such costs on the largest farms.

The significant differences between the system
of farming practised on small and large orchards, were:

(a)   that approximately equal amounts of costs were
      incurred per morgen of citrus orchards in spite of
      considerable differences in the number of trees
      per morgen.

(b)   Higher costs per tree were consequently incurred on
      large farms than on small farms.

(c)   The relatively lower rate of profit per tree on
      small farms was compensated for by the relatively
      larger number of trees per morgen to such an extent
      that profit per morgen on small farms slightly
      exceeded profit per morgen on large farms.

The relationship between planting distance,
cost per tree and the financial results of citrus
farming will be examined separately in a later analysis.

SIZE OF CITRUS CROP AND FINANCIAL RETURNS OF THE CITRUS ENTERPRISE.

Size of citrus crop differs from the size of
citrus orchards in morgen as a unit of measurement of
the size of the citrus enterprise in as much that it
represents the product of size of orchards and yield
per tree.   Relatively small crops may have been
produced on relatively large farms owing to a low
yield per tree and vice versa.   The analysis given in

Table 256: proves, indeed, that an entirely different relationship existed between size of citrus crop and the financial results of the citrus enterprise than was determined in the previous analysis between size of orchards and financial results. Each of these analyses reflects a different aspect of the farm business and the findings should be interpreted as such and not be confused by the fact that an increase in the average size of orchards was accompanied by an increase in the average size of crops.

Referring to the data in Table 256 it will be seen in the first instance that an increase in the average size of crops from 5306.7 to 48,815.0 pockets per farm was accompanied by an increase in the average amount of profit from the citrus enterprise from £714.2 to £8759.4 per farm.

In interpreting the results of the analysis expressed in terms of various physical units, it should be borne in mind that on an average, the larger crops were produced at considerably higher rates of yield per tree and per morgen than the smaller crops. Crops of an average size of 48,815.0 pockets per farm were produced at a rate of 8.2 pockets per tree and 1176.9 pockets per morgen as against 4.5 pockets per tree and 636.8 pockets per morgen in the case of crops of an average size of 5306.7 pockets per farm. These higher yields were of course responsible for the increase in total costs per morgen and per tree with increasing sizes of crop per farm. It is shown that an increase in the average size of crop per farm from 5306.7 to 48,815.0 pockets was accompanied by an increase in cost per morgen from £161.9 to £246.6 and an increase in cost per tree from £0.90 to £1.48. Higher yields entail increased costs per morgen and per tree in

Table 256 : Relationship between size of citrus crop and financial returns of the citrus enterprise on 67 farms in the Eastern Cape Coastal area 1950.

Size Groups: Size of Crops Pkts.	No. of Cases.	Av. Size of crops (pockets)	Total cost inc. int.	Total income from Citrus	Profit on citrus enterprise
Returns per farm £					
7500 and less	15	5306.7	1348.8	2063.0	714.2
7501 - 12500	19	10042.5	2523.8	4148.8	1625.0
12501 - 17500	11	15105.5	3327.6	6153.1	2825.5
17501 and more	22	48815.0	10229.5	18988.9	8759.4
Returns per morgen £					
7500 and less	15	5306.7	161.9	247.6	85.7
7501 - 12500	19	10042.5	162.2	266.6	104.4
12501 - 17500	11	15105.5	253.0	467.8	214.8
17501 and more	22	48815.0	246.6	457.8	211.2
Returns per citrus tree £					
7500 and less	15	5306.7	0.90	1.37	0.47
7501 - 12500	19	10042.5	0.90	1.47	0.57
12501 - 17500	11	15105.5	1.44	2.66	1.22
17501 and more	22	48815.0	1.48	2.75	1.27
Returns per pocket (d)					
7500 and less	15	5306.7	61.0	93.3	32.3
7501 - 12500	19	10042.5	60.3	99.1	38.8
12501 - 17500	11	15105.5	52.9	97.8	44.9
17501 and more	22	48815.0	50.3	93.4	43.1

respect of picking, transport, packing and packing material and all the various pooled charges. On a pocket basis, however, the same increase in the average size of crop per farm was accompanied by a decrease in total cost from 61.0 to 50.3 pence per pocket. As all the above-mentioned cost items, with the exception of picking, were incurred on a pocket basis, the saving in cost per pocket with increasing sizes of crops may be assumed to have been mainly in respect of cost of production (i.e. prior to picking).

The decrease in cost per pocket should be attributed to the higher rate of yield per tree at which the larger crops were produced.

The increase in profit per morgen from £85.7 to £211.2 which accompanied the increase in average size of crops from 5306.7 to 48,815.0 pockets per farm, reflects the rate at which the margin between total cost and total income widened with increasingly larger crops. The corresponding profit per tree increased from £0.47 to £1.27. With approximately constant returns per pocket of citrus fruit, profit per pocket increased from 32.3 to 43.1 pence with the aforementioned increase in average size of crop per farm. It should be noted that the increase in profit per pocket from the first to the final group of farms, was entirely due to a decrease in cost per pocket. The tendency in the relationship between size of crop and profit per pocket was somewhat disturbed by the fact that the third group of farms realised an average gross income of 97.8 pence per pocket as against 93.4 pence in the case of the final group. As income per pocket cannot be readily associated with size of crops, this disturbing factor should be regarded as purely incidental and no significance should be attached to the decline in profit per pocket from the third to the final groups. The decrease in cost per pocket is significant and should be noted.

YIELD PER TREE AND THE FINANCIAL RESULTS OF THE CITRUS ENTERPRISE.

Yield per tree is of vital importance in citrus production as a profit determining factor. Low yields, both when the result of adverse climatic and biological conditions as well as when due to inefficient cultural care of orchards, are reflected in high costs and low profits per unit of product. High yields, on the

other hand, are, with certain qualifications, generally
conducive to favourable financial results.

It may be seen from Table 257 that an increase
in yield per tree from 3.9 to 10.4 pockets was accompanied
by an increase in profit from the citrus enterprise
per farm from £1700.8 to £9611.7. Although it has
been determined that an increase in the size of citrus

Table 257: Relationship between yield per tree and
the financial results of the citrus enter-
prise on 67 farms in the Eastern Cape
Coastal area - 1950.

Size Groups: Yield per tree Pkts.	No. of Cases.	Av. Yield per tree Pockets.	Total cost inc. int.	Total income from citrus	Profit on the citrus enterprise
Returns per farm (£)					
5.0 and less	18	3.9	3229.4	4930.2	1700.8
5.1 - 7.0	22	6.1	3778.3	6407.7	2629.4
7.1 - 9.0	12	8.0	3204.7	5932.8	2728.1
9.1 and more	15	10.4	10008.7	19620.4	9611.7
Returns per morgen (£)					
5.0 and less	18	3.9	150.8	230.2	79.4
5.1 - 7.0	22	6.1	205.7	348.8	143.1
7.1 - 9.0	12	8.0	233.5	432.3	198.8
9.1 and more	15	10.4	286.8	562.2	275.4
Returns per Bearing tree (£)					
5.0 and less	18	3.9	1.03	1.57	0.54
5.1 - 7.0	22	6.1	1.45	2.45	1.00
7.1 - 9.0	12	8.0	1.64	3.03	1.39
9.1 and more	15	10.4	2.08	4.08	2.00
Returns per pocket (d)					
5.0 and less	18	3.9	63.5	97.0	33.5
5.1 - 7.0	22	6.1	56.8	96.4	39.6
7.1 - 9.0	12	8.0	48.8	90.4	41.6
9.1 and more	15	10.4	47.9	94.0	46.1

Note: The average size of citrus orchards on farms
in each of the above groups in the same order
as shown was 21.4, 18.4, 13.7 and 34.9 morgen
respectively.

undertakings was generally accompanied by increased
yields, the tendency shown in the above Table should
not be attributed primarily to the influence of the
size factor. Both large and small farms may have
produced at either high or low yields. In actual fact
the average size of orchards decreased from the first
to the third group of farms. The relationship between
yield per tree and financial results of the citrus enter-
prise may be studied more effectively and to the partial
exclusion of the influence of the size factor by expressing
the relationship in terms of various physical units.

It is shown that an increase in average yield
per tree from 3.9 to 10.4 pockets was accompanied by
an increase in cost per morgen from £150.8 to £286.8
and in cost per tree from £1.03 to £2.08. Explanations
have been advanced in the preceding discussion for
these increases. A similar increase in yield per tree
was, however, accompanied by a decrease in cost per
pocket from 63.5 to 47.9 pence.

An increase in yield per tree from 3.9 to
10.4 pockets is also shown to have been accompanied
by an increase in profit per morgen from £79.4 to £275.4
and in profit per tree from £0.54 to £2.00. It is
clear that the increasing amount of profit both per
morgen and per tree was obtained as a result of the
rapidly increasing extent to which costs incurred were
off-set by income obtained at each successively higher
level of yield per tree. Profit per pocket increased
from 33.5 to 46.1 pence with an increase in yield from
3.9 to 10.4 pockets mainly as a result of a decrease
in cost per pocket. The variations which did occur in
respect of income per pocket were negligible and should
not be attributed to the influence of yield per tree
but to differences in the average composition of the

crops of each group of growers, by species, variety, grade and size of fruit.

Under current conditions of the price level, the advantages of a high yield per tree were twofold viz: a wider margin of profit per pocket in addition to the higher crop per tree. The combined influence of these two factors are reflected in the more favourable financial result which accompanied increased yields. Caution must be expressed, however, that higher yields could not indefinitely be expected to exercise a beneficial influence on the financial result of citrus farming. As higher yields can, under uniform conditions of soil and climate, only be obtained at increased cost of production, it is evident that a stage must be reached where, according to the Law of Diminishing Returns, the increase in yield obtained would not cover the additional costs incurred to effect the increase. It should also be borne in mind that a decline in the price level of citrus fruit, would lower the average margin of profit per pocket and curtail the extent to which increasing yields may be pursued profitably by intensification of costs. This aspect of the matter will be expanded upon in the discussion of the relationship between costs, yield and profit. In Fig. 19 the relationship between the three factors cost per tree, yield per tree and income per tree is illustrated graphically. The average relationship between yield per tree and total cost per tree (i.e. including cost of production; picking, packing and transport and the various pooled charges applicable to local market fruit) was calculated from the data of 67 farms in the Eastern Cape for 1950 and is represented by the equation:

$$\log y = 1.8975 + .6914 \log X.$$

Total income per tree at the various levels of yield

Fig 19: Relationship between yield per tree, and income, cost and profit per tree on 67 farms in the Eastern Cape Coastal area - 1950.
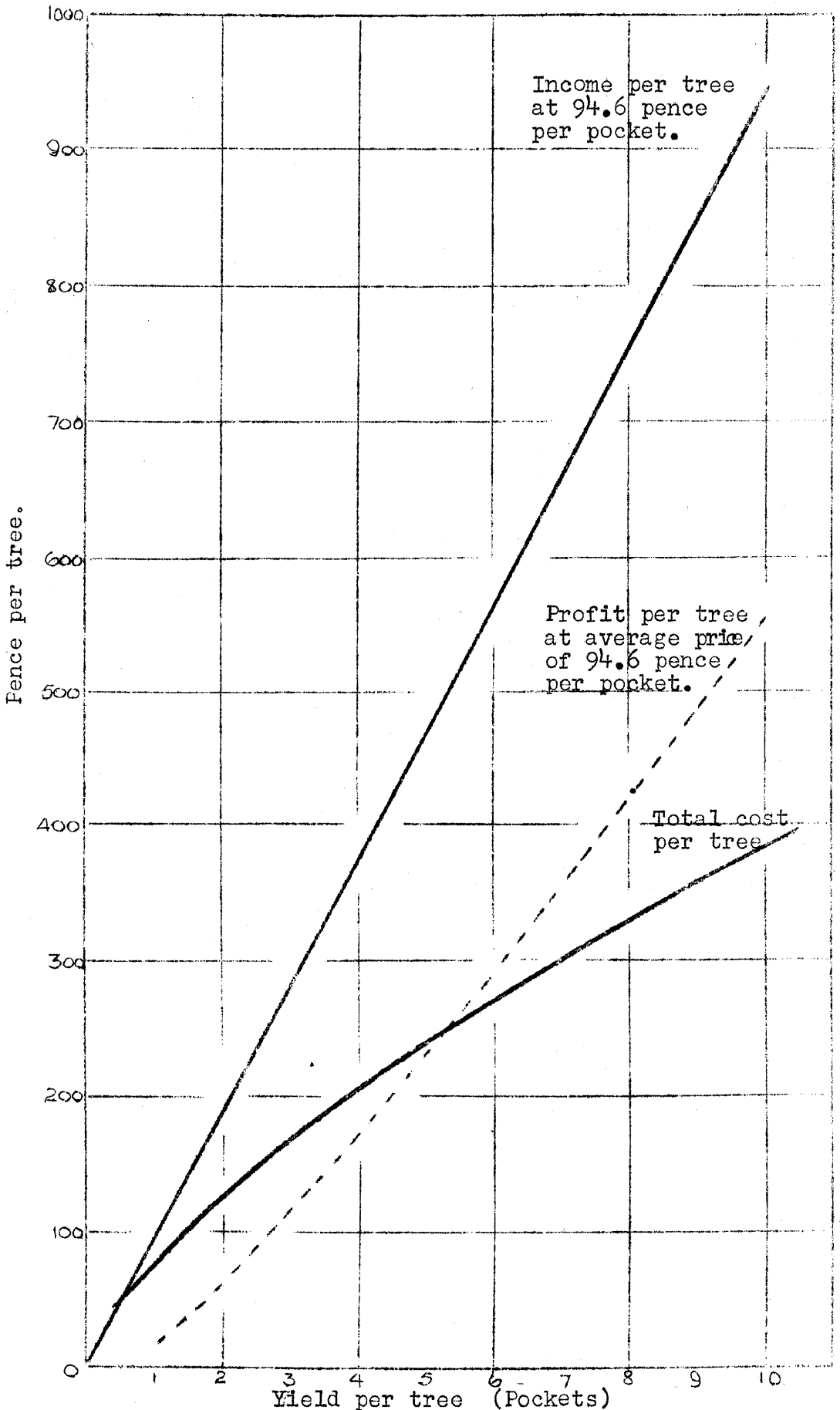
Equation for relationship between yield per tree and total cost per tree: $\log y = 1.8975 + .6914 \log x$.

per tree was calculated on the basis of an average realisation of 94.6 pence per pocket - the actual average for the 67 farms under review. For the sake of clarity it may be stated that this gross realisation per pocket denotes f.o.r. proceeds both in the case of exported fruit and local market fruit.

The profitability of citrus farming under the above conditions of price is demonstrated by the curve representing profit per tree at various levels of yield per tree. It will be noted that on an average, a profit was realised even at the lowest rate of yield per tree shown. It has of course to be borne in mind that cultural costs were low on orchards yielding a low crop per tree. It should also be remembered that the curve represents an average relationship and would not reflect the profitability of crops produced at varying ratios of cost per tree and yield per tree.

COMBINED INFLUENCE OF SIZE OF ORCHARDS AND YIELD PER TREE ON FINANCIAL RESULTS OF THE CITRUS ENTERPRISE.

In Table 258 an analysis is presented of the combined influence of size of citrus orchards and yield per tree on the financial results of citrus farming in the Eastern Cape Coastal area during 1950. The value and necessity of an analysis of this nature have been explained earlier under the discussion of the contents of Table 250 From Table 258 the following significant facts may be observed.

Of orchards of approximately the same size, those who produced a relatively high yield per tree, realised a higher net profit from the citrus enterprise than others who produced a relatively low yield per tree. On orchards of less than 11 morgen in size, for example, an increase in yield per tree from 4.6 to 8.1 pockets was accompanied by an increase in the amount of profit on the citrus enterprise from £777.9 to £1672.2 per farm. The same tendency applied

Table 258: Relationship between size of orchards and yield per tree combined and the financial returns of the citrus enterprise on 67 farms in the Eastern Cape Coastal area – 1950.

Size of Orchards (Morgen)	S i z e G r o u p s.					
	11.0 and less		11.1 - 19.0		19.1 and more.	
Yield per tree (pockets)	6.5 & less	6.51 & more	6.5 & less	6.51 & more	6.5 & less	6.51 & more
Number of cases	9	12	12	10	12	12
Av. Size of orchards(Mgn)	7.6	7.9	15.0	13.4	38.0	45.4
Av. Yield per tree (Pkts)	4.6	8.1	4.8	9.5	4.9	9.8
Av. Yield per morgen(Pkts)	719.0	1157.0	723.2	1337.5	699.1	1328.8
Returns per farm (£)						
Total cost	1349.7	1865.4	2709.1	3611.7	6574.7	12315.2
Income from citrus	2127.6	3537.6	4554.7	6994.8	10730.2	23353.9
Profit on citrus	777.9	1672.2	1845.6	3383.1	4155.5	11,038.7
Returns per morgen (£)						
Total cost	178.6	236.4	180.1	270.1	172.8	271.4
Income from citrus	281.6	448.3	302.8	523.2	282.1	514.7
Profit on citrus	103.0	211.9	122.7	253.1	109.3	243.3
Returns per tree (d)						
Total cost	228.0	333.2	229.3	375.9	240.7	399.4
Income from citrus	359.5	632.0	385.5	728.0	392.9	757.5
Profit on citrus	131.5	298.8	156.2	352.1	152.2	358.1
Returns per pocket (d)						
Total cost	59:6	49:0	59:8	48:5	59:3	49:0
Income from citrus	94:0	93:0	100:5	93:9	96:8	92:9
Profit on citrus	34.4	44.0	40.7	45.4	37.5	43.9

to each of the two other size groups of orchards.

By following a similar approach, it may be seen from the data that if the yield factor is kept constant, an increase in the size of orchards resulted in considerably higher profits from the citrus enterprise per farm. It is shown, for example, that of those farms who produced 6.5 and less pockets per tree, those with an average area of 38.0 morgen of citrus orchards per farm, realised an average amount of profit of £4155.5 on the citrus enterprise per farm as against only £777.9 in the case of growers who owned 7.6 morgen of citrus orchards. The same tendency in the influence of size of orchards on operators earnings is shown in the case of farms with a yield per tree of 6.5 pockets and more.

The value of the above analysis is, of course, that the relationship between any one of the abovementioned two factors and profits on the citrus enterprise, may be studied to the exclusion of or in conjunction with the other. Under normal circumstances high yields are obtained on both small and large orchards. As both high yields and larger orchards exercised a favourable influence on profits per farm, the combined effect of these influences when occurring in opposite directions i.e. high yields on small farms or low yields on large farms, was to neutralise the individual effect of each of these factors on the financial results of a sample of farms. By grouping farms according to both size and yield per tree as in Table 258 the combined influence of these two factors may be studied within various ranges. It may, for instance, be seen that under the current price level of citrus fruit, the largest farms with an average of 45.4 morgen of citrus orchards per farm secured the greatest advantage in respect of profit on the citrus enterprise by producing an average yield of 9.8 pockets per tree. These farms realised an average of £11,038.7 profit on the citrus enterprise as against £777.9 on farms with an average of 7.6 morgen of citrus orchards and a yield of 4.6 pockets per tree. In the former instance both size and yield were extremely favourable and in the latter instance both factors were extremely unfourable from a profit determining point of view.

Several noteworthy features of the combined

influence of size of orchards and yield per tree on the
financial returns of the citrus enterprise, are
revealed by expressing the above analysis in terms
of various physical units of measurement. It may
for instance be seen that an increase in yield per
tree, within each size group of orchards in morgen,
was accompanied by an increase in the amount of profit
on the citrus enterprise per morgen, per tree and per
pocket of citrus fruit. This tendency conforms to
the general tendency determined earlier in the relation-
ship between yield per tree and the financial results
of the citrus enterprise. A significant feature
revealed by the analysis is, however, that expansion
of the area under citrus at yields below as well as above
6.5 pockets per tree, provided the most favourable
results in each case, per morgen, and per pocket, to
growers in the size group 11.1 - 19.0 morgen. With
yield per tree below 6.5 pockets for instance,
expansion of the average size of orchards from 7.6 to
15.0 and 38.0 morgen was accompanied by profit from
citrus per morgen of £103.0, £122.7 and £109.3 respectively.
A similar tendency is shown between increasing sizes of
orchards and profit per morgen and per pocket at yields
above 6.5 pockets. In the case of profit from citrus
per tree, however, an increase in size of orchards
at yields above 6.5 pockets was accompanied throughout
by increasing profits.

It will be noted that although cost per morgen
increased throughout with expansion of the area of
citrus orchards under conditions of relatively high
yields, income from citrus per morgen was higher in the
size group 11.1 - 19.0 morgen than in either the smaller
or the larger group of orchards. It is evident that
the increase in yield per tree which accompanied
expansion of the area under citrus, was not reflected
correspondingly in yield per morgen. Differences in

planting distance may to a large extent be held responsible for this discrepancy. In actual fact an increase in cost per morgen in the final group of orchards, was accompanied by a decrease in yield per morgen and, consequently, income per morgen. The ratio of cost per morgen to yield per morgen explains the tendency in financial returns per pocket with increases in size of orchards under conditions of high yields.

Under low-yield conditions, yield per morgen also declined in spite of an increase in yield per tree with expansion of the area under citrus. Under conditions of low yields, the group of orchards of 11.1 - 19.0 morgen showed both the highest cost and highest income per morgen. The ratio of costs to income was however more favourable than in the preceding and succeeding groups and profit per morgen was consequently established at a higher level in this group.

The fact that profit from citrus per farm was increased considerably under low-yield conditions by expansion of the area of citrus orchards, serves as an indication of the particularly favourable level of prices enjoyed during 1950. Under low-price conditions, crops produced at low yield (or high cost) generally show a loss per pocket. Expansion in area under such conditions would of necessity increase the amount of loss per farm.

COMBINED INFLUENCE OF SIZE OF CROP AND YIELD PER TREE ON THE FINANCIAL RESULTS OF THE CITRUS ENTERPRISE.

In an earlier analysis it was shown that during 1950, the size of the citrus crop produced, exercised a strong influence on the financial result of citrus

farming in the Eastern Cape Area.   As in the case of
the previous analysis, a neutralising influence was
exercised on the relationship between size of crop and
financial results of the enterprise by the fact that
some relatively large crops were produced at a low yield
per tree while some relatively small crops were produced
at a high yield per tree.   In Table 259 an analysis
is presented of the relationship between the combined
influence of size of crop and yield per tree and profit on
citrus.   The relationship determined differs
from the previous analysis in as much that the size factor
in this instance is the product of the size of orchards
and the productivity of trees expressed in terms of yield
per tree.

In the analysis shown in Table 259, farms were,
in the first instance grouped according to total crop
produced per farm.   Each group was subsequently divided
into sub-groups on the basis of yield per tree.   The
level of 6.5 pockets per tree was applied purely
arbitrarily in the sub-division of farms as the most
favourable dispersal of cases in each group could be
effected at this level.

It will be seen from the analysis that in
each size group of total crop per farm, more favourable
financial results were achieved by growers who harvested
a relatively high crop per tree than by growers who
harvested a relatively low crop per tree.   In the size
group of 10,000 pockets and less per farm, growers who
harvested an average crop of 6806.6 pockets per farm
at a yield per tree of 3.9 pockets, realised an average
amount of profit of £901.3 on the citrus enterprise.
Growers who harvested 6632.0 pockets per farm at an
average yield of 7.3 pockets per tree realised an
average amount of profit of £1044.7 from the citrus

Table 259: Relationship between size of citrus crop and yield per tree combined and the financial results of the citrus enterprise on 67 farms in the Eastern Cape - 1950.

	Size Groups.					
Size of Crop (pockets)	10,000 and less		10,001 - 20,000		20,001 - and more	
Yield per tree (pkts)	6.5 & less	6.51 & more	6.5 & less	6.51 & more	6.5 & less	6.51 & more
No. of Cases	17	8	9	13	7	13
Av. Size of Crop	6806.6	6632.0	12547.4	14747.0	38561.0	59012.6
Av. Yield per tree	3.9	7.3	4.9	8.3	5.4	10.1
	Returns per farm (£)					
Total Cost	1853.1	1521.5	3051.6	3158.0	-9226.7	11773.6
Total income from citrus	2754.4	2566.2	5532.5	5783.3	15135.6	22840.9
Profit on citrus	901.3	1044.7	2480.9	-2625.3	5908.9	11067.3
	Returns per morgen. £.					
Total cost	150.4	205.6	172.2	244.8	192.2	280.3
Total income from citrus	223.5	346.8	312.2	448.3	315.3	543.8
Profit on citrus	73.1	141.2	140.0	203.5	123.1	263.5
	Returns per tree (£)					
Total cost	0.79	1.26	0.96	1.44	1.13	1.70
Total income from citrus	1.17	2.13	1.74	2.64	1.86	3.30
Profit on citrus	0.38	0.87	0.78	1.20	0.73	1.60
	Returns per pocket. (d)					
Total cost	65.3	55.1	58.4	51.4	57.4	47.9
Total income from citrus	97.1	92.9	105.8	94.1	94.2	92.9
Profit on citrus	31.8	37.3	47.4	42.7	36.8	45.0

enterprise. The same tendency applied in the two
remaining size groups of total crop per farm. The
analysis proves why growers who harvested the same size
of crops, could have shown financial results of varying
favourability.

By expressing the above relationship in terms
of various physical units, the influence of the size
factor in determining total profit per farm may be eliminated.
It is shown that crops of 10,000 pockets and less,
produced at a yield per tree of 3.9 pockets, yielded a
profit of £73.1 per morgen,£0.38 per tree and 31.8 pence
per pocket. Approximately the same size of crops
produced at a yield of 7.3 pockets per tree, yielded
a profit of £141.2 per morgen, £0.87 per tree and 37.8
pence per pocket. The same tendency is shown to have
existed within each of the two remaining size groups
of orchards. Crops of any particular size, produced
at a high yield per tree, yielded a higher rate of profit
per morgen, per tree and per pocket than other crops
of the same size but which were produced at a low
yield per tree. The influence of high and low yields
within each size group of crops, is reflected in the
variations in cost per pocket which occurred within
these groups. In the case of the group of crops of
20,000 pockets and more, for instance, those crops which
were obtained at an average yield per tree of 10.1
pockets, were produced at an average cost per pocket
of 47.9 pence as against 57.4 pence per pocket in the
case of crops produced at an average yield per tree of
5.4 pockets. The corresponding amounts of profit
per pocket were 45.0 and 36.8 pence.

It may also be seen from the analysis that
an increase in size of crops at constant levels of
yield per tree, was accompanied by an increase
in profit per morgen and per tree.

An increase in the average size of crop from 6806.6
to 12547.4 and 38561.0 pockets at a yield per tree of
6.5 pockets and less, was, for instance, accompanied
by an increase in profit per morgen from £150.4 to
£172.2 and £192.2 and in profit per tree from £0.79
to £0.96 and £1.13. A similar tendency is shown to
have existed in the case of yields above 6.5 pockets
per tree.

The analysis presented in Table 259 indicates
that although large orchards yielding a low crop per tree,
realised a higher profit per farm during 1950 than smaller
orchards with a high yield per tree, size of the crop
should by no means as such be regarded as a guarantee
of financial success under all circumstances. Cost
per unit of product as determined, inter alia, by yield
per tree, would determine profit per unit of product
at any given price level. With a decline in citrus
prices, a stage will be reached where large crops
produced at a low yield per tree would entail considerable
losses per farm whereas both large and smaller crops
produced at a high yield per tree would still realise
profits. Size of the crop should be regarded as the
multiplier of either profit or loss per pocket as
determined by the combination of the factors cost per
unit of area, yield per unit of area and price per
unit of product.

RELATIONSHIP BETWEEN COST PER MORGEN AND THE FINANCIAL RESULTS OF THE CITRUS ENTERPRISE

It has previously been indicated that cost
of production per morgen exercised a strong influence
on yields in citrus production. The financial
implications of this relationship will now be examined.
As all costs incurred with and after picking of the
fruit, are in proportion to the crop already produced,

only cost of production (i.e. costs incurred prior to
picking) which is now known to have exercised an
influence on the actual size of the crop, will be
considered in the analysis.

It may be seen from Table 260 that an increase
in the average cost of production, excluding interest
per morgen from £36.4 to £90.7 was accompanied by an
increase in average yield per tree from 5.1 to 8.9
pockets and in average yield per morgen from 741.1 to
1339.2 pockets. A similar increase in cost per morgen
was accompanied by an increase in profit per farm on the
citrus enterprise from £2145.4 to £6002.4, an increase
in profit per morgen from £128.0 to £235.6 and an
increase in profit per tree from £0.71 to £1.37.
In each case the increase in costs incurred was increasing-
ly compensated for by the higher income received from
the citrus enterprise.

No definite conclusion can be formed as regards
the relationship between cost per morgen and cost per
pocket as various other factors were involved which
should also be considered in the matter. These will
be discussed presently. It is evident, however,
that although no regular tendency is shown between
these two factors, an increase in cost per morgen
was accompanied by a slight increase in total cost per
pocket. It was indeed shown earlier that the number
of pockets per £1 cost decreased with increasing cost
of production per morgen or per tree. Increases in
yield were therefore obtained at a rate of diminishing
returns in relation to the costs incurred. Profit
per pocket as shown in Table 260 does not reflect the
true result of the influence of increased costs per
morgen on yields as variations occurred in the average
income from the citrus enterprise per pocket of citrus
fruit. At a constant level of prices, profit per pocket

Table 260: Relationship between cost of production per morgen (excluding picking, transport, packing and interest) and the financial results of the citrus enterprise on 67 farms in the Eastern Cape Coastal area - 1950.

	Size Groups (£)			
Cost of production per morgen	45.0 & less	45.1 – 57.5	57.6– 70.0	70.1 & more
Number of Cases	16	21	14	16
Av. Cost per morgen ..	36.4	51.2	64.8	90.7
Av. yield per tree ...	5.1	6.4	8.2	8.9
Av. yield per morgen .	741.1	861.3	1136.9	1339.2
Returns per farm (£)				
Total cost	2623.5	4889.4	4744.9	7422.1
Total income from citrus	4768.9	8578.3	8855.3	13424.5
Profit on citrus enterprise	2145.4	3688.9	4110.4	6002.4
Returns per morgen (£)				
Total cost	156.4	193.9	243.8	291.5
Total income from citrus	284.4	340.1	455.0	527.1
Profit on citrus enterprise	128.0	146.2	211.2	235.6
Returns per tree (£)				
Total cost	0.88	1.17	1.39	1.70
Total income from citrus	1.59	2.05	2.59	3.07
Profit on citrus enterprise	0.71	0.88	1.20	1.37
Returns per pocket (d)				
Total cost	50.7	54.0	51.5	52.2
Total income from citrus	92.1	94.8	96.0	94.5
Profit on citrus enterprise	41.4	40.8	44.5	42.3

would have shown a decrease with increasing costs per morgen as a result of the increase in cost per pocket.

The relationship demonstrated in Table 260 is qualified by the ruling price level during 1950. With a declining price level, the margin of profit per pocket will be reduced and it may occur that, owing to the inception of diminishing yields per £1 cost with increasing levels of cost per morgen, the most favourable

financial results per unit of product and per morgen
or per tree would be realised at a lower level of costs
per morgen although accompanied by a lower rate of yield
per tree.   Growers should bear in mind that profit
per unit of product combined with the size of the crop
is the criterion of financial success per farm and
not the latter factor only.   Yield per tree should be
regarded as a means to an end and nôt as an end in itself.
If higher yields can be obtained only at uneconomic
levels of cost, adjustments should be made to re-establish
the optimum ratio between costs and yield.   It must be
admitted that adjustments of this nature are perhaps
as hard to effect as it may be to determine in advance
the necessity for doing so.   It is evident that both
growers who exploited the productive potential of their
orchards during the present period of favourable prices
as well as those who incurred low yields and high costs per
pocket as a result of inefficient cultural care of their
orchards, would be the first to experience the adverse
effects of a decline in prices.

RELATIONSHIP BETWEEN COST PER TREE AND YIELD PER
TREE COMBINED AND THE FINANCIAL RESULTS OF THE
CITRUS ENTERPRISE.

In the previous analysis, cost per morgen
was regarded as an indication of the intensity of costs
incurred in citrus production.   It has been shown earlier
that considerable variations occurred in the number
of trees planted per morgen from farm to farm.   It
may therefore occur that in spite of a high cost
per morgen any particular farm with a large number of
trees per morgen, would show a relatively low cost per
tree.   As costs incurred per tree may be expected to
be more closely related to the productivity of orchards
on a tree basis than cost per morgen (in view of

variations in planting distances) an analysis is
presented in Table 261 of the relationship between cost
per tree and the financial results of the citrus
enterprise. By combining the influence of yield per
tree and cost per tree in this Table, it has been
endeavoured to determine by comparison whether and
to what extent, advantages were obtained by producing
a high yield at a high cost per tree as against a low
yield at a low cost per tree. In this analysis, once
again, only cost of production (i.e. prior to picking)
was applied as the causal factor of increased yields
for the same reasons as stated earlier.

The first obvious fact, demonstrated by the
analysis, is that more favourable financial results
were achieved by growers, within each cost per tree group
at a relatively high yield per tree than at a relatively
low yield. This aspect of the matter need not be
discussed further.

Secondly, it may be pointed out that growers
who operated at a relatively low cost per tree but who
secured a high yield per tree realised more favourable
financial returns per farm than growers who incurred
relatively higher costs per tree but obtained a low
yield per tree. Referring to the data, it may be
seen for instance that growers who produced an average
of 8.7 pockets per tree at a cost of production of only
55.8 pence per tree realised an average of £3164.9 profit
on 12.8 morgen of citrus orchards, as against £2572.9 real-
ised by growers who harvested a yield of only 6 pockets per
tree at a cost of 104.5 pence per tree. The Analysis
proves that a higher level of cost of production is not
always conducive to more favourable financial returns, (as
may wrongly be concluded from the previous analysis).
Unless accompanied by proportionally increased yields, inten-
sification of costs would not produce the desired results.

In the third instance it will be observed that
growers who produced a high yield per tree at a high
cost per tree, realised more favourable financial returns
than growers who produced a low yield per tree at a low
cost per tree.   For example, growers who harvested, on
an average, 9.8 pockets per tree at a cost of 134.1
pence per tree, realised an amount of profit from the
citrus enterprise of £257.9 per morgen, £1.56 per tree
and 43.4 pence per pocket as against only £86.3, £0.44
and 37.6 pence respectively in the case of growers who
produced an average of 3.8 pockets per tree at a cost
of 46.9 pence per tree.   The higher costs incurred
per tree in the case of the former group of growers were
proportionately more productive than the lower costs
incurred in the case of the latter group of growers.

In the final instance it may be seen that at
relatively high rates of yield per tree an increase
in cost per tree was accompanied by an increase in cost
per pocket.   Cost per pocket increased from 43.0 to
46.6 and 50.6 pence when cost of production per tree
increased from 55.8 to 83.6 and 134.1 pence.   The
above increases in cost per pocket were effected in
spite of an accompanying increase in yield per tree
from 8.7 to 10.2 and a slight decrease to 9.8 pockets.
These increases in yield exercised a neutralising influence
on the relationship between cost per tree and cost per
pocket.   The significance of the relationship which was
established is, however, increased if this factor is borne
in mind.   Profit per pocket tended to decrease with
an increase in cost per tree at relatively high rates of
yield per tree.   The tendency in the relationship between
the latter two factors is somewhat disturbed by the fact
that the first group (producing at an average cost
of 55.8 pence per tree) realised only 89.1 pence per

Table 261: **Relationship** between cost per tree (excluding picking, transport, packing and interest) and yield per tree combined and the financial results of the citrus enterprise on 67 farms in the Eastern Cape Coastal area — 1950.

Cost per tree (£)	£0.25 and less		£0.26 – 0.40		£0.41 and more	
Yield per tree (pockets)	7 & less	7.1 & more	7 & less	7.1 & more	7 & less	7.1 & more
No. of Cases	12	6	20	10	8	11
Av. Cost per tree (d)	46.9	55.8	76.4	83.6	104.5	134.1
Av. Yield per tree (Pkts)	3.8	8.7	5.2	10.2	-6.0	9.8
Av. Size of Orchards (Mgn)	18.3	12.8	20.5	29.1	19.9	29.1
Returns per farm (£)						
Total cost	2533.6	2953.8	3723.9	7462.5	4546.1	8749.0
Income from citrus	4116.0	6118.7	6168.4	14988.8	7119.0	16263.5
Profit on citrus	1582.4	3164.9	2444.5	7526.3	2572.9	7514.5
Returns per morgen (£)						
Total cost	138.2	231.1	181.3	256.4	228.7	300.3
Income from citrus	224.5	478.6	300.4	515.0	358.2	558.2
Profit on citrus	86.3	247.5	119.1	258.6	129.5	257.9
Returns per tree (£)						
Total cost	0.70	1.32	1.08	1.56	1.35	1.82
Income from citrus	1.14	2.73	1.79	3.14	2.11	3.38
Profit on citrus	0.44	1.41	0.71	1.58	0.76	1.56
Returns per pocket (d)						
Total cost	60.4	43.0	57.9	46.6	61.9	50.6
Income from citrus	98.0	89.1	95.9	93.6	97.0	94.0
Profit on citrus	37.6	46.1	38.0	47.0	35.1	43.4

pocket as against 93.6 and 94.0 pence in the two remaining groups. Profit per tree followed the same pattern as profit per pocket with increases in cost per tree at a high rate of yield per tree. The only conclusion which could be arrived at is that the average yield in each successive cost per tree group, was obtained at rates of increasing cost or alternatively, that increases in cost per tree were accompanied by a diminishing rate of increase in yield per tree.

Although some growers succeeded in producing a high yield per tree at a relatively low cost per tree and experienced a distinct advantage in respect of cost per tree and per pocket over other growers who produced high yields at relatively high costs per tree, the dispersal of farms in each group shows that the former growers were rather exceptional in their achievement. Not only were the majority of high yields produced at a high cost per tree but also were the average yields in the high cost groups considerably higher than the average yield in the low cost per tree group. The results of the above analysis provide further ground for the caution expressed under the preceding section viz:

(a) That a limit exists to which higher yields may be pursued profitably by intensification of cultural costs.

(b) That a decrease in the margin of profit per unit of fruit, would affect the most highly intensified orchards sooner and more severely in the long run on account of the fact that they already operate at a lower margin of profit per unit of product owing to the incidence of diminishing returns in the cost : yield per tree ratio.

RELATIONSHIP BETWEEN PLANTING DISTANCE AND THE FINANCIAL RETURNS OF THE CITRUS ENTERPRISE.

Which planting distance to adopt in the lay-out of a new orchard is a factor which should be considered

carefully.   The horticulturist would bear in mind
the average size to which trees develop in any particular
area and provide for the required space to ensure proper
cultivation and insect and pest control.   The economist
would consider, in addition to these factors, the most
efficient utilisation of available factors of production.
He should stand critical towards both the practice of
overcrowding of trees on small farms where available
orchard land may be a limiting factor as well as to
unnecessary distant spacing of trees on large farms
where suitable land may be in abundance.   Both extremes
in the planting distance practised may result in either
inefficient cultural operations and/or waste of factors
of production.

In Table 262 the influence of planting distance
on the financial results of the citrus enterprise is
analysed.   In the first instance it is shown that an
increase in the number of trees per morgen, was accompanied
by an increase in yield per tree and per morgen up to
a certain stage after which yield decreased rapidly.
The optimum planting distance in the Eastern Cape Coastal
area appears to have been from approximately 160-180
trees per morgen at which a yield per tree of 9.1 pockets
and per morgen of 1292.9 pockets were obtained. Although
a fairly satisfactory yield per tree of 7.5 pockets
was obtained on the group of farms with 160 and less
trees per morgen, the total yield per morgen was low
on account of the relatively small number of trees per
morgen.   On the group of farms with 195 and more trees
per morgen the relatively low yield per tree of 5.2
pockets was obtained which, even at the large number
of trees per morgen, resulted in the lowest crop per
morgen of the four groups examined.

An increase in the average number of trees per
morgen from 141.8 to 200.4 was accompanied by a decrease

in the average amount of profit from the citrus enterprise
from £5276.0 to £2378.9.   The knowledge that the lowest
and highest number of trees per morgen were related
to the largest and smallest orchards respectively,
creates the possibility that part of the above decrease
in profit per farm might be attributed to the influence
of the size factor.   The relationship between planting
distance and the financial results of the citrus enter-
prise may be demonstrated to the exclusion of the size
factor by expressing these financial results in terms
of various physical units.

In the first instance it is shown that the
highest profit per morgen, per tree and per pocket of
citrus fruit was achieved on the group of farms with
an average planting distance of approximately 160-180
trees per morgen.   Profit per morgen, in this group,
amounted to £247.5, profit per tree to £1.45 and profit
per pocket to 460 pence.   In view of the relatively
higher yields per tree and per morgen, produced in this
group, advantages were derived both from the relatively
most favourable cost per pocket as well as from the
considerably higher income per tree and per morgen in
comparison with the remaining groups of farms.

The group of farms on which a planting distance
of 177-195 trees per morgen,was practised, showed
more favourable financial results per morgen per tree
and per pocket than either the group with 160 and less
or the group with 195 and more trees per morgen.
These margins should, in view of the results of the
above analysis, be observed as a guide to the most
profitable planting distance to be practised.
Difficulties would be experienced in producing a reason-
ably high crop per morgen even at a high yield per tree
with less than 160 trees per.morgen.   By exceeding

195 trees per morgen on the other hand, the risk is
incurred of creating unfavourable conditions in the

Table 262:   Relationship between number of trees per
              morgen and the financial results of the citrus
              enterprise on 67 farms in the Eastern Cape
              Coastal area - 1950.

	S i z e G r o u p s.			
Number trees per mgn.	160.0 & less	160.1– 177.5	177.6– 195.0	195.1 & more.
Number of cases	14	13	17	23
Av. trees per morgen.	141.8	170.8	184.3	200.4
Yield per tree (Pkts)	7.5	9.1	7.7	5.2
Yield per morgen (Pkts)	914.7	1292.9	1176.1	827.9
Av. morgen citrus	35.6	21.3	19.4	16.2
Returns per farm (£)				
Total cost	7261.0	5733.0	4884.5	3070.3
Total citrus income	12537.0	10997.8	8905.4	5449.2
Profit on citrus	5276.0	5264.8	4020.9	2378.9
Returns per morgen (£)				
Total cost	204.0	269.5	251.2	189.6
Total citrus income	352.2	517.0	458.0	336.5
Profit on citrus	148.2	247.5	206.8	146.9
Returns per tree (£)				
Total cost	1.44	1.58	1.36	0.95
Total citrus income	2.48	3.03	2.48	1.68
Profit on citrus	1.04	1.45	1.12	0.73
Returns per pocket (d)				
Total cost	53.5	50.0	51.3	55.0
Total citrus income	92.4	96.0	93.5	97.5
Profit on citrus	38.9	46.0	42.2	42.5

orchard both as regards growth and cultural care.   As
will be shown in Table 263 a tendency existed for growers
not to provide for the increased requirements per morgen
of a larger number of trees per morgen by incurring
higher costs per morgen than in the case of orchards in
which trees were more distantly spaced.   The decrease
in yield shown by the final group of farms in Table 262
may be attributed to one or both of the above factors.

The analysis proves beyond doubt that a definite limit
existed in the extent to which available land could be
exploited. By not providing for the nutritional and other
cultural requirements of overcrowded orchards to the
same extent as in the case of trees spaced at the optimum
planting distance, the opportunity for these orchards
to produce satisfactory returns, was greatly reduced.
This aspect of the matter will be examined in closer
detail in the following analysis.

RELATIONSHIP BETWEEN NUMBER OF TREES PER MORGEN
AND COST PER TREE COMBINED AND THE FINANCIAL
RESULTS OF THE CITRUS ENTERPRISE.

The dispersal of farms shown in Table 263 shows
that high costs per tree were incurred in some orchards
in which a large number of trees was planted per morgen
while low costs were incurred per tree in other orchards
where a small number of trees was planted per morgen.
It is shown, however, that in conformation with the
tendency shown in Table 262, a predominant number of
farms in the groups with a relatively small number of
trees per morgen incurred relatively high costs per tree
and vice versa.

It is difficult to explain why an increase
in the average cost of production per tree from 69.2
pence to 103.3 pence was accompanied by an insignificant
increase in yield per tree and per morgen in the case
of orchards with 170 trees and less per morgen. With
the abovementioned increase in cost per tree, yield
per tree increased from 7.2 to 7.8 pockets and yield per
morgen from 927.1 to 961.5 pockets. The only possible
solution which could be offered seems to be that
exceptionally good crops were obtained in the former
case due to favourable natural conditions in spite
of the relatively low costs incurred per tree. The

effect of this favourable cost: yield ratio in the case
of orchards with 170 trees and less per morgen and
an average cost of production of 69.2 pence per tree is
reflected throughout in a higher profit per morgen, per
tree, and per pocket than in the case of orchards with
the same number of trees per morgen but on which a higher
average cost per tree was incurred.

In the two remaining groups of orchards, viz:
170-190 trees per morgen and 190 and more trees per morgen,
considerably higher profits per morgen and per tree were
obtained from orchards on which a higher cost per tree
was incurred than from orchards on which a relatively
lower cost per tree was incurred. In the case of
orchards with 170-190 trees per morgen for instance, the
group on which an average cost of production of 111.4
pence per tree was incurred, realised a profit on the
citrus enterprise of £261.4 per morgen and £1.47 per tree
as against only £142.8 per morgen and £0.78 per tree in
the case of those orchards on which a cost of only 58.4
pence per tree was incurred.

Several aspects of the group of orchards with
the largest number of trees per morgen are of significance.
Firstly it is evident that the majority of growers in this
group provided insufficiently for the increased requirements
of the larger number of trees per morgen in relation to
orchards with a smaller number of trees per morgen. In
19 of the 27 cases in this group an average cost of
production of only £44.8 per morgen was incurred. The
consequent low cost per tree, in conjunction perhaps with
unfavourable natural conditions created by the close
planting distance, resulted in the lowest yield per tree
and per morgen and the lowest profit per tree and per
morgen of all the groups.

Secondly it may be concluded that the higher
costs per tree incurred by the remaining 8 growers in

Table 263: Relationship between number of trees per morgen and cost per tree combined and the financial returns of the citrus enterprise on 67 farms in the Eastern Cape Coastal area — 1950.

	Size Groups					
No. of trees per morgen	170 and less		170.1 – 190.0		190.1 and more	
Cost per tree	£0.33 & less	£0.34 & more	£0.33 & less	£0.34 & more	£0.33 & less	£0.34 & more
Number of Cases	9	11	6[1]	14	19	8
Av. trees per morgen	143:4	145:4	181:8	178:6	198:9	202:0
Av. Cost per tree (d)	69:2	103:3	58:4	111:4	54:0	99:2
Av. cost per morgen £	41:4	62:6	44:2	82:9	44:8	83:4
Av. yield per tree (pkts)	7:2	7:8	5:6	9:2	5:0	6:5
Av. Yield per morgen (pkts)	927.1	961.5	850.1	1390.8	748.6	1115.8
Returns per farm (£)						
Total cost	2556:0	−8952:9	3285:7	−7908:9	2954:0	2723.0
Total income	5173:5	15213:8	5797:5	14994:4	5245:2	4616:5
Profit	2617.5	6260.9	2511.8	7085.5	2291.2	1893.5
Returns per morgen (£)						
Total cost	183:4	216:4	186:9	291:8	170:3	262:5
Total income	371:3	367:8	329:7	553:2	302:4	445:0
Profit	187.9	151.4	142.8	261.4	132.1	182.5
Returns per tree (£)						
Total cost	1:28	1:49	1:03	1:63	0:86	1:30
Total income	2:59	2:53	1.81	3:10	1:52	2:20
Profit	1:31	1.04	0.78	1.47	0.66	0.90
Returns per pocket (d)						
Total cost	47:5	54:0	52:8	50:3	54:6	56:4
Total income	96:1	91:8	93:1	95:4	97:0	95:7
Profit	48.6	37.8	40:3	45.1	42.4	39.3

[1] Note: Owing to the limited number of cases in this group, the significance of the averages for the group is doubtful.

this group, were either still insufficient to meet the
requirements for high yields or unfavourable natural
conditions in these orchards prohibited higher yields.
Nevertheless with the average yield of 6.5 pockets per
tree and the relatively large number of trees per morgen
in this group a favourable yield per morgen and profit
per morgen was obtained by this group of growers. In
the case of small growers who adopted a close planting
distance as a means of exploiting the limited area of
land at their disposal, profit per morgen was the main
consideration rather than profit per tree or per pocket.
The advantage to be secured by maintaining a high standard
of individual cultural care of trees is illustrated only
too well by comparing the results of densely populated
orchards with above average and with low cost of production
per tree, respectively, on a morgen basis.

     Table 263 may be summarised by stating that
whether total costs are incurred in citrus production on
a morgen basis or specifically on the basis of the
requirements of the individual tree, it is evident that
in order to achieve the most favourable results, an optimum
level exists both as regards the number of trees per morgen,
as well as the cost requirements of the individual tree.
The most consistently favourable results would be achieved
from orchards where the number of trees per unit of area
is in proportion with the natural carrying capacity of
the soil. Neither would undue costs be required to
enforce an exceptionally high yield per tree, which is
required to obtain the potential crop from an area planted
uneconomically distant, nor would production be hampered
by unfavourable natural conditions arising from overcrowd-
ing of trees in the orchards. Even when incurring
higher costs per tree on too densely populated orchards,
it will be found that the extent to which exploitation

of the soil may be undertaken profitably, is limited.

INFLUENCE OF FOUR IMPORTANT FACTORS ON THE FINANCIAL RESULTS OF THE CITRUS ENTERPRISE.

In Table 264 an analysis is presented to demonstrate the relationship between four independent factors, above the average in favourability, and the financial results of the citrus enterprise. These factors are viz:

       Size of orchards in morgen;

       Yield per bearing tree;

       Rate of Capital turnover;

       Price per pocket of citrus fruit;

In the analysis, orchards were arranged according to the number of these factors which occurred above the average in favourability in the organisation and management of the citrus enterprise on different farms. It will be observed that the average amount of profit from the citrus enterprise increased from £922.1 in the group where none of the four factors were above the average to £13,473.1 where all of the four factors were above the average. The significance of the tendency is increased if it is borne in mind that in the groups with 1, 2 and 3 factors above the average, the increasing trend established should be attributed to any one, or combinations of any two or three of these factors. The accumulating influence exercised by increasingly stronger combinations of these four factors provides proof of the significance of each individual factor.

The financial results of the citrus enterprise in the above analysis may be studied more effectively and to the exclusion of the influence of the size factor, on the basis of returns per morgen. Profit on the citrus enterprise increased from £84.3 per morgen in the case

Table 264: Relationship between four factors, above the average in favourability, and the financial results of the citrus enterprise on 67 farms in the Eastern Cape Coastal area — 1950.

	Number of factors above average.				
	0	1	2	3	4
Number of Cases	9	18	19	13	8
Size — No. bearing trees[1]	1296.2	2536.3	3102.3	3078.6	6668.9
Yield per tree (pockets)	5.6	4.9	6.0	7.7	10.4
Rate of Cap. turnover(Yrs)	1.8	2.1	1.8	1.2	1.0
Price per pocket (d)	86.4	91.1	98.0	95.2	94.4
Size orchards (morgen)	10.9	18.7	22.3	19.7	45.4
Financial results of citrus enterprise per farm £					
Total income	2638.8	4737.6	7674.3	9430.4	27222.5
Total cost	1716.7	3144.9	4380.3	4966.0	13749.4
Total Profit	922.1	1592.7	3294.0	4464.4	13473.1
Financial results of citrus enterprise per morgen £					
Total income	241.1	252.9	344.3	479.4	599.9
Total cost	156.8	167.9	196.5	252.5	303.0
Total profit	84.3	85.0	147.8	226.9	296.9
Financial results of citrus enterprise per pocket (d)					
Total income	86.4	91.1	98.0	95.2	94.4
Total cost	56.2	60.5	56.0	50.1	47.7
Total profit	30.2	30.6	42.0	45.1	46.7

[1]Note: As the average number of bearing trees per farm as determined by the survey exceeded the number of bearing trees controlled by the majority of growers, a basis of 2000 bearing trees was assumed for the purpose of this analysis. All orchards with more than 2000 bearing trees were classified as above average in favourability as regards the size factor.

of the group with none of the four factors above the average to £296.9 in the case of the group with all of the factors above the average in favourability. Both cost and income per morgen of citrus orchard increased throughout with an increase in the number of factors above the average in favourability. The ratio of income to cost per morgen became more favourable, however, as reflected in the increase in profit per morgen. Total cost per pocket of citrus fruit decreased with an increase in the number of factors above the average in favourability with a corresponding increase in profit pocket.

It is evident that large orchards with a high yield per tree, a rapid capital turnover and a high average price per pocket of citrus fruit enjoyed a considerable advantage in respect of profit per morgen and per pocket in relation to any other orchards in which all of these factors were not above average in favourability.

COMPARISON OF DETAILS OF MOST SUCCESSFUL AND LEAST SUCCESSFUL CITRUS UNDERTAKINGS ON THE BASIS OF PROFIT FROM THE ENTERPRISE.

In Table 265 a comparison is shown between details of organisation and management of the ten most successful and the ten least successful citrus undertakings in the Eastern Cape during 1950 on the basis of profit from citrus per morgen. The analysis reveals some of the factors which were conducive to high profits when favourable and to low profits when unfavourable. Some of these factors are outlined below:

1. It is evident that size of orchards was only distantly related to the results of the best and poorest farms. The difference in size of orchards of the two groups is not wide enough to establish a close relationship although the poorest results were achieved on smaller orchards than the best results.

2. The best orchards showed a more distant planting distance than the poorest orchards. (176.1 as

against 189.9 trees per morgen).

3.   Little difference occurred in the composition
of orchards on, and of the crop produced and of prices
realised per pocket of fruit by the two groups.

4.   The main difference between the two groups
was in respect of yield per tree.   The best orchards
yielded 11.0 pockets per tree as against only 3.7 pockets
in the case of the poorest orchards.   The former
group produced 1740.1 pockets per morgen as against
495.0 pockets in the case of the latter group.

5.   The best orchards did not show a much more
intensive capital investment per morgen than the poorest
orchards. (£593.3 as against £551.0)   Rate of capital
turnover in the former case was however 0.86 years as
against 2.91 years in the latter case.

6.   Considerable differences occurred in the
average level of costs established on the two groups
of orchards.   Labour amounted to £26.8 per morgen
and total cost of production to £98.5 per morgen on
the best farms as against £15.4 and £75.3 per morgen
on the poorest farms.   In view of the relationship
established earlier between cost per morgen and yield
per morgen, the relatively low level of costs on the
poorest farms may have been one of the causal factors
of the low profitability of citrus production on these
farms.

7.   Income per £1 labour cost amounted to £25.6
on the best farms as against £12.2 on the poorest farms.
Labour constituted 27.2 percent of the total cost of
production on the former farms as against 20.5 percent
on the latter farms.

8.   Cost of production amounted to 13.6 pence
per pocket on the best farms as against 36.5 pence on
the poorest farms.   The possibility has to be considered
that the unfavourable ratio of crop produced to costs

<u>Table 265</u>:　　Comparison between average details of 10 orchards with the most favourable financial results <u>per morgen</u> and 10 orchards with the poorest results in the Eastern Cape - 1950.

Average Details.	10 best orchards	10 poorest orchards.
Size of orchards ....(morgen)	19.7	15.0
Number of trees per morgen	176.1	189.9
Percentage bearing trees ....%	90.1	69.6
% bearing orange trees of total bearing trees ....%	74.8	74.9
% bearing valencia trees of total bearing orange trees ....%	49.4	49.9
Percentage first grade fruit .... %	87.8	84.8
Yield per tree ....(Pockets)	11.0	3.7
Size of crop per morgen ......(pockets)	1740.1	495.0
Citrus capital per morgen .... £	593.3	551.0
Rate of capital turnover ....(Years)	0.86	2.91
Labour cost per morgen .... £	26.8	15.4
Income per £1 labour .... £	25.6	12.2
% labour of total cost of prod. ... %	27.2	20.5
Gross Proceeds per pocket of fruit . (d)	94.7	91.8
Cost of production (incl.int) per mgn. £	98.5	75.3
Cost of production per pocket ..... (d)	13.6	36.5
Financial results of citrus enterprise per morgen.		
Gross proceeds from citrus ... £	687.1	189.3
Total cost .... £	319.3	147.8
Profit on citrus .... £	367.8	41.5
Financial results of citrus enterprise per pocket of fruit.		
Gross proceeds from citrus (d)	94.7	91.8
Total cost .... (d)	44.0	71.7
Profit on citrus .... (d)	50.7	20.1

incurred on the poorest farms, was accentuated by

crop failures caused by climatic or other disturbances.

9.　　　Profit per morgen on the ten best farms amounted

to £367.8 as against £41.5 on the ten poorest farms.

The corresponding profit per pocket was 50.7 and 20.1 pence respectively.

INFLUENCE OF VARIETY, QUALITY AND PRICE FACTORS ON FINANCIAL RESULTS OF THE CITRUS ENTERPRISE.

As the absence of analyses to demonstrate the influence of variety, quality and price of fruit on the financial results of the citrus enterprise may leave the impression that all the significant factors which affected the profitability of citrus farming, were not examined, it must be stated that these factors were indeed considered. It was found however that the occurrence of each of these factors co-incided with a multiplicity of other causal factors which tended to counter-act any influence which might have been exercised by the above three factors individually. No relationship could be established between these factors and the profitability of the citrus enterprise in spite of endeavours to eliminate the influence of other factors.

CHAPTER XI.

S U M M A R Y   A N D   C O N C L U S I O N S.

GENERAL SUMMARY.

1.   The Citrus Industry in the Union of South
Africa initiated its development as a major agricultural
enterprise only after the end of World War I(1918) when
improved shipping facilities created an outlet for
South African Citrus fruit on Overseas Markets.   In
its present stage of development the Industry is
equipped for export to such an extent that any serious
disturbance in either export facilities or overseas
prices would entail disastrous results.

2.   Citrus production in the Union is confined to
seven limited localities, three of which occur in the
Transvaal, three in the Cape Province and one of which
occurs in Natal.   The scattered and diverging character
of the areas and vast distances separating most of them
either from the local centres of sale or from the ports
of export created severe problems in the establishment
of a central co-operative co-ordinating body.   The
South African Co-operative Citrus Exchange, handling
over 85 percent of the Citrus fruit crop produced in
the Union, is a proud example of the achievement of
farmers in whom the need for co-operative effort over-
ruled self-interest.

3.   An economic survey of the Citrus Industry,
executed by the Department of Agriculture during 1938,
confirmed the claim of growers at the time that the
Industry was labouring under an uneconomic price-level
on the local market.   The Industry received a serious
set-back during the war years 1939-1946 when exports
were restricted by unavailability of shipping and citrus

fruit was disposed of at a dumping price-level on the
local market.   Although extremely favourable export
prices were obtained for citrus fruit when normal ex-
ports were resumed after the war, controlled local
market prices remained at an uneconomic level.

4.   The object of the investigation under review
was, primarily, to determine the ratio of costs to
price per pocket of citrus fruit sold on the local
market and secondarily to determine the financial returns
realised by the average citrus grower in the Union during
the immediate post-war years.   Various aspects of the
organisation and management of citrus farms which, of
necessity, influence financial returns, were analysed
and are summarised below.

5.   According to Table 9, 53.9 percent of the
growers interviewed during 1950, conducted farming
operations on a total area of land of less than 100
morgen.   This fact is significant in view of the
average size of all farms covered by the survey viz:
371.5 morgen.   According to Table 10, 51.7 percent
of growers cultivated less than 30 morgen of land com-
pared with the average for all growers of 48.2 morgen.
According to Table 11, 58.4 percent of growers controlled
less than 20 morgen of citrus orchards compared with 24.5
morgen for all the growers surveyed.

6.   During 1950 the value of land comprised 77.3
percent of the total farm capital, improvements 13.8
percent and all other capital items combined, 8.9
percent. (Table 12) The value of citrus orchards
constituted 61.3 percent of the total land value per
farm for all the areas combined. (Table 14)   Managers
and foreman's houses, stores and sheds for supplies and
implements, and irrigation facilities constituted 22.0,
19.4 and 22.1 percent respectively of the total
capital investment in fixed improvements for all the

areas combined. (Table 16)   Lorries (26.9%), tractors
(43.8%) and miscellaneous engines for irrigation purposes
(14.1%) constituted the main individual items of
mechanical power equipment for the seven citrus areas
combined.   (Table 17)

7.   The survey revealed an extremely favourable
position on citrus farms as regards mortgage debt.
Bonds as a percentage of fixed capital per farm varied
between 1.2 percent in the Western Transvaal and 19.2
percent in the North Eastern Cape with an average for
all areas of 6.9 percent. (Table 19).   During 1950
58.0 percent of all the growers surveyed had no bonds
on their farms whereas only 1.7 percent held bonds which
exceeded 60 percent of the total fixed capital per farm.
(Table 21)

8.   During 1950 the average percentage of the total
farm income derived from citrus, varied between 83.7
percent in the Eastern Transvaal and 93.6 percent
in the Western Transvaal with an average for all the
areas of 89.9 percent. (Table 25)   During the same
year the average operators earnings per farm varied
between £394.3 in the North Eastern Cape and £5960.9
in the Northern Transvaal with an average per farm for
all the areas of £3615.9.   (Table 26)   As 54.5
percent of all the growers surveyed,realised less than
£2500., it is evident that the indicated average for all
the growers combined was considerably in excess of the
financial results achieved by the majority of growers.
(Table 27)

9.   At a rate of operators remuneration of 1/3
per pocket, the average amount of operators remuneration
per grower during 1950 was £1500 while the average
return on capital was 13.7 percent. (Table 28)

10.   The average composition of the total capital

investment for citrus production consisted of 80.5 percent land, 12.8 percent fixed improvements, 2.2 percent general equipment, 4.3 percent mechanical power equipment and 0.2 percent draught animals. The average investment for citrus production per farm amounted to £14800.1 for all the areas combined (Table 32). The average value of citrus orchards for all the areas combined over the period 1948-1950 amounted to £476.2 per morgen or £2.7 per citrus tree. (Table 37) The corresponding average total capital investment for citrus production amounted to £593.0 per morgen and £3.39 per citrus tree. (Table 46) The average composition of the total investment for citrus production consisted of 93.3 percent fixed capital and 6.7 percent floating capital. Fixed capital for citrus production amounted, on an average, to £553.4 per morgen and £3.16 per tree whereas floating capital amounted to £39.6 per morgen and £0.23 per tree. (Table 51)

11. On the basis of the sample, orange trees constituted 88.1 percent of the total number of citrus trees on citrus farms in the Union, grapefruit trees 8.2 percent, lemon trees 2.8 percent, naartjie trees 0.7 percent and seville trees 0.2 percent. The average number of trees per farm for all the areas combined, was 4364.2. (Table 55) If it is taken into consideration, however, that 51.6 percent of the growers surveyed during 1950 had less than 3000 trees, it is evident that the calculated average was considerbly in excess of the number of trees of the majority of growers. (Table 56) During the immediate post-war years, new citrus plantings consisted practically entirely of orange trees. Of all the young trees planted during the period 1948-1950, orange trees comprised 96.9 percent. (Table 60). During the same period bearing citrus orchards consisted of 86.7 percent

orange trees, 9.5 percent grapefruit trees, 2.9 percent
lemon trees, 0.7 percent naartjie trees and 0.2 percent
seville trees (Table 64). During the period 1948 - 1950 new
plantings of citrus trees were effected at the rate of 182.8
trees per farm per year. During this period citrus trees
under 1 year comprised 4.2 percent of the total number of
citrus trees per farm as against 83.7 percent bearing citrus
trees (Table 68). As regards the representative nature of
the average size of orchards as determined by the investi-
gation, it may be seen from Table 134 that 64.4 percent of
all the growers surveyed during the three years, owned less
bearing trees than the average of 3652 per farm. It is
also shown that the above percentage of farms only contri-
buted 33.2 percent towards the total number of bearing trees
owned by all the growers covered by the three surveys.

12.   A marked tendency of preference in favour of
Valencias is revealed by the analysis of young orange
orchards. During the period 1948 - 1950, 124.8 young
Valencia trees were planted annually per farm in all the
areas combined as against only 46.7 young Navel trees and
5.7 young Midseason trees. (Table 72) This recent tendency
in favour of Valencias is further demonstrated by the fact
that whereas bearing Navel trees comprised 88.6 percent of
the total number of Navel trees, bearing Valencia trees
only constituted 76.7 percent of the total number of
Valencia trees. (Table 76). It is also shown that of the
total number of young orange trees planted during the period
1948 - 1950, Navels constituted 26.4 percent, midseasons
3.2 percent and Valencias 70.4 percent. (Table 80). It
will be noted that whereas Navels and Valencias comprised
46.0 and 48.8 percent respectively of the existing number
of bearing trees during the period under review, the
proportions of Navels and Valencias of the total number
of orange trees were 42.8 and 52.6 percent respectively.

13.   The average number of trees planted per morgen
varied between 146.1 in Natal and 224.2 in the Western
Province with an average for all the areas combined of
174.9 (Table 89).

14.   The calculated average production of citrus fruit per
farm during the period 1948 - 1950 was 23,442.7 pockets.

(Table 93)   It is evident, from the analysis shown in Table
130, that the calculated average size of crop per farm was
considerably in excess of the crops of the majority of
growers covered by the survey.   Of the total number of
growers included in the sample during the three surveys,
63.2 percent harvested annual crops of less than 20,000
pockets.

15.   The average composition of the citrus crop
produced during the three-year period, consisted of 84.5
percent oranges, 11.8 percent grapefruit, 3.1 percent lemons,
0.5 percent naartjies and 0.1 percent sevilles. (Table 97)
During the same period the crop produced was composed of
77.8 percent first grade, 20.5 percent second grade and 1.7
percent "other grades" fruit.   The Western Transvaal and
Eastern Cape Coastal area maintained the relatively highest
percentage of first grade fruit of all the areas throughout
the three-year period.   The Northern and Eastern Transvaal
areas showed the poorest crop analysis in this respect.
(Table 101).

16.   Although Navel and valencia trees comprised
46.0 and 48.8 percent respectively of the total number of
bearing orange trees on farms during the period 1948 - 1950,
Navel oranges and Valencia oranges constituted 35.2 and 59.2
percent respectively of the total orange crop produced on
the same farms during the same period. (Table 113).   The
differences in yield per tree between these two varieties
were as follows:

17.   During the above period the average yield per
tree of navels on all the farms covered by the survey was
only 4.79 pockets as against 7.57 pockets in the case of
Valencias.   The average yield per tree for all oranges com-
bined was 6.25 pockets.(Table 125).   The Northern Transvaal
area realised the highest average yield per tree for both
navels and valencias.   Of the six areas which enjoyed normal
conditions during the period under review, (i.e. excluding
the North Eastern Cape) the Western Province showed the lowest
crop returns per bearing tree.   The three-year average in
respect of yield per tree for grapefruit was 7.96 pockets,
lemons 6.78 pockets, naartjies 4.97 pockets and sevilles
3.56 pockets.   The average yield per tree for all citrus

fruit was 6.75 pockets during 1948, 5.62 pockets during
1949, 6.86 pockets during 1950 and 6.42 pockets during the
three years combined. (Table 129). The reliability of the
average is borne out by the analysis shown in Table 131.
Of the total number of farms covered by the three surveys
47.6 percent harvested yields of 6 pockets and less while
52.4 percent harvested yields of 6 pockets and more per tree.

18.   Of the total number of farms included in the
three surveys, 68.5 percent produced crops which were smaller
than the average size of crop per farm as determined by the
investigation (23,443 pockets). The total crop produced by
the above farms comprised only 32.4 percent of the entire
crop produced by all the growers included in the investiga-
tions over the period 1948 - 1950. The remaining 31.5 per-
cent of growers who produced crops above the average size,
were responsible for 67.6 percent of the total crop of all
the growers surveyed. (Table 132)

19.   A similar analysis revealed that whereas 52.9
percent of growers harvested a yield per tree below
the average for all the growers combined (6.42 pockets)
these growers produced only 34.1 percent of the total
crop of all the growers included in the three surveys.
The remaining 47.1 percent of growers who harvested a
yield per tree above the average, produced 65.9 percent
of the total crop of all the growers surveyed. (Table 133)

20.   Interest on capital constituted 31.1 percent
of the average total cost of citrus production per farm
for all the areas combined over the period 1948 - 1950,
labour 27.3 percent, cash expenses (as defined) 20.8
percent and running cost of mechanical power equipment
5.7 percent. (Table 142). The average total cost of citrus
production per morgen as determined by the three surveys,
varied between £78.50 in the Western Province and
£129.79 in the Western Transvaal with an average for
all the areas combined of £95.38. (Table 153).   The
corresponding cost per citrus tree varied between 84.0

pence in the Western Province and 180.1 pence in the
Western Transvaal with an average cost per tree for
all the areas combined of 130.9 pence. (Table 165)

21.   The average cost of production including interest
per pocket of citrus fruit produced during the period
covered by the investigation amounted to 23.111 pence
during 1948, 27.065 pence during 1949, 23.437 pence
during 1950 and 24.371 pence for the three years combined.
The average cost of production of the individual areas
varied, during the latter period, between 21.920 pence
per pocket in the Northern Transvaal and 31.117 pence
in the North Eastern Cape (Table 173)

22.   It was shown in Table 180 that 55.3 percent of
the crop covered by the survey of farms during the period
1948-1950 was produced at a cost of production excluding
interest per pocket of below the weighted average for
all the areas combined.   Only 45.6 percent of the growers
concerned in the survey, however, produced their crops
at a cost below the above weighted average.   It is
evident, therefore, that although a relatively small
number of growers enjoyed an advantage in respect of
cost of production, this advantage applied to a relatively
large percentage of the crop.   Particularly favourable
levels of cost of production were established, in relation
to the average for all the areas, in the Eastern Cape,
Natal, Northern and Eastern Transvaal areas where more than
50 percent of the crop was produced at below average cost.

23.   Farms and estates conducted citrus farming
at approximately equal levels in respect of capital
investment for citrus production per morgen viz: £593.0
as against £596.3 (Table 183)   Although the estates
operated at an average cost of production of £111.9
as against only £95.4 per morgen in the case of smaller
growers, various differences in the organisation of the

orchards of the two types of producers tended to
equalise the level of costs on a "per pocket" basis.
Cost of production including interest per pocket
amounted on an average to 24.5 pence per pocket for
estates and 24.4 pence per pocket for smaller growers.
(Table 185).

24.   Weighted according to the actual number of morgen,
citrus trees and bearing trees occurring on farms and
estates respectively as well as the actual number of
pockets of citrus fruit produced by these two types of
growers, the average cost of production of all citrus
growers in the Union during the period 1948-1950 was
calculated to have been: £101.6 per morgen, 135.6 pence
per citrus tree, 154.7 pence per bearing tree and 24.730
pence per pocket.   The above costs included interest on
capital for citrus production at the rate of 5%. (Tables
188 and 189)

25.   The total cost of producing for and marketing
citrus fruit on the South African local market amounted
to 47.906 pence per pocket during 1948, 49.944 pence
during 1949, 51.257 pence during 1950 and 49.654 pence
per pocket during the three years combined. (Table 190)

26.   The average gross price realised per pocket
of citrus fruit sold on the South African local market
amounted to 41.203 pence during 1948, 44.327 pence during
1949, and 52.391 pence during 1950 with an average for
the three-year period of 46.313 pence per pocket.
(Table 192)

27.   The nett resultant of the average cost : price
ratio during this period was a loss of 6.703 pence per
pocket during 1948, a loss of 5.617 pence per pocket
during 1949, a profit of 1.134 pence per pocket during
1950 and a loss per pocket of 3.341 pence per pocket
over the three-year period.   (Table 192)

28.   The average profit on the citrus enterprise
per farm varied, during 1950, between £1192.4 in the
North Eastern Cape and £6470.8 in the Northern Transvaal
with an average for all the areas combined of £3820.5
per farm (Table 193).   The average profit per bearing
tree during this year varied between £0.3 in the North
Eastern Cape and £2.4 in the Western Transvaal with an
average for all the areas combined of £1.1 per bearing
tree.   The average profit per farm was in excess of
the profits realised by a majority of growers.   Only
31.8 percent of growers realised a profit on the
citrus enterprise of £4000 and more. (Table 194)

Concerning the Eastern Cape Coastal area:

29.   Smaller growers differed from larger growers
in the organisation of their orchards in as much that:

(a)   they showed a tendency to prefer valencia orange
      trees to navel trees; (Table 195)

(b)   they showed a tendency to concentrate on orange
      trees in preference to other species of citrus trees;
      (Table 196)

(c)   they showed a tendency to plant more trees per
      morgen than larger farms; (Table 199)

(d)   they showed a higher percentage of bearing trees
      than larger farms; (Table 200)

(e)   they showed a higher percentage of the total capital
      investment for citrus production in land and
      equipment but a lower percentage in fixed improvements
      than larger farms; (Table 201)

(f)   they showed a lower total capital investment for
      citrus production per citrus tree than larger
      farms; (Table 202)

(g)   they showed a relatively high cost of production per
      morgen and were more or less on the same level as
      the largest group of farms; (Table 203)

30.   Smaller farms harvested a lower yield per tree
for each variety of oranges and each species of citrus
fruit than larger farms (Tables 197 and 198).

31.   A considerably lower capital investment was
established per citrus tree on farms where a close
planting distance was practised than on farms where
a distant planting distance was practised.(Table 206)

32.   An increase in the size of citrus orchards in
the case of distantly spaced trees (i.e. less than 185
trees per morgen) was accompanied by an increase in cost
of production per morgen.   In the case of closely
spaced trees (i.e. more than 185 trees per morgen) however,
lower costs were incurred per morgen by large growers than
by small growers.   Furthermore, lower costs were incurred
per morgen on closely spaced trees than on distantly
spaced trees particularly on the larger farms.   In the
case of the smaller farms, these costs were approximately
the same.   (Table 207)

33.   An increase in cost of production per tree was
accompanied by an increase in yield per tree (Table 208).
An increase in cost per morgen on large orchards was
accompanied by a more pronounced influence on yield
per tree than in the case of a similar increase in
costs on small orchards. (Table 210)

34.   Increases in the levels of the component cost
items labour, and manure and fertilizers, were accompanied
by increases in yield per tree.(Tables 211 and 212).

35.   An increase in yield per tree was not accompanied
by any particular influence on the quality of fruit
produced.(Table 213).

36.   Distantly spaced trees produced a higher
yield per tree in the case of large orchards than in the
case of small orchards.   Closely spaced trees
produced a lower yield per tree in large orchards than

in small orchards. (Table 214) This tendency coincides
with the relationship demonstrated in Table 207.

37.   A high percentage of bearing valencia trees
of the total number of bearing orange trees was conducive
to a high over-all average yield per tree. (Table 215).

38.   An increase in yield per tree was accompanied
by a decrease in cost per pocket. (Table 216).

39.   An increase in cost per tree was accompanied
by an increase in cost per pocket on account of a decrease
in the number of pockets produced per £1 cost. (Table 217).

40.   An increase in yield per tree at constant levels
of cost per tree was accompanied by a decrease in cost
per pocket. An increase in cost per tree at constant
levels of yield per tree was accompanied by an increase
in cost per pocket. A lower cost per pocket was
established at a high cost and a high yield per tree
than at a low cost and a low yield per tree. (Table 218)

41.   An increase in the size of citrus crops was
accompanied by a decrease in cost of production per pocket.
(Table 219)

42.   An increase in the size of orchards at a low
yield per tree was accompanied by an increase in cost
of production per pocket. An increase in the size of
orchards at yields per tree of above 5.6 pockets was,
however, accompanied by a decrease in cost of production
per pocket. (Table 220)

43.   The percentage of the total farm income derived
from citrus remained approximately constant with an
increase in the size of the total farm area. (Table 223)

44.   Whereas an approximately constant rate of profit
was shown in the ratio between costs and income appertain-
ing to the citrus enterprise with increases in the size
of the total farm area, an approximately constant rate
of loss was shown on other enterprises with the same
increases in size of farms. (Table 224)

45.   An increase in the percentage of first grade
fruit produced (i.e. in the quality of fruit) was
accompanied by an increase in the average price realised
per pocket of citrus fruit sold.(Table 228)   Similarly
an increase in the percentage oranges of the total citrus
fruit crop, was accompanied by an increase in the average
price per pocket. (Table 229)

46.   The average financial results of the citrus
enterprise on an allocated basis exceeded the financial
results of the entire farming organisation in favourability.
Losses incurred on enterprises other than citrus were
consequently a drain on the profits obtained from citrus.
(Table 230)

47.   The following size factors were positively
related to the financial results (Operators earnings)
realised on the entire farming organisation:

(a) Total farm area; (table 233)

(b) Size of orchards in morgen; (Table 234)

(c) Number of citrus trees ;   (Table 235)

(d) Number of bearing trees;   (Table 236)

(e) Size of citrus crop;   (Table 237)

(f) Total capital investment; (Table 238)

(g) Total farm income,   (Table 239)

(h) Total farm expenditure;   (Table 240)

(i) Total cost of labour;   (Table 241)

48.   An increase in the size of the total farm
income was accompanied by increased productivity of
capital and of total expenditure.   An increase in
the size of total farm income was, however, only
accompanied by an increase in the productivity of labour
up to a certain stage.   A decline in the productivity
of labour was shown in the case of the group of farms
with the highest incomes.(Table 242)

49.   An increase in total expenditure per farm

was accompanied by an increase in productivity of
expenditure only up to a certain stage.   In the case
of the group of farms with the highest expenditure per
farm a decline in the productivity of expenditure
was shown.(Table 243)

50.   An increase in the size of capital investment
per farm was accompanied throughout by a decrease in
the productivity of capital. (Table 244)

51.   An increase in the total cost of labour per
farm was accompanied by a sharp decrease in the productivity
of labour. (Table 245)

52.   A decrease in the productivity of capital was
accompanied by a sharp decrease in operators earnings
i.e. in the profitability of the farming organisation and
particularly of the citrus enterprise.(Tables 246 and 247)

53.   An increase in yield per tree was accompanied
by an increase in operators earnings per farm. (Table 249)
The effect of favourable yields on operators earnings was
more pronounced when accompanied by a relatively large
farm area. Small growers who had a high yield per tree
compared favourably with large growers who harvested
low yields. (Table 250)

54.   A high percentage labour of the total farm
expenditure was a characteristic of the organisation
of the farms on which the most favourable financial
results were achieved. (Table 251)

55.   A further characteristic of the latter group
of farms was a relatively high percentage of the total
farm income obtained from citrus. (Table 253)

56.   The most successful farms were also characterised
by a relatively high percentage of fixed capital of the
total farm capital.(Table 254)

57.   An increase in the size of citrus orchards
was accompanied by a decrease in profit per morgen up
to a certain stage. Particularly large orchards, however,

showed approximately the same level of profit per morgen as the smallest orchards. The largest group of orchards showed the highest profit per tree owing to a smaller number of trees per morgen. (Table 255)

58. An increase in the size of citrus crop per farm was accompanied by an increase in profit per morgen and per tree. The tendency was attributed to the higher average rate of yield per tree at which larger crops were produced in relation to smaller crops. (Table 256)

59. An increase in yield per tree was accompanied by an increase in profit per morgen and per tree. (Table 257)

60. The most favourable profit per morgen was realised on orchards of 11.1 - 19.0 morgen in size both in the case of an average yield per tree of 6.5 pockets and less as well as in the case of yields of 6.5 pockets and more. Growers controlling orchards of 11.0 morgen and less and 19.1 morgen and more incurred the disadvantage of a lower yield per morgen in both the mentioned yield per tree groups than growers in the size group 11.1 - 19.0 morgen. (Table 258)

61. An increase in size of crop at constant levels of yield per tree was accompanied by an increase in profit per morgen. Similarly an increase in yield per tree at constant sizes of crops, was accompanied by an increase in profit per morgen. (Table 259)

62. An increase in cost per morgen was generally accompanied by an increase in profit per morgen. (Table 260) Crops produced at both a high cost per tree as well as a high yield per tree showed higher profits per morgen than crops produced at low cost and a low yield per tree. The beneficial influence of increases in cost per tree on profit per morgen is qualified by an increasing rate of yield per tree. If an increase in cost per tree is not accompanied by an increase in yield per

tree, more favourable financial results cannot be expected. (Table 261)

63.   The highest amount of profit per morgen was obtained from trees planted at the rate of 160.1 - 177.5 per morgen. A clear distinction was demonstrated between profit per morgen from trees planted at the above distance and at a rate of less than 160 or more than 195 per morgen. Both too distant and too close spacing of trees was obviously detrimental to the profitability of citrus production.(Table 262)

64.   At any particular planting distance above 170 trees per morgen, an increase in cost of production per tree was accompanied by an increase in profit per morgen and per tree. The same tendency could not be established in the case of trees planted at a rate of less than 170 per morgen. The majority of growers who controlled closely spaced trees provided insufficiently for the increased requirements per morgen of the larger number of trees per morgen. This resulted in a relatively low cost per tree, yield per tree and profit per tree in the case of 19 out of 27 growers who planted 190 trees and more per morgen.(Table 263)

65.   The significance of size of orchards, yield per tree, rate of capital turnover and price per pocket as profit determining factors was demonstrated in Table 264. As the number of these factors which occurred jointly on farms in above average proportions in favourability, increased, a distinctly more favourable financial result per morgen was realised on the citrus enterpise.(Table 264).

66.   The main differences in the organisation and management of the ten orchards which realised the highest profit per morgen and the ten orchards which realised the lowest profit per morgen were:

(a) A relatively high yield per tree in the case of the best orchards as against a relatively low yield in the case of the poorest orchards;

(b) A considerably more rapid rate of capital turnover in favour of the best orchards;

(c) More intensive employment of labour per morgen on the best farms.

(d) Greater intensity of cost of production per morgen on the best farms.

CONCLUSIONS.

GENERAL: 1. The dependence of the South African
Citrus Industry on the established export market for
its crop and the vulnerability of the Industry in the
event of partial dislocation of export facilities, were
demonstrated during the duration of World War II.

2. Whereas the development of the Industry
may be justified in broad outline from a national agro-
economic point of view in each of the seven main citrus
producing areas of the Union, the scale of development
was nevertheless based on a market which involved an
element of serious risk. The maintenance of the Citrus
Industry in the Union is dependent not only on the
availability of shipping facilities but also on the level
of trade, degree of employment and volume of purchasing
power of the main countries and particularly the United
Kingdom, providing markets for South African Citrus fruit.

3. The element of risk, in the above respects,
impart the necessity of the creation of reserve funds
to all citrus growers in the Union. Profits realised
during times of prosperity are required to tide growers
over periods of depression or, as during the past war,
periods when exports are disrupted by circumstances
beyond their control.

4. According to the findings of an official
survey, conducted during 1938 the average citrus grower
in the Union was by no means in the position to accumulate
the reserve funds which were required to meet the
emergencies created by the war. Since 1946, when
normal exports were resumed, exceptionally remunerative
prices were realised on overseas markets. It is evident
that part of these profits would be required to repair
the deterioration of orchards, improvements and
equipment during the war.

5. The level at which controlled maximum
prices of citrus fruit in the Union was fixed after the
war has, however, been a bone of contention between
the Industry and the Government Authorities concerned.
As indicated in a preceding summary, the average prices
fixed during the period 1948-1950 did not even cover
the average cost of production and marketing of citrus
fruit sold on the local market. In actual fact,
therefore, the Industry was required to supply the local
market with citrus fruit without any remuneration in the
form of profit. During the period 1948-1950 the local
market absorbed approximately 6,000,000 pockets (40%
of the entire crop) of citrus fruit per annum. This
quantity was constituted of all the fruit of non-exporter
growers plus all the non-exportable quality of fruit as
well as a compulsory retention of exportable quality of
fruit of exporter growers. In view of the unsatisfactory
level of local market prices, particular hardships were
imposed on non-exporter growers who did not share in
the high export prices while justified dissatisfaction
was caused to exporter growers who were restrained by
government regulation to export all their exportable
quality of fruit and were forced to sell a certain
percentage of their fruit at a loss on the local market.

6. In considering the issue of local market
prices in relation to the calculated cost of production
and marketing, various factors which have a bearing
on the matter, have to be examined critically.

7. In the first instance it has to be
considered if and to which extent the establishment
of the industry on an export basis, increased operational
costs above the level which would have been required
to supply the local market only. It may be contended
that the present scope of the Industry warrants the
employment of costly equipment for production purposes

as well as the construction of fixed improvements for
production and handling the crop on a scale in excess of
the level required for the supply of the local market
only.   Although it has to be admitted that the above
possibilities do exist, it should on the contrary be
borne in mind, firstly, that without the stimulus
provided by the export market, the Industry in the
Union would most probably have been little further
advanced than during 1918 and unable to supply the full
requirements of the local market.   Secondly it should
be borne in mind that improved equipment and essential
improvements are conducive to higher yields and lower
costs by way of more efficient cultural practices.   It
is therefore by no means certain that the development
of the size of the industry on an export basis as such
gave rise to an unduly increased level of the cost of
production of local market fruit.

8.   It may, secondly, be argued that the level
of costs of citrus production in the Union may be influenced
by the high profits realised at present on exported fruit.
High profits induce expansion while a spirit of expansion
creates higher land values and wages.   High profits may
also be accompanied by a decrease in the efficiency at
which costs are incurred and capital is invested.
The above facts cannot be denied, although it will be
extremely difficult to gauge the extent of the effect
of high profits on costs.   It should be borne in mind
that the spiral of costs has been ascending throughout
the War years even when the Citrus Industry experienced
a severe slump.

9.   The preceding ideas give rise to the
question: What is the actual average cost of production
of citrus fruit for the local market and how can it
be determined?   It is common knowledge that cost of
production varies not only from farm to farm but also from

area to area and from year to year.   Most growers
will endcrso any governmental policy which accepts the
principle of "average costs plus a reasonable profit"
as the basis for price fixation.   That this principle
will not ensure continuous financial security to all
growers may be concluded from the following facts:
(a) The mere fact that an <u>average</u> cost forms the basis of
price fixation, implies that some growers operated at
higher levels of cost while others operated at lower
levels of cost than the average.   If the calculated costs
of individual growers were all <u>actually incurred</u> costs,
all those growers who operated at above average costs
would incur losses at the price fixed on the basis of the
average.   To many gorwers interest on capital may not
be an <u>actual</u> cost as they may have no bonds or debt on
which interest has to be paid.   Such growers would
realise a profit from a personal accounting point of view
although their calculated costs were above the average.
These growers would be in the position to continue
production in spite of operating at an above average
level of costs.
(b) If the average cost of production is determined
year after year and prices are fixed annually on this
basis it will be found that if no increase in costs
is caused by the general price level, the average cost
of production for the Industry as a whole will decline.
This will be caused by the elimination of sub-marginal
growers i.e. those growers who operated at costs above
he average and who consequently failed to realise
pro its.   The process of reduction of the average
cost could theoretically be continued indefinitely as
long as elimination of those growers with the highest
costs are still effected.
(c) Cost of production is as much a result of prices
as it influences price.   The cost of production of

citrus fruit is constituted of the price of the component
cost items labour, equipment, fertilisers etc. The
price of citrus fruit, based on these costs, is a com-
ponent in its turn of the factors determining the general
price level. As the fixed price cannot deviate for
any considerable period from the normal price as determined
by the supply of and demand for citrus fruit, it is evident
that any undue increase in the price of materials required
in citrus production, particularly when the general price
level is relatively high, would create difficulties in
maintaining prices based on average costs plus a reasonable
profit to the grower.

10. It should be evident from the above
discussion, that not only is it an extremely contentious
matter to distinguish between current costs of the
Industry in its present condition of development and
what costs would have been if production were undertaken
for the local market only, but also to decide between
actual costs as regards interest on capital, and costs
to which growers are entitled in this respect. It is
equally clear that even if the above problems did not
complicate the issue of the calculation of average costs
for the industry, that no industry can be maintained
at a price level which merely covers average cost of
production plus a living allowance to the grower. If
by the elimination of sub-marginal growers the average
cost of production is reduced annually it follows that
prices fixed on this basis will also decline. Lower
prices to the consumer will therefore be achieved at
the expense of a decreasing supply. The normal price,
determined by the scarcity of the commodity will eventually
exceed the fixed price based on average costs.

11. The above theoretical argument is
presented in justification of the claim that the allowance

to the grower over and above cost of production should
not only cover living expenses of the grower but
should also allow a profit to him.   This claim must
be qualified as follows:

(a) The product concerned must enjoy a comparative
advantage over competitive enterprises which could be
practised in the same agricultural area.

(b) The product must be an essential commodity to such
an extent that its production is considered desirable.

(c) The margin of profit allowed an the product will
be determined firstly by the extent to which it is in
the national interest to be self-contained in respect
of the product; secondly by the extent to which it is
considered desirable from a socio-economic point of view
to maintain farmers on the land, employed in the production
of the product to which the land is best suited, thirdly,
by the possibility of importing the commodity at a lower
price.and, fourthly, by the general price tendency.

12. In South Africa, the local market has been
treated by governmental authorities as an appendage of
the export market in as much that although it has been
recognised that the controlled local market prices were
unremunerative, growers were expected to subsidise their
incomes from local sales out of their income from
exported fruit.   In spite of this approach, a compulsory
retention of exportable quality of fruit is enforced
on growers.   While exporter growers have their profits
diminished at the present stage, they enjoy no permanent
security on the overseas markets and cannot expect any
guarantee of the local government for security during
periods of crisis.

13. Whereas the above governmental policy
is obviously motivated by the ambition to combat the
present increasing trend in the level of cost of living
the practical effect of the policy amounts to a relatively

small saving to consumers in general at the expense
of a relatively large sacrifice by the Citrus Industry.

CONCLUSIONS AND RECOMMENDATIONS BASED ON THE FINDINGS OF
THE INVESTIGATION:

14. The analysis of the organisation and
management of 67 farms in the Eastern Cape Coastal area
revealed a number of efficiency factors which exercised
a significant influence on the financial results of citrus
farming. Although the conclusions which were arrived at
were applicable only to the Eastern Cape under the
current price-level for citrus fruit during 1950, certain
fundamental principles were established which may serve
as a guide to growers not only in this but also in the
other citrus areas of the Union under any condition of
price.

15. Cost per tree and yield per tree: It
was demonstrated in Table 208 that the quantity of fruit
produced per tree was related very closely to the
intensity of cultural costs[1] incurred per tree.
GROWERS SHOULD NOTE THAT FAILURE TO PROVIDE CITRUS
TREES WITH OPTIMUM CULTURAL REQUIREMENTS HAS BEEN
DETERMINED AS ONE OF THE MAIN CAUSES OF LOW YIELDS.
Growers are strongly advised to examine their organisation
and management critically in the light of established
citricultural practices to ensure that their orchards are

[1]Denotes cost of production prior to
picking.

equipped and treated to produce optimum yields.

16. <u>Cost per tree, cost per pocket and</u>
<u>nett profit</u>: It was demonstrated in Table 217 that
although increased costs per tree were accompanied by
increased yields per tree, the increase in yield was
effected at a relatively lower rate than the increase
in cost.   An increase in cost per tree was in fact
accompanied by a decrease in the number of pockets
produced per £1 cost i.e. an increase in cost per pocket.
AN INCREASE IN COST OF PRODUCTION PER TREE IS HOWEVER
JUSTIFIED IN SPITE OF THE INCREASE IN COST PER POCKET
AS LONG AS THE <u>INCREASE</u> IN VALUE OF FRUIT PRODUCED PER
TREE EXCEEDS THE <u>INCREASE</u> IN TOTAL COST PER TREE. i.e.
AS LONG AS PROFIT PER TREE INCREASES.   It is the
responsibility of the grower to be on his guard during
a price decline, when the margin between price and cost
per pocket is reduced, to establish the adjusted optimum
intensity of costs at which the maximum profit will be
realised.

17. <u>Planting distance, cost per tree and yield</u>
<u>per tree</u>: On the basis of the analyses shown in Tables
261 and 262 it may be concluded that not only is the
planting distance adopted in citrus orchards a factor
of primary importance in determining the financial results
of citrus farming but also that the former influence
is accentuated by the level of cost of production at
which orchards, established at varying planting distances,
are operated.   AN OPTIMUM EXISTS BOTH AS REGARDS THE
NUMBER OF TREES PLANTED PER MORGEN AS WELL AS THE
INTENSITY OF COST OF PRODUCTION WHICH IS REQUIRED TO
PROVIDE FOR CITRUS TREES, PLANTED AT A SPECIFIC DISTANCE,
IN THE MOST PROFITABLE MANNER.   In view of the fact
that growers and particularly the smallest growers, were
inclined to reduce cultural costs on closely spaced
trees, it must be stressed that, even if allowances are

made for the savings which do accompany closer spacing
of trees, the beneficial influence of adequate care of
trees on yield per tree would justify the maintenance of
cultural costs per tree at the optimum level irrespective
of the planting distance applied.

18.   The decrease in productivity of labour,
capital and total expenditure which characterised the
financial results of the entire farming organisation of
the relatively largest farms, calls for the attention
of the growers concerned to:

(a) endeavour to minimise losses or increase profits
on the portion of their farms not occupied by citrus,
which in general, proved to be a burden to the owner
rather than an asset;

(b) effect measures to ensure the most efficient
employment of labour;

(c) ensure that all farm costs are incurred with the
same efficiency as would be the case under a less
profitable level of prices;

(d) guard against over-capitalisation in respect of
durable improvements and costly equipment.

19.   The decrease in productivity of labour,
capital and total expenditure which was shown to have
characterised the financial results of the entire farming
organisation of the largest group of farms should be of
particular significance to these growers. The earlier
observations of possible weaknesses in the farming
organisation of the largest group of farms may be
related in part or in full to the decrease in productivity
of the factors mentioned above. As productivity of a
factor is measured in terms of gross farm income per unit
of the factor, it is evident that relatively low productivity
may be caused either by a low income in relation to normal
levels of the factor or by a normal income in relation to
excessively high levels of the factor.

It should be the duty of each grower to maintain the
highest continuous efficiency in production, to employ
the essential factors of production rationally, to
secure himself for the future by creating reserve funds
from the present high profits, and above all to avail
himself with the knowledge of his business without which
he will be unable to adjust his management from time to
time to meet the requirements of changing conditions.

KEY TO CITRUS PRO-DUCING LOCALITIES.

A. Citrusdal.
B. Porterville.
C. Paarl.
D. Swellendam.
E. Calitzdorp.
F. Grootbrak.
G. Patentie.
H. Sundays River Valley.
I. Grahamstown.
J. Kat River.
K. King Williamstown.
L. Umzinto.
M. Zululand.
N. Richmond.
O. Muden.
P. Pietermaritzburg.
Q. Pongola.
R. Nelspruit.
S. **Pilgrimsrest.**
T. Lydenburg.
U. Tzaneen.
V. Louis Trichardt.
W. Potgietersrust.
X. Rustenburg.
Y. Marico.
Z. Upington.

MAP
OF
UNION OF SOUTH
AFRICA

SHOWING LOCATION
OF MAIN
CITRUS PRODUCING
AREAS.

(Each dot =
25,000 citrus
trees)
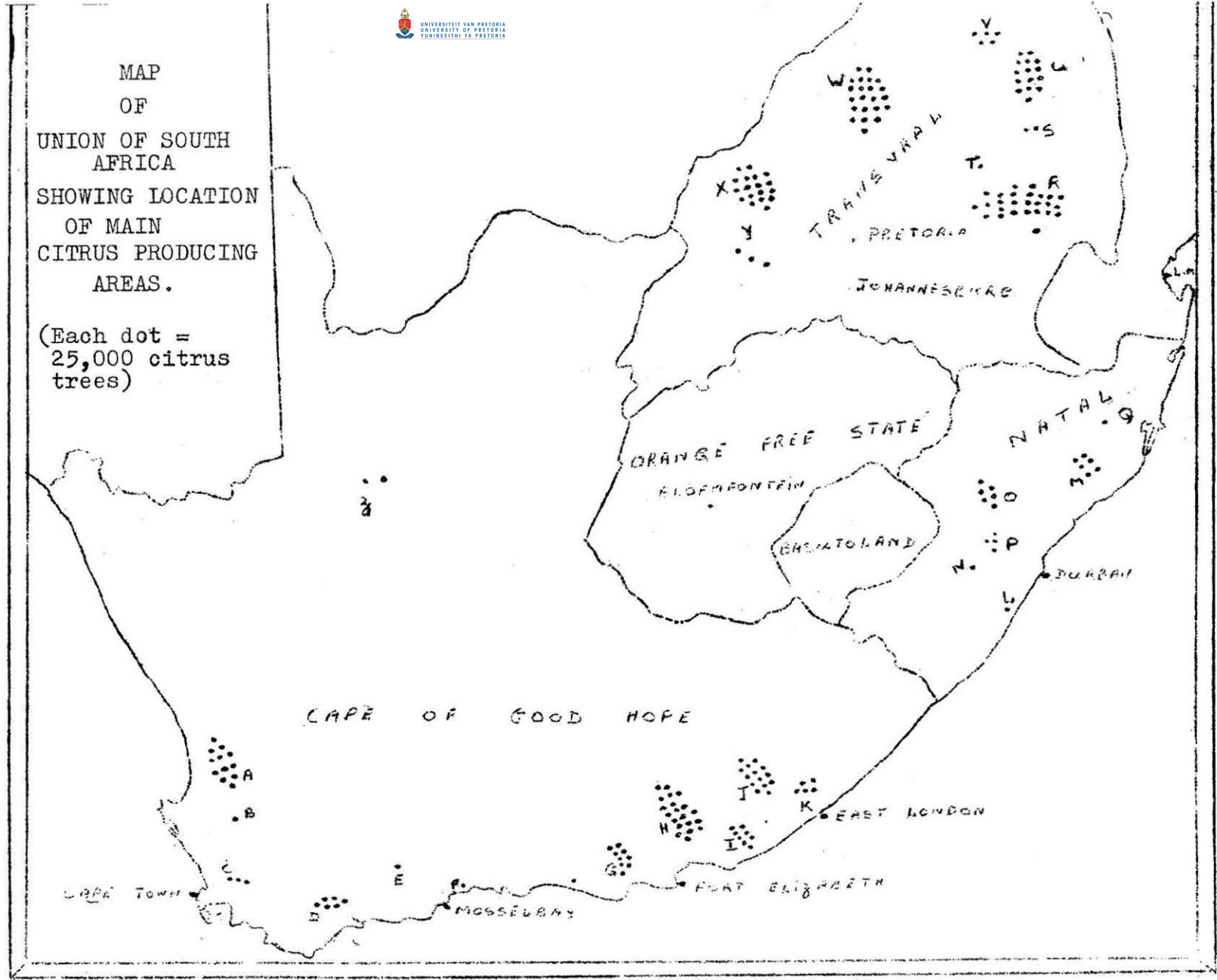
ANNEXURE 1.

DESCRIPTION OF THE MAIN CITRUS PRODUCING AREAS OF THE UNION.

It may be seen from the accompanying map that commercial citrus production in the Union, is confined to a limited number of well-defined localities, scattered over three of the four provinces. Although most of these areas have been merged together successfully from a business point of view, by virtue of the common marketing interest, it will be realised that each area will have its own character of production. Soil, climatic, biological, social and economic conditions exercise influences on both the size and quality of crops produced per farm as well as the financial results achieved per farm in each of the areas. In the ensuing description of the individual areas, it will be endeavoured to point out the natural advantages and handicaps of the various areas.

WESTERN TRANSVAAL.[i]

1. GEOGRAPHICAL LOCATION: The citrus area of the Western Transvaal is located on the northern incline of the Magaliesberg range stretching in a western direction from the Hartebeespoort dam to Zeerust approximately. The main concentrations of citrus farms occur in the following localities: Rustenburg; Koster; Groot Marico - Vaalkop - Zeerust; Marikana - Wolhuterskop and De Wildt. More than 80 percent of the entire export crop of the Western Transvaal is produced in the Rustenburg area.

2. CLIMATE:

(a) Rainfall: Details of the average dispersal of rainfall in the Rustenburg area, are given below:

Month.	1947	1948	1949	1950	Av. for 14 year period 1930-35 & 1943 - 50
		Rainfall in inches.			
January	4.0	5.3	8.7	1.7	4.1
February	3.7	3.4	2.1	1.1	3.8
March	4.0	8.5	5.2	2.6	3.8
April	1.0	3.0	0.7	2.6	1.6
May	0	0.4	0	1.6	0.4
June	0	0	0.9	1.2	0.5
July	0	0	0	0	0.2
August	0	0	0	0	0.2
September	0.7	0.2	0.1	0	0.4
October	1.5	2.5	1.6	1.9	2.1
November	2.8	5.2	3.9	1.7	3.2
December	2.9	0	7.7	6.8	4.5
Total	20.7	28.4	30.8	21.1	24.8

[i]Information in this section submitted by Mr. J.H. Engelbrecht, Field Officer Western Transvaal.

The average annual rainfall of approximately
25 inches is, owing to inefficient dispersal and
unreliability, insufficient for citrus production.
As the downpour often occurs in showers of less than
½ inch at a time, the effective rainfall is even less
than indicated in the above statement.   During the
14 year period on which the average rainfall of 25
inches was based, the total rainfall varied between
a minimum of 15.6 inches and a maximum of 34.5 inches
per annum.   The critical period for citrus production
from August to November, when the trees are in blossom
and the fruit is set, is usually characterised by
extreme drought.   Only 23.8 percent of the average
annual rainfall of 24.8 inches occurred during this
period.   Sufficient irrigation water during the
critical period is an essential requirement for
successful citrus production in the area.

It has been determined that during the period
1948 - 1950 the crops of growers included in the
cost surveys, were not affected to any significant
extent by rainfall in comparison with other years.
The setting of the crop was, however, poor in
orchards where sufficient irrigation water was not
available during the critical period.

(b) Temperatures: Details of the average minimum and
maximum temperatures registered in the Rustenburg
area, are given below:

Month.	Average maximum temperatures (°F)				
	1947.	1948.	1949.	1950.	Av. for period 1943 - 1950.
January	88	85	88	85	87
February	86	84	83	86	84
March	84	82	80	83	82
April	79	79	80	76	78
May	73	76	74	69	73
June	70	74	69	69	69
July	67	74	70	69	70
August	79	81	74	72	76
September	79	84	84	83	82
October	87	85	84	84	85
November	90	80	83	85	84
December	85	90	83	-	87

	Average minimum temperatures (°F)				
January	66	63	71	68	67
February	65	63	68	70	66
March	61	65	65	70	64
April	57	55	60	63	58
May	47	51	52	54	50
June	43	45	50	51	45
July	39	48	48	51	45
August	48	51	52	54	49
September	53	55	61	62	57
October	61	65	65	63	63
November	64	65	66	67	64
December	63	71	68	-	66

The citrus producing areas of the Western
Transvaal are characterised by moderately cold
winters and comparatively warm summers. As regards
prevailing temperatures, the area is particularly
suited to citrus production. The Western Transvaal
is subject to light frost but frost damage to fruit
seldom occurs. Frost is however, a limiting factor
to development of some localities in the area.
During the period 1948 - 1950, temperatures were
approximately normal and did not affect production
either favourably or adversely.

(c) <u>Hail</u>: The area is subject to hail damage. Unfortunate-
ly no data are available to indicate the occurrence
of hail or the extent of damage caused. During 1950
a severe hail-storm struck a portion of the Rustenburg
area, causing considerable damage. With the
exception of this incident, the period 1948 - 1950
was comparatively free of hail damage.

(d) <u>Wind</u>: Dry winds, occurring generally during August
and September, have a detrimental effect on the
setting of the crop. Quite often, too, wind damage
is caused to the appearance of fruit during October-
November. The Rustenburg area is however well
protected against wind by wind-breaks. The area
was not affected particularly severely by winds
during the period 1948 - 1950.

In general it may be considered that climatic
conditions during the period 1948 - 1950 were
comparatively favourable, particularly during the
1949 and 1950 seasons. In the Rustenburg area
bumper crops were harvested during 1950 both as
regards total crop and percentage of first grade
fruit.

3. <u>SOIL</u>: "The soils[i] of the Rustenburg - Boshoek
area are of mixed origin viz: diabase and quartsitic
parent material. Along the Magaliesberg range the
relatively deep colluvial quartsitic sandy soils predominate
and are of a light red-brownish colour. In some instances
where there is a concentration of water, the soil is
greyish sand with a hard "ouklip" layer near the surface.
Where only diabase soils occur they are of a slightly
heavier clayey loam type which is reddish-brown and deep
with a good crumb structure. The sandy soils are
poorer in plant elements than this soil and are also
sour. Away from the quartsite hills the pure colluvial
diabase soils predominate in the Boshoek area but on the
slopes of the hills sandy soils predominate"

"The groves in Groot Marico are situated on
a good alluvial soil along the banks of the Groot Marico
river. In some cases, however, the trees are on poorer
shallow soils. New alluvial soils are usually deep,
light and fertile while old alluvial soils, though also
fertile, are more clayey with a poor structure. At
Vaalkop the soils are of a light greyish sandy type,
except along the river where alluvial soils are to
be found. The sandy soil varies in depth and is poor
in plant nutrients. The soils in the citrus area of
Koster are of the same origin as those of Rustenburg

[i]All sections dealing with soils which are
quoted in parenthesis, were extracted from
departmental Bulletin No.221 OP. Cit.

and vary according to situation.   The diabase appears
in the low-lying parts and the lighter sandy soils
along the slopes"

The reddish-brown sandy loam type of soil on
which the majority of trees in the Western Transvaal
is planted is well-drained and of good depth although
comparatively poor in plant nutrients.   On some of the
heavier loam types of soil injudicious irrigation causes
root diseases such as dry root rot and crown rot.

Kraal manure forms the basis of fertilising
in the area.   It is applied mainly as a source of
nitrogen.   Applications of 100 - 200 lbs per bearing
tree are made during the winter months. Especially
in the case of Navels, kraal manure is generally supple-
mented by applications of inorganic nitrogen in the
nitrate form prior to or during the blossoming or setting
periods.   Superphosphates in applications of approximate-
ly 5 lbs per tree exercise a beneficial influence on
the quality of fruit produced in the area.   "Mottle
leaf" a disease caused by a deficiency of zinc is common
in the area and spraying with zinc-oxide is a general
practice.   In general, soils in the area are acid and
applications of lime have to be made periodically to
improve the soil reaction.   Green manuring is practised
to a very limited extent mainly as a result of the close
spacing of trees practised in the area.

4.   <u>IRRIGATION</u>: In general Rustenburg growers have
sufficient irrigation water at their disposal to satisfy
the normal requirements of their orchards.   The following
are the main sources of supply:

(a) Commissiedrift - dam

(b) Mountain streams.   The two most important streams
     are those from Baviaanskrans and Modderfontein.

(c) Bore holes.   A few orchards are entirely reliant
     on water from this source although the majority
     of growers supplement their regular water supply
     by pumping water from boreholes.

In the rest of the area practically only
those growers with orchards on the banks of the Marico
river have sufficient irrigation water.   Lack of water
is the main cause of the low level of yields in these
localities.   These growers rely on fountains and
boreholes for their supply of water which is often low
during times of drought.

5.   <u>INSECT PESTS AND PLANT DISEASES</u>:   Red, Purple,
and to a lesser extent yellow scale are the main insect
pests in the area.   An infestation of Red Spider was
observed for the first time during 1950 and it appears
as if this pest is assuming ominous significance.
False Codling Moth and Fruit Fly (both the Natal and
Mediterranean types) cause considerable damage particularly
to Navels.   Thrips are regarded as one of the main
insect pests in citrus orchards in the area.

The following pests also occur sporadically in
the Western Transvaal although severe infestations occur
from time to time: Soft (brown) scale, Bollworms,
Mealy Bugs, Australian bug, Aphids.

The Western Transvaal area is comparatively free of plant diseases.

6. RAILWAY AND ROAD COMMUNICATIONS: In general, the various localities are well served with road and rail facilities. The Rustenburg area particularly enjoys the convenience of tarred roads to both Johannesburg and Pretoria in addition to a railway line to Pretoria. Koster growers (Steenbokfontein and vicinity) who are situated less favourably as regards the nearest railway, employ S.A.R. Road Motor Services to Koster for the conveyance of their fruit.

7. CO-OPERATIVE FACILITIES: There are three citrus co-operatives in the Western Transvaal. Rustenburg Co-operative Packhouse Ltd., which extends picking, transport, packing, pest control and various production services to its members in addition to supplying production requisites such as fertilisers, insecticides etc; Koster River Valley Citrus Co-op., which supplies its members with packing material only; Maricose Citrus Koöperasie Beperk - Groot Marico. This Co-op. supplies members from Swartruggens to Zeerust with packing material, insecticides and other farming requisites.

The main deterring factors to co-operative packing in the localities other than Rustenburg are the relatively small crops produced in each of these localities and the comparatively long distances separating the localities from one another.

8. NATURE OF FARMING: In the Rustenburg area practically no side-lines are practised on citrus farms. In the other areas, however, mainly tobacco but also cotton and maize are generally found as sidelines on citrus farms. It is a common occurrence that the cultivation of other crops exercises a detrimental influence on the citrus crop by way of competition for the limited quantity of irrigation water.

9. MAIN SPECIES AND VARIETIES OF CITRUS: Valencias and Washington Navels constitute the main varieties in existing orchards as well as in new plantings. Both varieties do equally well under favourable conditions but when conditions are less favourable (owing to drought) Valencias showed better results. Valencias were on this account receiving preference to navels in recent plantings. Lemons do well in the area but no large orchards of this citrus species are found. Grapefruit produced in the area is of poor quality. Naartjies do extremely well in the Western Transvaal and are favoured by the smaller growers in the Marikana - Wolhuterskop localities who find a ready market for this fruit on the Rand and Pretoria Markets.

10. POSSIBILITY OF FUTURE EXPANSION: It is considered by those in authority that the possibility of expansion in the Western Transvaal is very limited. Suitable soil and irrigation water are the main limiting factors in this respect. It is contended that future expansion could only be effected by the employment of marginal land both as regards suitability for citrus production as well as availability of water. The present period of relative prosperity may serve as an incentive to growers to develop such marginal land in the area. These orchards will however be forced out of production

when prices decline to a less profitable level.

EASTERN TRANSVAAL.[i]

1. GEOGHRAPHICAL LOCATION: The citrus producing
area of the Eastern Transvaal stretches from Waterval-
Onder in the west to Komatipoort in the east and from
Barberton in the south to the Olifantsrivier in the North.
The main concentrations of orchards in the area are
along the Elandsrivier from Sycamore to Nelspruit and
in the locality between Karino and White River.

2. CLIMATE:

   (a) Rainfall: Details of the total annual rainfall
       at a number of places in various parts of the
       citrus area of the Eastern Transvaal are given
       below:

Year.	Elands-Valley.	Barber-ton.	Nel-spruit.	Upper White River.	White River.	Av. Annual rainfall Eastern Tvl.
	inches	inches	inches	inches	inches	inches.
1948	24.4	30.7	16.0	25.2	28.5	25.0
1949	33.5	31.4	33.9	30.7	31.0	32.9
1950	32.4	28.4	19.3	28.9	35.2	28.8
Average 1939-49.	32.6	34.2	31.7	35.1	37.7	34.6

The effectiveness of the indicated, relatively
high annual rainfall may be judged from the normal
dispersal of rainfall over the period of a year,
as shown below.[ii]

Month.	Nelspruit Average for 34 years.		White River. Average for 33 years.	
	Rainfall ins.	No. days rain	Rainfall ins.	No. days rain.
January	5.01	10	6.93	14
February	4.69	9	6.02	12
March	4.36	9	4.86	13
April	1.73	4	2.02	7
May	0.68	2	0.90	5
June	0.45	1	0.45	2
July	0.40	1	0.64	3
August	0.40	2	0.43	3
September	1.08	4	1.32	6
October	2.29	6	2.76	10
November	3.99	11	4.64	13
December	4.63	10	5.34	13
T o t a l	29.71	69	36.31	101

[i]Information in this section submitted by Mr. J.
du T. Deetlefs, Field Officer Eastern Transvaal.

[ii]Based on data supplied by the Division of
Meteorology.

On an average, the downpour in both the Nelspruit
and White River areas occur at an intensity of
less than $\frac{1}{2}$ inch per day which may impair the
effectiveness of the rainfall. It is also evident
that particularly during the early stages of the
critical period for the crop, the water requirements
of orchards must be supplemented by irrigation.

(b) Temperatures: The area is characterised by a very
high summer temperature accompanied by relatively
low humidity, and mild temperatures in winter.

(c)   Although the Eastern Transvaal is relatively
frost free, hail damage is often sustained. Wind
is not a significant factor in citrus production in
this area.

3. SOIL: "The soils in this area vary widely. Near
White River the parent material of the soils is granite
and forms part of the socalled Lateritic and Red Earth
types. The soils are deep, reddish brown in colour,
clayey though with a crumbly structure; they are sour,
poor in calcuim, potash and available phosphates. Though
the soils are rich in humus and nitrogen, these properties
soon disappear under cultivation. Good cultivation and
fertilising are essential in the case of lateritic soils."

"The low-lying soils towards Karino, though
derived from the same parent rock viz: granite, are
totally different. They are coarse, sandy, shallow, sour
and lacking nitrogen and phosphate. These two nutrients
as well as organic matter are absolutely necessary".

"The soil along the Elands river is mostly from
alluvial and colluvial origin. Near Sycamore it is
derived from quartsite and scale while in the vicinity of
Nelspruit the parent rock is granite. The light, red-
brown sand and sand-loam are usually deep with good
internal drainage, but they lack nutrients except potash.
In addition they are sour."

The natural fertility of the Eastern Transvaal
soils and hence their ability to maintain citrus orchards
unaided by fertiliser applications vary considerably, the
majority of citrus orchards being planted to soils with
comparatively low fertility. The general tendency for
soils under irrigation in this area, is to deteriorate in
respect of fertility and particularly so if injudicious
fertilising and irrigation methods are practised. On
certain sandy soils which have been under cultivation
and irrigation for a long time and particularly where
Ammonium Sulphate was applied, the pH has dropped to a
very low level. In these soils the exchangeable base
content of the soil solution has also dropped very low
and the buffer capacity of the soil has been reduced to
such an extent that the condition of the soil is not
conducive to healthy, high producing trees.

In the majority of localities growers are,
however, not confronted with insurmountable nutritional
problems. General recommendations as regards fertilising
of citrus trees are: 1 - 1$\frac{1}{2}$ lbs nitrogen (N) per annum,
(5-10 year old trees) 1$\frac{1}{2}$ - 2 lbs nitrogen (N) per annum
(trees 10 years and older;) 5 lbs superphosphate per tree;
150 lbs Kraal manure per tree every three years.

4. **IRRIGATION:** The following are the main sources of irrigation water:
White river irrigation scheme - supplying White River Plaston and Karino.
Crocodile River and its tributaries - Farms along the river banks have a sufficient supply of water from this source although it has to be obtained at the cost of pumping.

5. **INSECT PESTS AND PLANT DISEASES:** The following are the main insect pests which growers have to cope with in the area: Red scale, Mussel scale, Round purple scale, Soft brown scale, Mealie bug, False Codling Moth, Natal fruit fly, Citrus thrips, Bollworm, Citrus aphis, Citrus nibbler, Citrus Psylla. Of the above pests scale, codling moth and fruit fly are the most severe.

PLANT DISEASES: In addition to the above insect pests, orchards in the area are subject to the following plant diseases: Black spot, dry root rot (Melanose) and stem-pitting, Greening, sooty blotch, blue mould, green mould, sour rot, brown rot and oleocellosis are the main diseases of the fruit produced in the Eastern Transvaal.

6. **RAILWAY AND ROAD COMMUNICATIONS:** The citrus producing localities of the Eastern Transvaal are extremely well-served with rail and road communications. Nelspruit lies on the main railway line from Pretoria to Lourenco Marques and is in addition served by the National road which is now in the process of being bituminised. In most of the other localities an extensive network of roads and railway lines is at the disposal of growers.

7. **CO-OPERATIVE FACILITIES:** Only one co-operative pack-house exists in the area. This co-op, the White River Fruit Growers Co-op. Company Ltd., has only a limited capacity for packing and consideration is now being given in the area to the establishment of an additional two packhouses. Road and rail communications are very favourable to centralised packing and the absence of co-operative packing units in the area should be ascribed mainly to an earlier lack of a co-operative spirit amongst growers. High cost of building and scarcity of building material are other factors which came into operation more recently to deter the development of co-operative citrus companies.

8. **NATURE OF FARMING:** Although citrus may be regarded as the most important enterprise in the organisation of most of the farms in the citrus area of the Eastern Transvaal, the production of vegetables and sub-tropical fruit constitutes significant subsidiary enterprises. The type of farming may be described as decidedly mixed.

9. **MAIN SPECIES AND VARIETIES OF CITRUS GROWN:** Valencia and midseason oranges, and lemons do very well in the Eastern Transvaal. Particularly in the White River area, however, Navels are inclined to be low in solids especially during wet seasons, when extensive periods of overcast conditions prevail. Navels have the advantage in this area, on the other hand, of maturing relatively early. Seeded grapefruit do exceptionally well in the Kaapmuiden locality .

10. **FUTURE EXPANSION:** The Eastern Transvaal offers extensive opportunities for future expansion. The following data, based on a survey made by the field officer of the Citrus Exchange in this area, provide an

indication of the scope for expansion in each of the citrus growing localities.

<u>Area:</u>　Estimated number of trees for which suitable soil and sufficient water <u>are available.</u>

Area	Estimated number of trees
Elandsriver	200,000
Crocodile Valley (Rivulets - Krokodilpoort)	750,000
White river area	20,000
Plaston - Karino	115,000
Boulders - Komatipoort	3,000,000
Klaserie - Acornhoek	400,000
Other areas	100,000
Total	4,585,000

It has been estimated that new plantings during recent years were constituted of approximately 60% valencias, 20% navels, 10% lemons, 8% mid-season oranges and 2% grapefruit trees.

NORTHERN TRANSVAAL.[1]

1. <u>GEOGHRAPHICAL LOCATION:</u>　The main concentrations of citrus orchards in the Northern Transvaal occur in the localities of Tzaneen, Duivelskloof, Potgietersrust, Nylstroom, Louis Trichardt and Letaba. The entire area ranges from the Olifants rivier in the south to the Limpopo rivier in the north and west and the Kruger National Park in the east.

2. <u>CLIMATE:</u>

(a) <u>Rainfall:</u>　For descriptive purposes as regards rainfall, the area may be divided into the socalled lowveld and highveld regions. The lowveld includes the localities of Tzaneen, Louis Trichardt and Letaba with an approximate rainfall of between 35-45 inches per annum. This region has a more effective dispersal of rain over the seasons than the highveld and differs from the latter also in as much that its downpour occurs in the form of convection rain. In the lowveld region, the rainfall during the period November to April is very reliable while winter rain often occurs.

The highveld region enjoys less favourable conditions in this respect and is for its rain dependent on thunderstorms which occur during the period October to May. Total rainfall in the highveld varies between 25-30 inches per annum and growers have to rely on catchment dams and boreholes for their supply of irrigation water.

During 1948 the entire area experienced a more or less normal rainfall as regards dispersal and precipitation. During the ensuing two seasons the catchment areas of the dams of one of the biggest citrus estates in the area, received a very poor rainfall and these orchards suffered considerably.

[1] Information under this section submitted by Mr. T.F.S. Malherbe, Field Officer, Northern Transvaal.

Drought occurred in the lowveld during October of both 1949 and 1950 but did not affect the crops of growers noticeably.

(b) Temperatures: Temperature conditions vary during the summer from high in the Letaba area to moderate in the Tzaneen area. During winter relatively mild temperatures generally prevail in the entire area.

(c) Hail, frost and winds: Wind is an important factor in the Highveld area i.e. Zebediela, Potgietersrust, Nylstroom and Warmbaths where it causes considerable damage to the young fruit and decreases the percentage of exportable fruit in the crop.

Hail occurs periodically but it seldom happens that extensive areas are affected. In general hailstorms are not severe although damage is caused to young fruit. The Potgietersrust area particularly is subject to hail. During the period 1948 - 1950 hail damage occurred only in the Duivelskloof - Politsi area during 1949 when approximately 30,000 cases of Valencias were destroyed and an additional 20,000 cases made unsuitable for export.

Damaging frost is not an important factor in the area.

3. SOIL: The soils of the Northern Transvaal are of varying origin and type. In the Tzaneen and Louis Trichardt localities soils are of Lateritic parent material. In the Letaba area orchards are established mainly on sandy loam to loam alluvial soils. In the Potgietersrust area soils are mainly of a sandy to sandy loam type of dolomitic and sandstone origin. In the Nylstroom and Warmbaths area soils are sandy, of sandstone and granite parent material. Though most of those soils are rich in humus and nitrogen these properties soon disappear under cultivation. Efficient cultivation and intensive fertilising are required particularly on the soils of lateritic origin. Heavy applications of nitrogenous fertilizers and phosphates are generally required. On lateritic soils magnesium and lime are supplemented by applications of burnt dolomite. In the highveld area zinc sulphate sprays are applied to supplement a deficiency of available zinc in the soil. The following fertilising program is generally employed in the area:

1 - 1½ lbs nitrogen (N) per tree,
5 lbs superphosphates per tree.
10 lbs Langfos per tree,
10 lbs burnt Dolomite per tree,
100 - 150 lbs kraal manure per tree.

4. IRRIGATION: In the lowveld area the main supply of irrigation water is obtained from streams and rivers. Below Tzaneen water has to be pumped from the streams but in the Politsi area most of the irrigation is done by gravitation. Most growers in the area have storage dams to provide for prolonged periods of drought. In the Potgietersrust area the only supply of water consists of catchment dams and boreholes. At present the area has no large-scale irrigation scheme but the Levubu dam, 15 miles to the east of Louis Trichardt, is nearing completion and water from this source will be available within the

near future.

5. INSECT PESTS AND PLANT DISEASES: The main insect
pests which citrus growers in this area have to cope with
are Red scale, Early thrips and Late thrips. Mites are
an additional pest in the Letaba area. The above pests
have been causing considerable damage to the appearance
of fruit produced in the Northern Transvaal in spite of
considerable expenses incurred in controlling them.

As regards plant diseases, Black spot and
Melanose offer the main problems particularly in the
Tzaneen area. It is estimated that measures to control
Black spot have been costing growers in this area approxi-
mately 2/- per tree per annum. Present methods of control
do not prove completely effective and it appears as if
the disease has come to stay.

An additional disease of the fruit called Sooty
Blotch requires the fruit to be washed with a mixture of
Chloride of lime and Sodium - bicarbonate prior to
marketing.

6. RAIL AND ROAD COMMUNICATIONS: The area is served by
the main railway line from Pretoria to Pietersburg and the
line from Pietersburg to Komatipoort. Both Tzaneen and
Duivelskloof are on the latter line. A branch line service
operates between Naboomspruit and Zebediela. The national
road from Pretoria to Beit Bridge passes through the area and
a network of provincial roads to the most important centres
is available.

7. CO-OPERATIVE FACILITIES: Only one co-operative company
exists which serves the smaller growers in the Tzaneen area.
At present the capacity of this packhouse is too limited
to handle the fruit of the Politsi area as well. This
packhouse is still in its infancy and it may expand in due
course. The citrus estates which produce a high percentage
of the total crop of the Northern Transvaal, are also
registered as co-operative societies but have only a limited
membership and these particular companies function practically
as private organisations. In the outlying citrus localities
of the area, long distances and comparatively small
individual crops are handicaps to co-operative packing of
fruit.

8. TYPE OF FARMING: Few citrus growers in the area
confine their farming activities to citrus production only.
The general type of farming is decidedly mixed although
citrus constitutes the major enterprise on most of the
farms in the citrus localities. Sub-tropical fruit such
as avocados, pawpaws, and mangos, and vegetables are
significant subsidiary enterprises. Flowers and rice
are grown as cash crops. In the highveld, slaughter
stock are kept and cotton, maize and groundnuts are grown
in addition to citrus. Timber plantations provide a
significant source of income to a number of growers in
the area.

9. MAIN SPECIES AND VARIETIES OF CITRUS GROWN: Oranges
in general and Navels and Valencias in particular are the
main citrus crops grown in the Northern Transvaal.
Naartjies do well and are produced in larger quantities
annually than in any other citrus area of the Union.

10. FUTURE EXPANSION: As in the case of the Eastern
Transvaal, the opportunities for future expansion in this
area is extensive. Vast areas of potential citrus land
are available in the Tzaneen area, in the Louis Trichardt

area below the Levubu dam as well as below the Njilele
dam to the north of the Soutpansberg.   Unlimited areas
of citrus land and sufficient water are still available
in certain unexploited areas to the north-west of Nylstroom
and in the Vaalwater and Ellisras localities along the
Mogolrivier and Sandrivier.

The stability of citrus production in the Tzaneen
area enticed a number of growers to this locality after
the recent war and considerable expansion of the industry
was effected.

EASTERN CAPE COASTAL AREA.[1]

1. GEOGRAPHICAL LOCATION: The citrus producing localities
of the Eastern Cape Coastal area are confined to certain
limited portions of the districts Uitenhage and Humansdorp.

Three main concentrations of citrus orchards
may be distinguished:
Sundays River Valley: The valley stretches from Barclay's
Bridge station, approximately 10 miles from the coast, to
7 miles above the village of Kirkwood i.e. approximately
45 miles up along the Sundays River from Barclay's Bridge.
The main concentrations of orchards occur from 2 miles
below Addo station to 5 miles above Kirkwood. Orchards
are planted on both sides of the river in the valley which
varies from 3 to 6 miles in width.
Gamtoos River Valley: This valley extends along the
Gamtoos River and its tributary, the Kleinrivier, ranging
from 12 miles from the coast to 40 miles inland. The
main concentration of trees occurs in the localities
of Hankey, Patentie and Andrieskraal.
Uitenhage: One comparatively large citrus estate and a
few small plantings occur in the locality up to 10 miles
east of Uitenhage.

2. CLIMATE:

   (a) Rainfall: Although the annual rainfall of the
        area varies between 9" - 16" the annual effective
        rainfall i.e. of rain occurring in showers of
        more than $\frac{1}{2}$" at a time, only amounts to from
        3" - 6".   The normal distribution of effective
        rain is confined largely to the two periods
        February to April and October to November with
        a major precipitation during the latter period.
        June and July are usually very dry months.
        Generally the effective rains are a month late
        for the two critical periods viz: September/
        October (Blossoming of trees and setting of
        crop) and February/March (sizing and normal
        development of fruit).   Irrigation is conse-
        quently required for all commercially grown
        citrus in the area.   Details of the average
        dispersal of the annual rainfall as registered
        at Kirkwood (Sundays River Valley) and
        Ferndale (Gamtoos Valley) are given below.

[1]Information under this section submitted by
   Mr. C.B. Mynhardt, Field Officer Eastern Cape
   Coastal area.

Month.	Kirkwood. (Av. for 39 years)		Ferndale. (Av. for 13 years)	
	Rainfall in inches.	No. of days rain.	Rainfall in inches.	No. days rain.
January	1.07	3	1.68	5
February	1.56	4	1.73	7
March	2.12	6	2.41	8
April	1.29	4	1.45	5
May	1.09	3	1.77	5
June	0.78	2	1.36	4
July	0.85	3	1.72	5
August	0.70	3	1.30	5
September	1.73	4	1.38	6
October	1.47	4	2.30	8
November	1.17	3	2.60	8
December	1.40	3	1.71	6
TOTAL	15.23	42	21.41	72

(b) Temperatures: Details of the average maximum and minimum temperatures registered in the area during 1949 are given below. It is considered that these temperatures may be regarded as representative of normal conditions in the area.

Month:	Average Maximum temperature (^{o}F)	Average Minimum temperature (^{o}F)
January	87.5	60.9
February	83.8	60.2
March	85.9	58.9
April	82.2	53.2
May	79.6	46.6
June	77.6	39.9
July	74.5	39.5
August	73.4	42.0
September	76.9	49.2
October	80.9	52.3
November	77.5	54.8
December	82.5	59.1

Reasonably high temperatures prevail during the period October to March, the period of most abundant weed growth. During this period an adequate water supply is essential for successful setting of the crop and development of the fruit.

(c) Hail, frost and wind: The citrus localities of the Eastern Cape Coastal Area are not as a rule subject to hail damage.

The area is also free from any damaging frosts. August and November are, however, usually windy months. Most fruit blemishes are generally due to wind-scars on setting fruit, caused by strong winds during late October and particularly November. The 1950 crop was particularly badly blemished due to strong winds late in 1949.

Strong and hot north-westerly winds late in October or during November often cause an undue drop of setting fruit, affecting the

size of the crop in addition to blemishing
the fruit.   These factors result in a reduction
of the percentage of exportable fruit.

3. SOILS: "The soils of the Sundays River Valley are
mostly of alluvial origin and are derived from Karroo
matter.   These soils vary from sand to sand loam and
are rich in plant nutrients especially in available
phosphate and potash; they also have good physical
properties".   Medium loams generally furthest away from
the river banks are of colluvial origin and are often
inclined to be heavy with restricted drainage.   These
soils are generally alkaline with a pH of over 7.

        Although soils in this area are generally
fertile, continuous leaching of plant foods on lighter soils
necessitate intensive applications of nitrogen, preferably
in organic form.   From 1 - 2 lbs of available nitrogen are
applied per full bearing tree per annum.   Soils with
restricted drainage require particularly careful irrigation
to ensure adequate penetration and yet to avoid over-
irrigation.   Careful cultivation is also required to
prevent plough sole formation or to break this sole where
already established.

        The soils of the Gamtoos Valley are mostly of
alluvial origin, derived partly from the Karroo and partly
from Tafelberg quartsitic formations.   The soils are
deep and range from sandy loam to a loam with a good struc-
ture and containing all the necessary plant nutrients.

4. IRRIGATION: Gamtoos River Valley: The main supplies
of irrigation water are flood and spring water from the
Komga River and flood water from the Grootrivier, which
has its catchment area in the Karroo.   Irrigation is
effected by means of gravitation canals from diversion
weirs on the river or by pumping the water from the river.
Sundays River Valley: The main supply of irrigation water
is obtained from Lake Mentz which has its catchment area
in the Karroo. A limited number of growers around Kirkwood
have wells which serve as a standby during periods of
severe drought when irrigation water contains a high brak
concentration.
Uitenhage: Irrigation water is obtained from boreholes
and artesian wells.

5. INSECT PESTS AND PLANT DISEASES: The most important
insect pests affecting citrus trees and fruit in the area
are Red scale, mussel scale, soft brown scale, Mediterranean
fruit fly, False Codling Moth, mealy bug, ants and black
aphids.   False Codling Moth is not, as yet, a pest in
the Gamtoos River Valley.

        Other than the occurrence of "pitted stem" in
grapefruit, which is a disease of physiological origin, the
area is comparatively free of plant diseases.

6. RAILWAY AND ROAD COMMUNICATIONS: Of the 60 mile
distance from the centre of the Gamtoos valley to Port
Elizabeth, 40 miles are asphalted road while the remain-
ing 20 miles are gravelled.   The valley is also served
by a narrow gauge railway line from Pantentie to Lang-
kloof.

        The Sundays River Valley is connected with
Port Elizabeth by means of the national road from Port
Elizabeth to Zuurberg pass.   The subsidiary road
through the valley from Addo to Kirkwood is also tarred

most of the way.   A railway branch line from Kirkwood
to Addo joins the main line from Johannesburg to Port
Elizabeth at Addo.   Sundays River growers enjoy an ad-
vantage over Gamtoos Valley growers in respect of the
type and conveniency of road and rail communications.

7. CO-OPERATIVE FACILITIES: It has been estimated that
over 80 percent of the entire crop produced in the Eastern
Cape Coastal area, is packed co-operatively.   In addition
to the Sundays River Co-operative Citrus Co. and the
"Patentlose Koöperatiewe Sitrus Maatskappy" the two main
packhouses in the area, co-operative packing facilities
are extended by the Uitenhage Co-op.

          Both the Gamtoos and Sundays River Valleys offer
excellent opportunities for co-operative handling of citrus
crops.   The fact that a number of growers in these areas
are not yet members of a packhouse may be ascribed to a
certain amount of domestic strife and perhaps unwarranted
criticism of the co-operative system applied. With elimina-
tion of possible weaknesses in the present organisation and
management of these packhouses which are mainly caused by
shortage and inefficiency of labour, it would be possible
to overcome gradually the objections on which grounds
some growers refrain from packing their fruit co-operatively

8. TYPE OF FARMING: In the Gamtoos River Valley, citrus
and tobacco are the main crops while vegetables (mainly
potatoes) and wheat are regarded as useful subsidiary
enterprises.   An increasing tendency exists to concentrate
on citrus only.

          In the Sundays River Valley citrus is the main
enterprise on practically all farms.   On a number of farms,
particularly in the upper reaches of the valley where there
is a condensed milk factory at Kirkwood, dairying and
lucerne production are however significant enterprises.
Some farmers in the lower section of the valley produce
fresh milk for Port Elizabeth.   Poultry and bee farming
are found to a limited extent and in and around Kirkwood
figs are produced commercially along the canals for factory
consumption in Port Elizabeth.

9. MAIN SPECIES AND VARIETIES OF CITRUS: The following
species and varieties of citrus fruit are grown in the
area:
          Oranges:

     Navels: Washington navel.
     Midseasons: Mediterranean sweets, midnight and
                    Moss Seedless, Seedlings.
     Valencias: Du Rois, Lue Gim Gongs.
     Grapefruit: Marsh seedless and Cecily seedless.
     Lemons: Eureka and Lisbon.

All varieties do well except grapefruit which, owing to
the virus causing "pitted stem" experience a rapid decline
in growth and production after only approximately 15 years.

10 FUTURE EXPANSION IN THE AREA: The limiting factor
to expansion in the Sundays River Valley was mainly a
shortage of water.   With increased storage capacity in
Lake Mentz after completion of the alterations which
are at present being effected, considerable expansion
will be allowed in this area.   In the Gamtoos River
Valley extensive opportunities exist for future expansion
as both suitable soil and sufficient water are available.

NORTH EASTERN CAPE.[1]

1. **GEOGRAPHIC LOCATION:**   The citrus producing areas of the North Eastern Cape occur in the districts of Fort Beaufort, Adelaide, Alice, King Williamstown and Grahamstown.

The main concentrations of orchards are along the Kat River, in a northerly direction from the Township of Fort Beaufort, and in the Bathurst - Fish River area. Citrus orchards are, however, also found in the following localities:

Parts of Alexandria along the Bushman's River;
Albany along the Fish River, North and West of Grahamstown;
Parts of Adelaide and Bedford along the Koonap and Kaka Rivers;
Parts of Victoria East along the Tyumie and Keiskama Rivers;
Parts of Kingwilliamstown - Keiskamahoek and along the Izeli River;
Parts of Stutterheim, Komgha, East London, and Port St. Johns along the Umzimvubu River.

2. **CLIMATE:**

   (a) **Rainfall:** The average distribution of rainfall, recorded during the period 1934 - 1950 was as follows:

August to October	- 1.4 inches per month.
November to January	- 2.0 inches per month.
February to April	- 2.1 inches per month.
May to July	- 0.8 inches per month.

   The average annual rainfall during this period amounted to 18.9 inches.

   It is considered that the above average rainfall is insufficient for the successful development of orchards not only as regards the total downpour but also as regards the monthly averages. Unreliability of rainfall and the heavy precipitation of rain when it does occur, create an urgent necessity for storage facilities of irrigation water. Insufficient water during the critical period October to December is a severe problem in citrus production in the area.

   Drought prevailed in the area since 1944. As regards conditions during the period covered by the cost surveys, the 1948 crop was favourably affected by relatively favourable conditions during the period when the crop was set and the fruit developed. The conditions for setting the 1949 crop were extremely poor and general crop failures were experienced. Although conditions during the critical period for the 1950 crop were more favourable than during the previous season, the prolonged drought began to have severe effects on trees in general and poor crops were harvested.

   (b) **Temperatures:** The area is characterised by extreme temperatures during the course of the seasons. Very high temperatures (well over

[1] Information under this section submitted by Mr. C.A. Lombard, Field Officer, North Eastern Cape

100 °F) during the summer months are generally
followed by damaging frosts during winter. Al-
though high temperatures are not necessarily
a deterrent factor in citrus production these
temperatures are often accompanied by wind of high
velocity during the setting period of the crop.
The two factors combined often cause a severe
reduction in the size of crop.

Frost is an important factor in the
Kat River, Fish River, Grahamstown and Alice areas.
Frost damage to fruit occurs practically every
year and is one of the reasons why such a high
percentage of the crop of the area consists of
Navel oranges. During 1948 and 1949 however,
little or no frost damage occurred. During 1950
when the crop was only approximately one-fifth of
normal, damaging frost occurred during July.

(c) Hail and winds: Both hail and wind are factors
affecting citrus production in the area. Hail
occurs generally during the period August to
March and particularly in the localities of the
Kat River, Fish River, Alice and Adelaide. Hail
storms usually move in belts and are accompanied
by high winds which increase the damage.

The area as a whole is subject to strong
prevailing winds. Wind-scarred fruit is a serious
factor in citrus production in the area and
extensive windbreaks are an essential requirement
in successful citrus production. Although winds
are experienced during all the seasons with the
exception of winter, the most damaging winds occur
during the period August to November when crops are
extremely sensitive. Windstorms are particularly
severe in the Grahamstown and coastal localities.

3. SOILS: Recent alluvial sand loam and loam soils along
the rivers (Fish -, Kat -, Koonap -, Tyumie -, Kowie -,
Bushman's -, Kariega -, Keiskama -, and their tributaries)
are favoured for citrus orchards as these soils are deep,
usually well-drained, of high humus and nitrogen content
and of a light texture with a good structure. These
soils are usually well supplied with all plant nutrients
required by citrus trees except phosphates.
"Soils in the Bathurst area are of colluvial and alluvial
origin derived from the Dwyka formations and Witteberg
quartsites".

Lime and associated alkali- substances are
prevalent in most soils in the area. This factor is
accentuated by supplies of brak water for irrigation
purposes. The concentration of brak in the water is
so high that the first few days floodwaters are usually
allowed to flow to the sea before the floodwaters can be
used for irrigation.

Fertilising programs in the area usually consist
of 150 - 250 lbs of Kraal manure per tree every alternate
year plus either 5 lbs of sulphate of Ammonia or 3 lbs of
Ammonium nitrate per tree given in two or three applications
just after rain or irrigation.

4. IRRIGATION: No central irrigation scheme exists in the
area and rivers provide the main supply of irrigation water.
Although some growers have their own storage dams, fed by

gravitation or pumping from the rivers, most growers
irrigate direct from the river.   Water is diverted from
the river by privately owned weirs from which furrows
lead or from which water is pumped.   In view of the
unreliability of flood water, provision for storage of
water is recommended in the area.

The quantity of floodwater available for irrigation
is reduced considerably by the presence of brak as mentioned
above.   Irrigation in the area is not only a costly but
a highly specialised task.   Growers are constantly on
guard to avoid an undue accumulation of brak salts in their
soil as a result of injudicious irrigation.

5.   <u>INSECT PESTS AND PLANT DISEASES</u>:   The main insect
pests of economic significance in the area are:
Red scale, Mediterranean fruit fly, False Codling moth
Citrus Thrips, Mussel scale, Black Aphis, Soft scale and
Mealy bug.

Plant diseases which occur in the area are:
Root rot, Scaly bark, Brown rot on fruit, Mottle leaf,
Creasing (weak skins) Sooty mould and sooty blotch are
two fungus diseases occurring on the fruit produced in
parts of the area.

6.   <u>CO-OPERATIVE FACILITIES</u>: There are four co-operative
citrus companies in existence in the area.   Packing
facilities are extended by two of these viz: the Kat
River Co-operative Co. at Fort Beaufort and The Bathurst
Farmers Union at Grahamstown.   The latter organisation
may be described as a general purpose co-operative as it
handles all the products of its members and not only citrus.

Centralised co-operative packing is prevented on
a large percentage of the crop produced in the area owing
to the scattered nature of the numerous localities in which
citrus fruit is produced.   The total crop produced in
each of these localities is too small to warrant the
establishment of co-operative packing units.   It is
however possible that greater use may be made of existing
co-operative packhouses if the ground for criticism which
is expressed by some growers could be eliminated.   During
the past seven years, however, economic conditions in the
area were extremely poor and with enforced savings which
had to be effected, efficient administrative staff could
hardly be afforded.

7.   <u>NATURE OF FARMING</u>:   General farming is practised on
all farms on which citrus is grown in the area.   In the
Kat River Valley, farmers grow citrus, wheat, potatoes,
vegetables, tobacco and lucerne while beef cattle and sheep
are also important enterprises.   In the locality of
Adelaide, livestock are of even greater significance
in the farming organisation.   In the Albany - Bathurst
areas, less wool is produced but meat, pineapples, chicory
and citrus are important products.

8.   <u>MAIN VARIETIES OF CITRUS GROWN</u>:   The Washington Navel
orange is by far the most important citrus variety grown
in the area as a whole.   This is mainly due to natural
suitability and the frost hazard which has checked the
planting of later maturing varieties of citrus.   It is
estimated that 85-90% of the crop produced in the entire
area, consisted of Navels, 10-12% of Valencias and the
balance of Grapefruit, lemons, naartjies and midseason
oranges.   In the Grahamstown area, where frost is not
as severe as in the main localities, Valencia oranges are
produced in fair quantities.

9. <u>POSSIBILITIES FOR FUTURE EXPANSION</u>: Until provision can be made for large-scale water storage schemes, expansion of plantings in the area is not recommended. Experience during the past 25 years has proved that no security can be expected by citrus growers in the area while they are dependent on floodwater for irrigation of their orchards. It has been estimated that 1500 morgen of potential orchard land is still available for planting if sufficient water could be provided for irrigation.

<u>NATAL</u>[1]

1. <u>GEOGRAPHIC LOCATION</u>: Although citrus fruit is produced at scattered points all over Natal, the main concentration of citrus orchards is found along the Mooi River at Muden. Muden is situated 17 miles to the West of Greytown and 120 miles north-west of Durban. The locality is approximately 3000 feet above sea-level.

2. <u>CLIMATE</u>:

   (a) <u>Rainfall</u>: The Muden Valley had an average rainfall of 25.5 inches per annum during the past 30 years. In the following summary, the average dispersal of annual rain is shown as it occurred during the period on record as well as during the period 1948 - 1950.

Month.	Av. for 30 years inch.	1948 inches	1949 inches	1950 inches
January	3.99	4.51	3.78	1.04
February	3.86	3.15	4.37	1.47
March	2.96	3.66	2.91	2.95
April	1.26	1.37	2.74	2.88
May	0.66	0.37	0.75	0.68
June	0.46	-	0.11	-
July	0.39	-	0.22	0.36
August	0.50	-	0.03	1.16
September	1.09	0.21	0.68	0.06
October	2.39	3.35	3.02	2.08
November	3.59	4.23	3.88	1.51
December.	4.36	6.39	5.00	4.28
T O T A L	25.51	27.34	27.49	18.47

       It is indicated that a major percentage of the annual rainfall occurred during the period October to March. The downpour occurs mostly in the form of thunderstorms. When the rains are late, the supply of irrigation water in the Mooi River runs low and the setting of the new crop is affected adversely. The period 1948 - 1950, covered by the cost survey, was normal in respect of rainfall received during the critical months for the crop.

   (b) <u>Temperatures</u>: In the Muden Valley, very high summer temperatures accompanied by low humidity are generally experienced. In the coastal areas, N'Kwaleni and Pongola, both temperature and humidity

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[1] Information under this section submitted by Mr. D.H. Hugo, Field Officer, Natal.

is high in summer.   During winter mild temperatures
prevail in the Muden Valley and mild to low tempera-
tures in the Coastal areas.

(c) Hail, frost and wind:
Hail: Hail damage to fruit is a common hazard in
citrus production in the Muden Valley. Damage to
trees occurs seldom, however.
Wind: Dry north-westerly winds prevail in spring.
These winds do not affect the drop when rains are
early but during comparatively dry spring seasons,
the setting of the crop is affected adversely.
Frost: Light frost damage is experienced approximate-
ly once in every 3 to 4 years, while severe frost
damage occurs approximately once in every 12 years.
Frost is, however, limited to certain lowlying
orchards along the river. Frost damage is avoided
by planting early maturing navel oranges in the
localities which are known to be subject to frost.

3. SOIL: Muden soils may be classified into two types viz:
red-earth which is found on the hills and alluvial soils
along the rivers. Both types of soil are of a heavy texture
and vary from clay loam to clay with the exception of the
soils of a few orchards which are more of a sandy-loam. On
the clayey types of soil drainage is a difficult problem.
Impenetrable layers of Beaufort shale below the surface
limit the area of land suitable for citrus trees. Soils in
the Muden Valley are inclined to be alkaline.

        Fertilising of orchards was, during the past
15-20 years, confined to the application of nitrogen only.

4. IRRIGATION: The Mooi River is the only supply of
irrigation water available to growers. When spring rains are
late irrigation becomes a severe problem.

5. INSECT PESTS AND PLANT DISEASES: Red scale is the main
insect pest from a commercial point of view in the area. It
is estimated that control measures in this respect cost
growers from 2/- to 2/6 per tree per annum. Thrips is
the only other insect pest of major significance in the
Muden area.   Plant diseases: owing to the poorly drained
soils on which orchards are established in the area, root
diseases are common in the Muden Valley. Black spot is a
comparatively new disease in the area but it appears as if
the disease is assuming increasing proportions and control
measures have already been devised.

6. RAIL COMMUNICATIONS: The fruit of the Muden Valley is
conveyed by railway motor-bus to Greytown from where it is
sent by train to further destinations.

7. CO-OPERATIVE FACILITIES: Only one co-operative citrus
packhouse exists in the area which is well suited to co-op-
erative handling of crops. In addition to packing of fruit,
the packhouse undertakes picking and transport of fruit and
provides equipment for insect and pest control. Approximate-
ly one-half of the entire crop produced in the Muden Valley
is owned and packed by a Citrus Estate.

8. GENERAL NATURE OF FARMING: On the majority of citrus farms
in the area, citrus is the only enterprise. On a small per-
centage of farms lucerne and vegetables constitute relatively
insignificant sidelines.

9. MAIN VARIETIES OF CITRUS FRUIT GROWN: Navel and Valencia
oranges are the only varieties of citrus grown in the Muden
Valley.

10. POSSIBILITIES FOR FUTURE EXPANSION: In the Muden Valley further expansion is limited by the scarcity of suitable soil for citrus production. Extensive expansion is however still possible in the localities of Weenen along the Tugela River and of Pongola and N'Kwaleni near Zululand.

WESTERN PROVINCE[i]

1. GEOGRAPHIC LOCATION: The main concentration of citrus orchards in the Western Cape area occurs in the localities of Citrusdal, Clanwilliam and Swellendam. Citrus production is, however, also practised on a commercial scale at scattered points in the localities of Paarl, Wellington Heidelberg, Barrydale, Calitzdorp, Ladismith, Mosselbaai and at various points along the Orange River.

2. CLIMATE:

(a) **Rainfall:** An indication of the dispersal of the annual rainfall received during the period covered by the survey and the average dispersal of rainfall during the past eight years is shown below for the Citrusdal area.

Month.	Rainfall in inches. 1948	1949	1950	Av. for period 1943 - 1950.
January	.00	.06	.00	.01
February	.15	.00	.02	.10
March	.85	.45	.17	.71
April	.81	1.00	1.63	.49
May	2.62	.97	.44	1.67
June	1.40	1.45	2.11	2.00
July	2.40	1.51	3.43	2.18
August	2.00	1.47	.10	1.82
September	1.43	.98	2.13	1.15
October	1.55	.69	.46	.91
November	.04	2.74	1.21	.92
December	.15	.09	.68	.13
TOTAL	13.4	11.41	12.38	12.08

The Western Cape area receives a predominant percentage of its annual rainfall during late Autumn, winter and early Spring i.e. from May to September. During the critical period for citrus production September to December, when the trees blossom and the crop is set, fairly dry conditions generally prevail and irrigation has to be applied. The citrus crop ripens, on the other hand, during the rainy season. Picking is often delayed by unfavourable weather while the moist conditions under which export fruit is sometimes handled, is inducive to the development of waste.

(b) **Temperature:** An indication of temperature conditions in the area may be obtained from the

[i]Information for this area submitted by Mr. G.F. Joubert Field Officer for the Western Cape area.

following maximum and minimum temperatures registered in the Groot Drakenstein area near Paarl. Unfortunately the same information was not available for Citrusdal.

Month.	1948 Max. °F	Min.	1949 Max. °F	Min.	1950 Max. °F	Min.	Past 6 Years. Max. °F	Min.
January	06.0	61.0	85.5	60.9	88.1	62.0	85.9	60.6
February	86.2	62.6	86.6	61.5	85.0	62.7	87.3	61.9
March	78.9	56.4	87.1	59.9	83.4	56.0	83.8	58.5
April	75.1	53.5	75.6	48.6	72.1	48.9	75.6	51.3
May	69.9	49.5	71.1	44.4	70.4	47.9	72.9	47.0
June	62.1	40.5	71.7	42.1	67.0	41.6	65.0	42.7
July	61.3	40.4	65.9	38.9	60.8	41.4	61.7	41.5
August	64.6	43.6	64.3	44.6	66.9	44.3	64.5	43.5
September	65.3	44.4	68.4	46.8	67.4	46.5	68.7	47.3
October	70.4	51.5	75.2	50.8	76.6	49.8	61.5	51.9
November	78.8	55.0	76.1	55.2	75.7	55.3	78.4	55.0
December.	80.1	54.4	75.8	50.9	77.8	55.2	79.0	54.7

The area is characterised by moderate summer and winter temperatures. During the period 1948 - 1950 the Citrusdal area enjoyed normal conditions of climate both in respect of rainfall and temperatures.

(c) Hail, frost and winds: Hail and frost damage is not a factor in citrus production in the Western Cape as it practically never occurs. South Easterly winds prevail during the summer months but wind damage to trees and fruit is seldom experienced.

3. SOIL: The soils of the area may be classified as follows on the basis of origin and structure:
(a) Residual soils along the lower slopes of mountain ranges. These soils are usually of a fine to coarse sandy type while clayey layers may occur in the sub-soil.

(b) Alluvial soils along the banks of the various large rivers and their tributaries. These soils are of a sand to sandy loam type.

(c) Some orchards are found on soil of Bokkeveld shale origin. The soils are however not regarded as of the same quality as the above types and are in addition generally shallow.

4. IRRIGATION: Available sources of irrigation water in the area are: Mountain streams - of importance to the entire area;
Rivers:- most growers in the Citrusdal and Clanwilliam areas pump water from the Olifantsrivier;
Boreholes - particularly in parts of the Little Karroo;
Irrigation schemes - these apply only to a few growers in the Vredendal area.
The water supply of the area is fairly reliable owing to an extremely consistent annual rainfall.

5. INSECT PESTS AND PLANT DISEASES: Red scale, thrips, Mediterranean Fruit fly and the Argentine Ant are the main pests affecting the entire area. Mussel scale occurs only in the Swellendam and Heidelberg areas while Mealy bug are confined to the Citrusdal, Paarl, Wellington and

3wellendam areas.

Some of the most important plant diseases
affecting citrus orchards are: dry root rot, various
gum diseases, stempitting in grapefruit trees, and scaly
bark.   Various deficiency diseases caused by a lack
of specific trace elements, occur in the coastal areas
as far as Mosselbaai.

6. RAIL AND ROAD COMMUNICATIONS: Three main railway lines
traverse the areas in which citrus is grown commercially.
These are: the main line from Cape Town to Johannesburg,
the garden route line from Cape Town to Port Elizabeth
and the main line from Cape Town to Bitterfontein. Citrus-
dal growers are reliant on a railway roadmotor service
to convey their fruit to Eendekuil which is the nearest
railway station to them.   The Western Cape growers are
actually better served by the roads at their disposal
than by existing railway lines. The scattered nature of
production particularly along the south western coast
causes many growers to be at considerable distances from
the one railway line which serves that area.

7. CO-OPERATIVE FACILITIES: Only one important Co-operative
Packhouse for citrus fruit exists in the Western Cape viz:
"Die Goedehoop Koöperatiewe Sitrus Maatskappy Beperk" at
Citrusdal.   In addition to packing citrus fruit, this
company supplies growers with various farming requisites.
Another smaller co-op, The Brakriver Co-op. Fruit
Exporters Ltd., handles the crops of a few growers in the
Mosselbaai area but renders no other services to growers.
The "Langeberg Ko-operasie Beperk" at Ashton is a loose
co-op. for citrus growers supplying farming requisites to
growers, in the area from Robertson to George.

Factors deterring the development of more
comprehensive co-operative action in citrus farming in the
area are the scattered nature of citrus farms and wide
distances separating them, and the large number of relatively
small growers who produce citrus in areas other than
Citrusdal.

8. NATURE OF FARMING: The general nature of farming
practised may be described as decidedly mixed. As regards
the enterprises practised, the area may be divided into
several zones:
Calvinia to Porterville:- Livestock (cattle, sheep and
pigs) grain, deciduous fruit, vegetables (for canning
and for the market);
Paarl, Wellington, Villiersdorp, Robertson: - deciduous
fruit, wine and vegetables;
Swellendam to Mosselbaai, George Uniondale: - deciduous
fruit, sheep and wool, grain, vegetables for canning;
Montagu, Calitzdorp, Oudtshoorn:- grain, deciduous fruit,
wine, sheep and goats, dairying and vegetables;
The Karroo areas:-sheep, and deciduous fruit.

Citrus is grown either as a minor side-line
or in varying degrees of importance in the farming
organisation on each of the farms in the area. Only in
the Citrusdal area may it be said that citrus is the main
enterprise on most of the farms.

9. MAIN VARIETIES OF CITRUS: Navel, Valencia and seedling
oranges are the main varieties grown in the area. Grapefruit
production is on the decline owing to the socalled "stem-
pitting" disease. Naartjies and sevilles do well but are not
produced in significant quantities. Particularly high

yields of lemons are usually obtained in the Paarl
Wellington area. In the areas to the east of Wellington,
practically only Navel and valencia oranges are grown.

10. <u>FUTURE EXPANSION</u>:   Although unlimited areas of suitable
land are available in the Western Cape for expansion of the
citrus enterprise, it is considered that an irrigation
scheme for storage of water is required before any intensive
development could be effected.   Particularly in the
Citrusdal area, considerable opportunity   for expansion
offers itself if security in production could be obtained
in the form of a supply of irrigation water at the time
when it is required.   At the moment the Olifantsrivier
flows to the sea in winter, when water is not required, and
is dry in summer when orchards need irrigation.

Calculation of average cost of production (including interest) per pocket for each variety of citrus fruit produced on farms during the period 1948 - 1950.

Variety	1948	1949	1950	1948-50.
	Pence	Pence	Pence	Pence.
Navels	29.525	33.263	30.393	30.888
Midseasons	21.954	21.154	19.201	20.750
Valencias	21.244	25.143	21.550	22.558
Grapefruit	14.810	20.261	17.473	16.991
Lemons	21.963	27.818	19.604	22.064
Naartjies	67.820	49.140	18.609	33.989
Sevilles	126.945	44.734	52.012	63.393
All Citrus Fruit	23.111	27.065	23.437	24.371

Note: For the purpose of the above calculation it was assumed that cost per tree was the same for each of the varieties of citrus fruit. Differences in cost of production per pocket were consequently attributed to the influence of the yield factor only. As considerable differences occurred in the percentage of non-bearing trees between varieties, an adjustment is made below to eliminate the influence of this inequality on cost per pocket for each variety. When each variety is allowed an annual rate of replacement of 3⅓ percent of bearing trees (based on an assumed productive life of 30 years for citrus trees), the accumulated percentage of non bearing trees in orchards in which no expansion is effected, would be 13-1/3 percent over a period of 4 years. It will be remembered that trees of 5 years and older were regarded as bearing trees for the purpose of the investigation. Calculated on this basis, the average cost of production for the individual varieties was as follows during the period 1948 - 1950: (Only the results of small farms were available in suitable form for this calculation).

Variety:	Cost of production including interest per pocket (1948 - 1950)
	pence.
Navels	30.98
Midseasons	21.63
Valencias	19.61
Grapefruit	18.64
Lemons	21.88
Naartjies	29.86
Sevilles	41.63
All Citrus fruit	23.12

ANNEXURE 3:

Analysis of average costs incurred and profit realised in producing for and marketing a case of citrus fruit on overseas markets during 1950.

Item per case.	All Citrus Fruit exported.		Fruit exported to U.K.	
	s. d.	% of gross proceeds	s. d.	% of gross proceeds.
Total proceeds	33/7.119		35/9.450	
Interest on undistributed proceeds.	0/0.851		0/0.851	
Total Gross proceeds	33/7.970	100	35/10.301	100
Cost of prod.incl.int.	4/8.037	13.9	4/8.037	13.0
Picking	0/6.600	1.6	0/6.600	1.5
Transport to P/House	0/4.440	1.1	0/4.440	1.1
Packing	1/1.360	3.3	1/1.360	3.1
Packing material	4/3.100	12.7	4/3.100	11.9
Total cost F.O.R. Growers station	10/11.537	32.6	10/11.537	30.6
Railage to port	0/9.819	2.4	0/9.819	2.3
S.A. Charges	1/2.064	3.5	1/2.064	3.3
Ocean freight	5/1.091	15.1	5/2.509	14.5
Port agents charges	0/1.816	0.5	0/2.398	0.6
Transhipment charges	0/0.421	0.1	0/0.557	0.1
Salesmen's Com.	1/8.810	5.2	2/3.489	6.4
Handling charges	0/0.467	0.1	0/0.617	0.1
Inland transport	0/4.640	1.1	0/6.129	1.4
Cold storage charges	0/0.423	0.1	0/0.559	0.1
Levies	0/7.127	1.8	0/7.127	1.7
Fruit wasted in Switzerland	0/0.063	—	—	0
Adj. for railage (Clause 21/5)	0/0.055	—	0/0.055	—
Merged proceeds i.r.o. compulsory retention	0/9.404	2.3	0/9.387	2.2
Total charges after packing	10/10.200	32.2	11/8.710	32.7
Total Gross charges	21/9.737	64.8	22/8.247	63.3
Nett profit per case	11/10.233	35.2	13/2.054	36.7

ANNEXURE 4.

Analysis of average costs incurred in producing
for and marketing a pocket of citrus fruit through
the depots, and sales representatives employed by
the Citrus Board during 1950.

Cost item	Cost per pkt. in pence.
Cost of production (incl.int)	24.016
Picking, transport, packing	16.731
Railage	7.131
Selling charges	2.796
Levies	2.245
Total Cost	52.919
Gross proceeds realised at fixed local prices	48.054
Loss per Pocket	4.865

If the merged proceeds on exportable quality
fruit of exporter growers which was sold locally but
participated in the export pools, are not taken into
consideration, a loss of 4.865 pence per pocket was
sustained on an average, on each pocket of citrus fruit
sold by the markets and depots of the Citrus Board during
1950. As the local market pools were credited with
these merged proceeds to the extent of 8.873 pence per
pocket, the actual balance between costs and revenue
on fruit sold through the markets and depots amounted
to a profit of 4.008 pence per pocket.

ANNEXURE 5:

Weighted average profit per pocket - exported and local market fruit combined - 1950.

Revenue:

4600218 cases @ 33/7.970 per case	=	£ 7743125.3
6555269 pkts. @ 3/7.508 per pkt.	=	£ 1188361.0
i.e. 7409619 case equivalents[i]	=	£ 8931486.3
17289109 pkt. equivalents[ii]	=	8931486.3
Revenue per pocket eq.	=	10/3.983
Revenue per case eq.	=	£1 - 4 - 1.294

Costs:

4600218 cases @ 21/9.737 per case	=	£ 5016863.6
6555269 pkts. @ 4/3.257 per pkt.	=	£ 1400014.2
i.e. 7409619 case equivalents	=	£ 6416877.8
or 17289109 pkt. equivalents	=	£ 6416877.8
Cost per pocket eq.	=	7/5.076
Cost per case eq.	=	17/3.845

Profit:

Gross Revenue less Gross Costs	=	£ 2514608.5
Profit per pocket eq	=	2/10.907
Profit per case eq.	=	6/9 .449

The above average profit of 6/9.449 per case equivalent was based on the following crop analysis and the prices realised as indicated.

A. 68.8 percent 1st grade fruit of _exporters_ which participated in export pools at an average price of 33/7.970 per case;

B. 1.9 percent 1st grade fruit of _non-exporters_ which participated in local first grade pool at an average price of 3/9.029 per pkt;

C. 29.3 percent 2nd and other grades of fruit of _all growers_ which participated in local market pools for these grades at an average price of 2/4.898 per pocket.

Group.	Percentage of crop.	Average revenue per case eq.	Average cost per case eq.	Average profit or loss per case eq.
A	68.8	33/7.970	21/9.737	+11/10.233
B	1.9	8/9.067	9/11.600	- 1/2 .533
C	29.3	5/7.428	9/11.600	- 4/4 .172
All groups	100	24/1.294	17/3.845	6/9 .449

[i] 1 case = approx. 70 lbs of citrus fruit

[ii] 2-1/3 pockets = 1 case.

Analysis of percentage of each variety of citrus fruit exported during
the period 1948 — 1950.

(Percentages based on fruit sold through the Citrus
Board).

Variety.	Year.	Cases Export-ed.	Pocket eq.[i] Exported	Pockets sold locally.	Total No. pockets	Percentage exported.
Navels.	1948	1,045,727	2,440,029	1,980,241	4,420,270	55.2
	1949	1,168,548	2,726,611	1,904,459	4,631,070	58.9
	1950	1,597,861	3,728,341	2,125,572	5,853,913	63.7
Valencias	1948	1,836,014	4,284,032	2,781,415	7,065,447	60.6
	1949	2,027,050	4,729,782	3,163,738	7,893,520	59.9
	1950	2,329,231	5,434,871	2,833,786	8,268,657	65.7
Other oranges	1948	148,244	345,902	435,434	781,336	44.3
	1949	171,339	399,790	365,962	765,752	52.2
	1950	188,418	439,641	371,414	811,055	54.2
Grapefruit.	1948	429,740	1,002,726	635,174	1,637,900	61.2
	1949	458,041	1,068,762	242,805	1,311,567	81.5
	1950	447,054	1,043,125	449,627	1,492,752	69.9
Lemons.	1948	15,443	36,033	207,126	243,159	14.8
	1949	39,313	-91,730	176,503	268,233	34.2
	1950	59,283	138,326	187,243	325,569	42.5
All Varieties[ii]	1948	3,475,168	8,108,724	6,039,390	14,148,114	57.3
	1949	3,864,291	9,016,677	5,853,467	14,870,144	60.6
	1950	4,621,847	10,784,308	5,967,642	16,751,950	64.4

[i] 1 case = 2⅓ pockets.

[ii] Excluding naartjies.

COST OF PRODUCTION OF CITRUS
FRUIT ADJUSTED FOR INCREASES.
DURING THE PERIOD 1950-51 TO 1952-53.[i]

[i]Adjustments made by the Division of Economics and Markets, Department of Agriculture, Pretoria.

Cost Item.	Av. cost for 1949 & 1950. (pence per pocket)	% increase to 1952.	Adjusted costs for 1952.
MOTOR:	0.448		0.538
Interest	0.048	9.4	0.053
Depreciation	0.138	9.4	0.151
Repairs	0.054	29.3	0.070
Running cost	0.208	26.7	0.264
LORRIES:	0.682		0.831
Interest	0.050	9.4	0.055
Depreciation	0.166	9.4	0.182
Repairs	0.123	29.3	0.159
Running Cost	0.343	26.7	0.435
TRACTOR:	1.313		1.575
Interest	0.142	7.2	0.152
Depreciation	0.372	7.2	0.399
Repairs	0.190	29.3	0.246
Running Cost	0.609	27.7	0.778
POWER SPRAYS AND DUSTERS	0.148		0.163
Interest	0.030	1.8	0.031
Depreciation	0.074	1.8	0.075
Repairs	0.020	29.3	0.026
Running Cost	0.024	27.7	0.031
ENGINES:	0.565		0.676
Interest	0.058	1.9	0.059
Depreciation	0.122	1.9	0.124
Repairs	0.089	29.3	0.115
Running cost	0.296	27.7	0.378
OTHER FARM EQUIPMENT:	0.800		0.880
Interest	0.156	6.4	0.166
Depreciation	0.513	6.4	0.546
Repairs	0.131	28.3	0.168
FIXED IMPROVEMENTS:	1.497		1.602
Interest	0.918	1.7	0.934
Depreciation	0.369	1.7	0.375
Repairs	0.210	39.5	0.293
LABOUR:	7.110		8.019
European	1.965	7.7	2.116
Coloured	4.795	15.8	5.553
Family	0.152	-	0.152
Grower	0.198	-	0.198
Draught animals	0.100	-	0.100
MANURE & FERTILIZERS:	3.330	27.0	4.229
PEST CONTROL:	0.874	8.6	0.949
OTHER CASH EXPENSES:	1.231	14.9	1.414
SERVICES BY PACKHOUSES:	0.962	8.6	1.045
TOTAL	19.060		22.021
INTEREST ON LAND:	6.645		6.645
TOTAL INCLUDING INT:	25.705		28.666

ANNEXURE 8.

Analysis of average size of citrus crop produced by growers in the Union during 1950.

A. Average size of crop of all exporters excluding estate companies.

Growers with:	% Growers	% of Crop	Av. size of crop pockets.
21000 pockets and more	12.0	50.6	42,125
21000 pockets and less	88.0	49.4	5,583
All Growers	100	100	9,952

B. Average size of crop of all non-exporter growers.

Growers with:	% growers	% of crop.	Av. size of crop (pockets)
21000 pockets and more	0	0	-
21000 pockets and less	100	100	1927
All growers	100	100	1927

C. Average size of crop of exporters excluding estates, and non-exporters combined.

Growers with:	% growers	% of crop.	Av. size of crop (Pkts)
21,000 pockets and more	9.3	47.9	42125
21,000 pockets and less	90.7	52.1	4676
All growers	100	100	8147

D. Average size of crop of all citrus growers including estates[1]

Growers with:	% Growers	% of crop.	Av. size of crop (Pkts)
21,000 pockets and more	9.7	68.3	94,245
21,000 pockets and less	90.3	31.7	4,676
All growers	100	100	13,340

[1]Average size of crop for 6 estates
= 1,171,400 pockets.

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