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MINISTRY OF AGRICULTURE AND NATURAL RESOURCES

RECENT TRENDS
OF
AGRICULTURAL PRODUCTION
AND
PRODUCTIVITY IN CYPRUS

BY

ROGIROS CHR. MICHAELIDES

Director-General

Ministry of Agriculture and Natural Resources.

Nicosia, January, 1970.

M I N I S T R Y O F A G R I C U L T U R E A N D
N A T U R A L R E S O U R C E S

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AGRICULTURE

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RECENT TRENDS OF
AGRICULTURAL PRODUCTION
AND PRODUCTIVITY IN CYPRUS

By

Rogiros Chr. Michaelides
Director General
Ministry of Agriculture
and Natural Resources.

During the recent years, Agriculture in Cyprus underwent a radical change which is manifested by the continuous increase of the value added of the agricultural sector of the economy and the increasingly dynamic contribution of the agricultural exports to the National balance of payments. During the period 1958-1968 the index of Gross Agricultural Product at CFC soared from 100 to 194 and the value of agricultural exports increased from £6,400,000 to £19,000,000. These figures show that Agriculture in Cyprus is the biggest single industry and the first contributor towards earning of foreign exchange.

These developments may be attributed to three main factors:

1. A successful Government Agricultural Policy.
2. Proper marketing organization for most agricultural products.
3. Increased productivity.

In striving for the development of all three sectors of agricultural production namely

1. The Irrigated Agriculture sector
2. The Dryland Farming and
3. The Animal Husbandry sector

the Ministry of Agriculture and Natural Resources has followed a well defined agricultural policy with the following goals:

1. Expansion of the irrigated area through dam construction and other related water conservation measures and higher efficiency in irrigation.
2. Proper utilization of fallow land.
3. Expansion and conservation of fodder crop production.
4. Encouragement of mixed farming.
5. Increase in meat and milk production through the expansion of improved breeds of cattle, sheep, goats, pigs and poultry and application of sound management practices.

6. Development of an efficient Veterinary Service both for the control of animal diseases and for the proper guidance of livestock keepers on animal health matters.
7. Substitution of wheat for barley and application of sound management practices to raise cereal yields.
8. Increase of carob production horizontally through tree plantings on marginal lands, and vertically through proper management.
9. Vertical increase in yields, of tobacco, bananas, citrus, potatoes, carrots and other vegetables, deciduous fruit trees, almond trees and vines through proper management.
10. Expansion of cultivation of early vegetables and table grapes, mainly for export.
- II. Increase in production of deciduous fruit trees through horizontal expansion and better management of the existing trees.
- I2. Intensive programme for soil conservation.
- I3. Proper fertilization techniques through farmers' training and through leaf and soil analysis.
- I4. Application of a sound Plant Protection programme to control plant pests and diseases.
- I5. Improvement of bee-keeping industry.
- I6. Improvements in Rural Home Economics such as
 - a. Improvement of the dietary standards and health of the rural population.
 - b. Improvement of family finances and home management.
 - c. Better human relations.

The above objectives have been persistently pursued through

- I. Extensive infrastructural works.
2. Intensive programme of agricultural research.
3. Provision of adequate incentives and loan facilities to the farmers.
4. Intensive training of the farming population with the object to bring about the necessary changes ^{traditional} in farmers' skills and attitudes, to replace antiquated/techniques of production of a closed economy with modern, scientific ones, properly fit in a commercial type of agriculture.

The results of this policy are clearly shown by the numbers on the following pages, which clearly depict the impressive changes which have occurred in the structure and volume of agricultural production, on the one hand, and the productivity on the other.

I. Irrigated Agriculture:

The main irrigated crops in Cyprus are

- a. Citrus
- b. Deciduous fruit trees
- c. Potatoes
- d. Carrots
- e. Other vegetables (early and ordinary)

a. Citrus

The cultivation of citrus trees has been greatly expanded and intensified during the last ten years. New citrus plantations have been established, mostly at the Morphou area, raising the total citrus-trees acreage from 21,029 in 1958 to 93,827 (aver. 1965-67), an increase of 346%. Total production has increased by 155% i.e. 127,706 tons average of 1965-68 compared with 50,000 in 1958. Yields amounted to 2.5 tons per donum in 1958 and reached 4.33 tons * on the average during the period 1965-68, which indicates an increase of 73%. Presently, a constant correlation is observed between the acreage, the production and the per donum yield. Despite the fact that the rate of increase of the average is much more higher than the increase rate of total production, the latter can be considered satisfactory enough having in mind the period which elapses from the planting to full bearing of the trees.

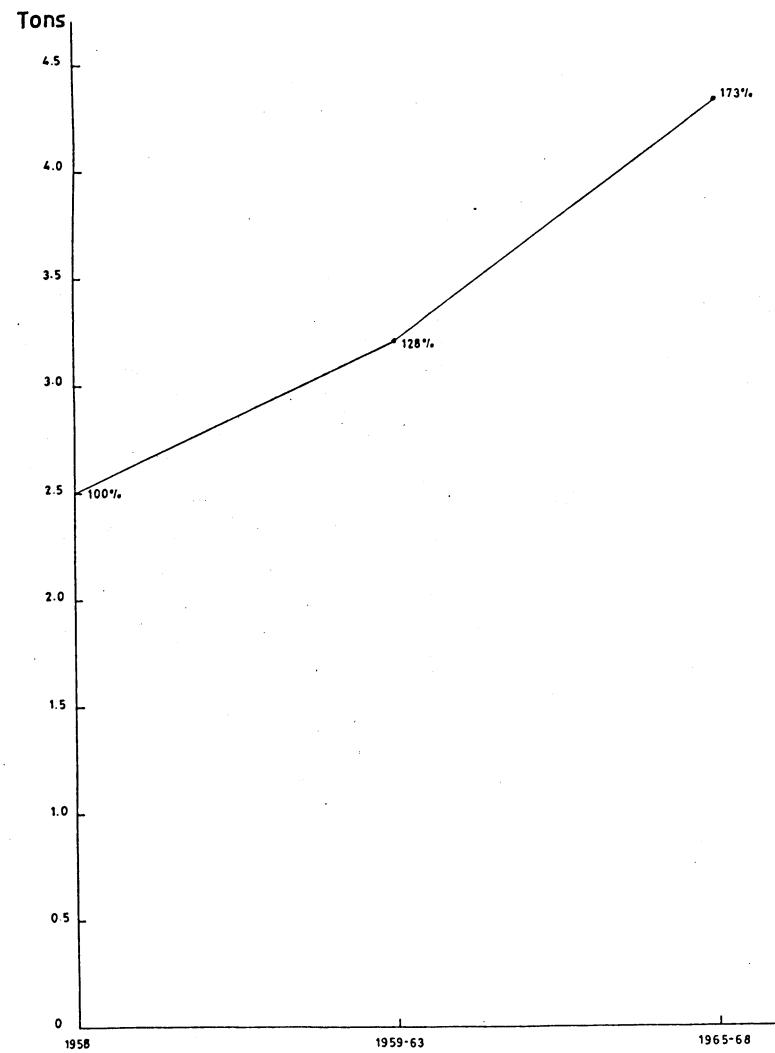
Graphs 1, 2 and 3 show citrus averages in yield per donum, and production and cultivated area for the years 1958, 1959-63 and 1965-68.

*Note. I.

The calculation of the per donum yield of deciduous fruit trees is based on a five-year backdated period, as far as the acreage is concerned, compared to the respective production. The acreage of 1953 and the production of 1958 are used as the basic figures. For the period 1959-63 the average production of this period is divided by the average acreage of 1954-58. Likewise the average production of 1965-68 is divided by the average acreage of 1960-63. In the case of citrus trees the per donums yield of the period 1965-68 is based on a seven-year backdated period i.e. 1958-61 owing to the very high rate of increase in citrus-trees planting from 1960 onwards and the fact that full bearing of citrus trees does not start before the 10th year.

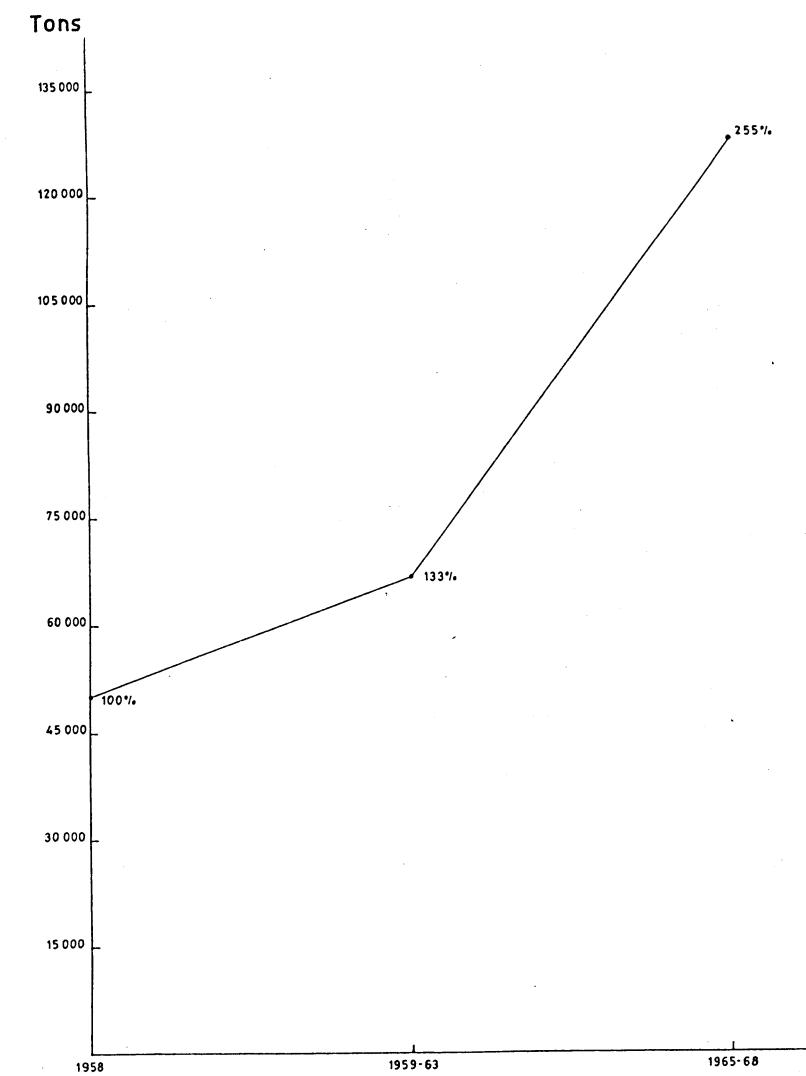
Graph 1

CITRUS - Average yield per donum



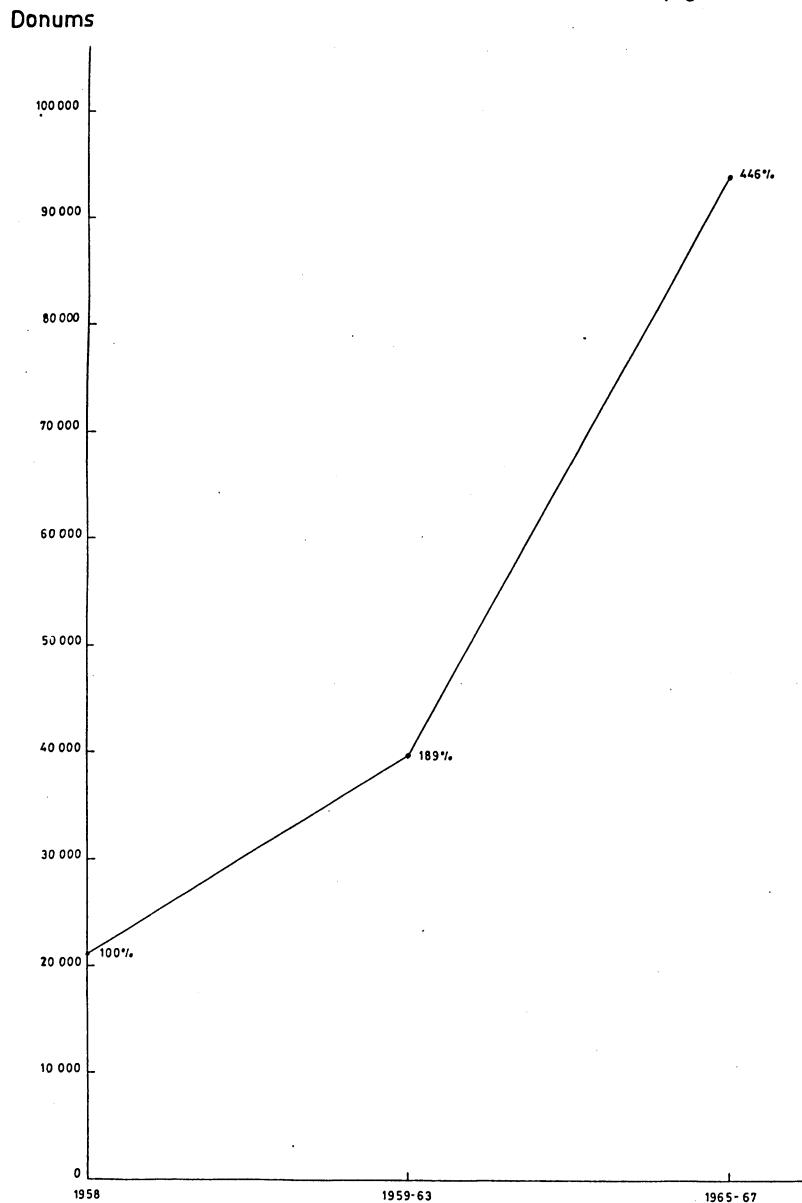
Graph 2

CITRUS - Production (average)



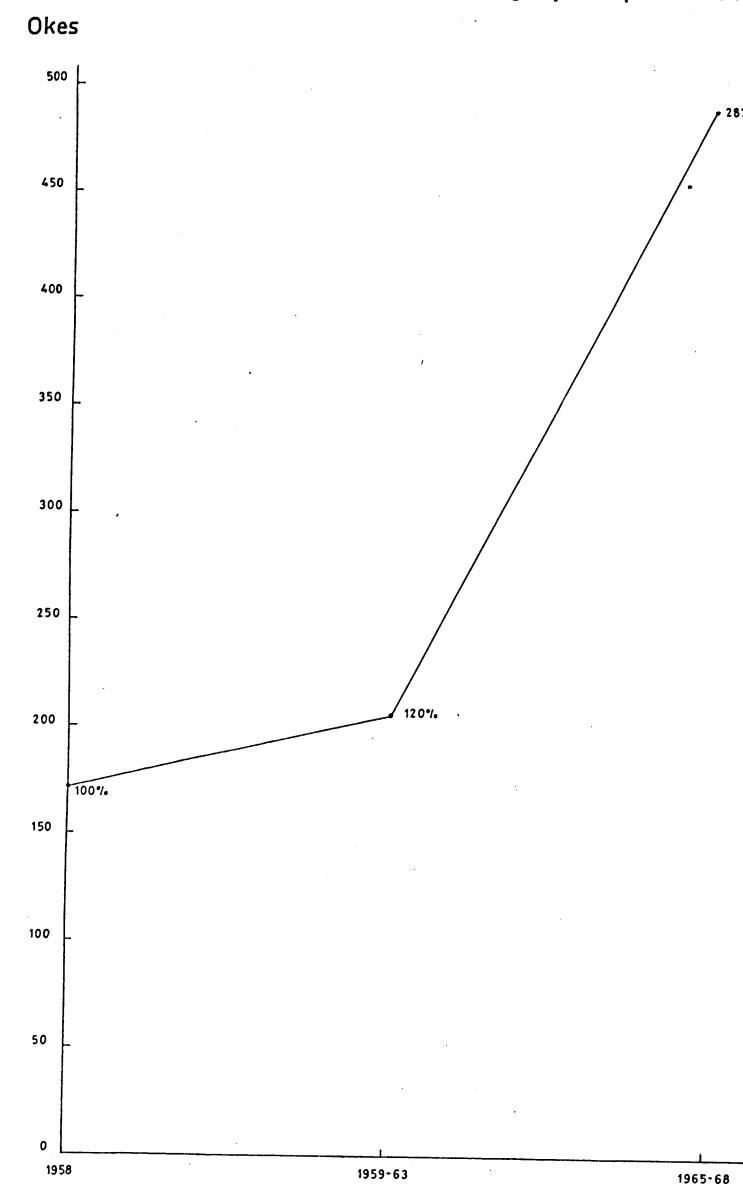
Graph 3

CITRUS - Cultivated area (average)



Graph 4

DECIDUOUS FRUIT TREES - Average yield per donum



b. Deciduous fruit trees

Although the deciduous fruit trees area has increased by 66% only compared to the 1958 respective area - during the same period, the total production of deciduous fruits was continuously increasing and in the last 1965-68 period the average production showed a remarkable increase of 398%. Total production in 1958 amounted to 2,725 tons and the average production of 1965-68 to 13,582 tons. An impressive change is shown in the per donum yield of deciduous fruits too. The per donum yield in 1958 was 171 okes, while the average per donum yield of 1965-68 was almost three times as much (491 okes or 187% increase)*

Graphs 4, 5 & 6 show deciduous fruit trees averages in yield per donum ^{and} production and cultivated area for the years 1958, 1959-63, 1965-68.

c. Potatoes

A constant correlation is noticed between the acreage, the total production of potatoes, and the per donum yield. In 1958 total area under potatoes was 36,713 donums, total production 51,237 tons and the per donum yield 1,116 okes. During the period 1965-68 the average area was almost 74,750 donums (103,6% increase) total production 152,450 tons (197.5% increase) and yields per donum raised to 1,632 okes i.e. an increase of 46%.

Graphs 7, 8 and 9 show potatoes averages for yield per donum, production, and cultivated area for the years 1958, 1959-63, 1965-68.

* See Note I.

d. Carrots

A higher rate of increase is observed in the first five-year period 1959-63, than in the following one, as far as the acreage and total production of carrots are concerned. However, the average increase of per donum yield is almost linear during the whole period 1958-68. Total production raised from 6,188 tons to 19,375 tons or by 213.1% and the area cultivated with carrots expanded from 2,560 donums to 5,375 i.e. it increased by 110%. The average yield during the same period increased by 49% reaching the 2,884 okes per donum.

Graphs I0, II and I2 show carrots averages for yield, production and cultivated area for the years 1958, 1959-63, 1965-68.

e. Other vegetables.

While total area cultivated with vegetables (excluding potatoes and carrots) decreased by 8% during the recent years, total production and per donum yields increased three fold compared to 1958. A substantial increase is observed from 1963 onwards.

During the whole period of 1958-1965-68 the average production was raised to 119,105 tons (212%) and average per donum yields reached 1,717 okes, an increase of 239%.

Graphs I3, I4 and I5 show vegetables averages for yield, production, and cultivated area for the years 1958, 1959-63 and 1965-68.

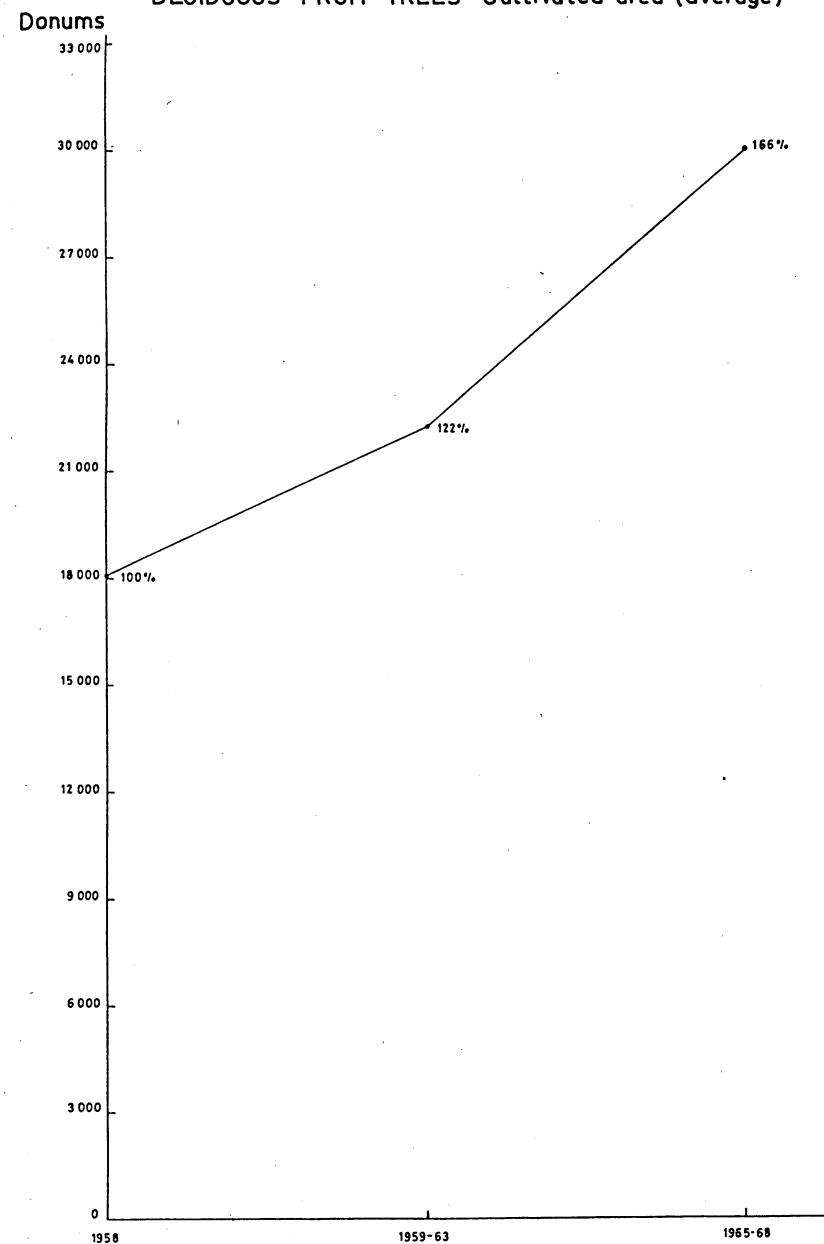
II. Dry land farming:

The main dry land crops in Cyprus agriculture are:

- a. Cereals
- b. Fodders
- c. Tobacco
- d. Carob trees
- e. Olive trees.
- f. Almond trees
- g. Vines.

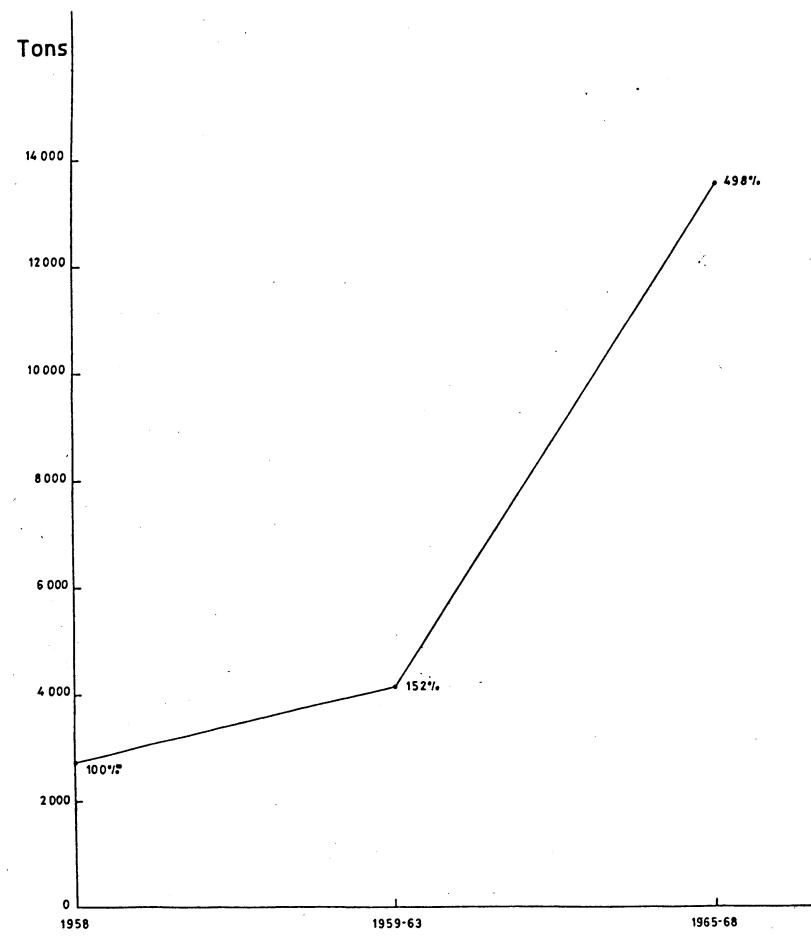
Graph 6

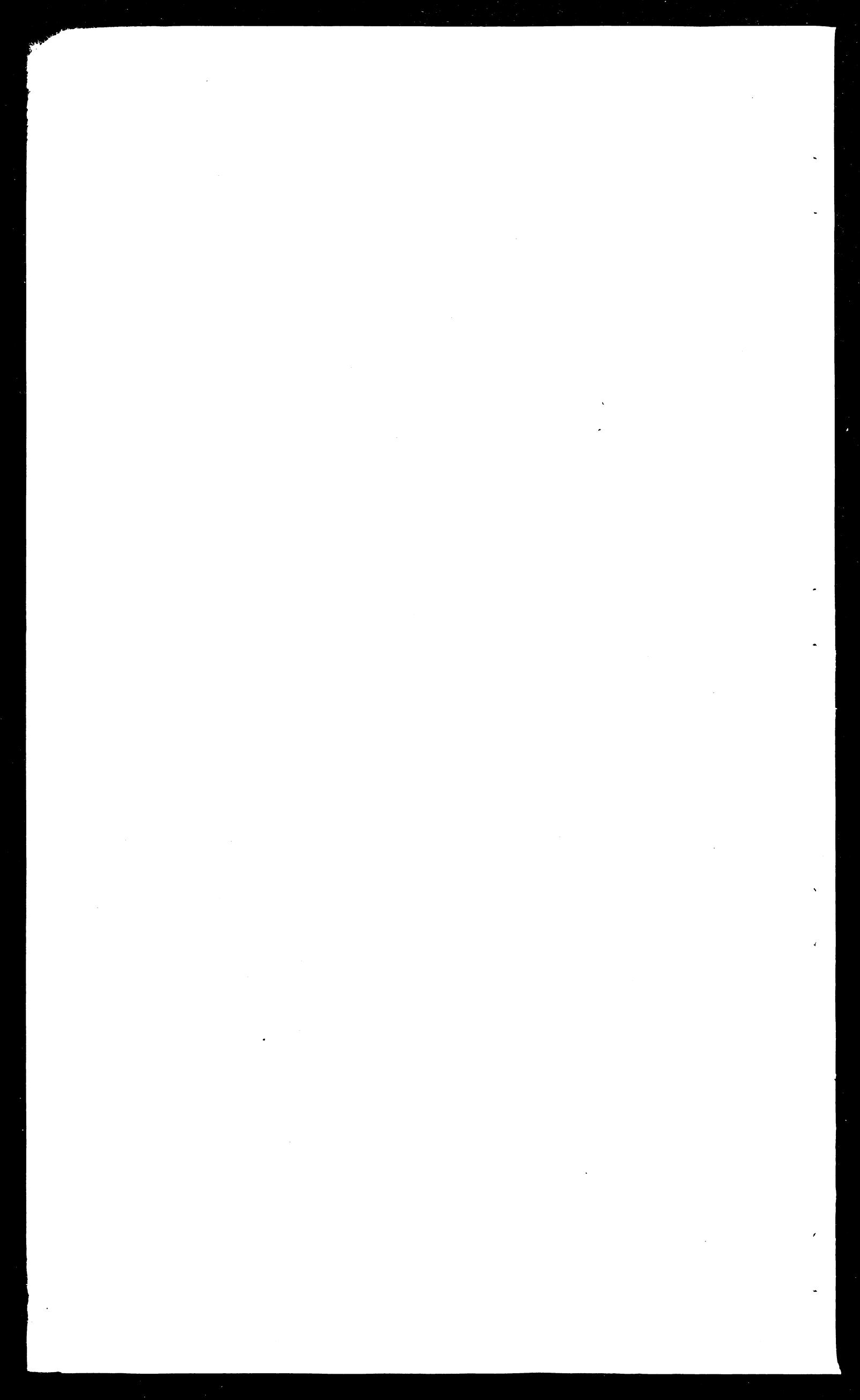
DECIDUOUS FRUIT TREES - Cultivated area (average)



Graph 5

DECIDUOUS FRUIT TREES - Production (average)

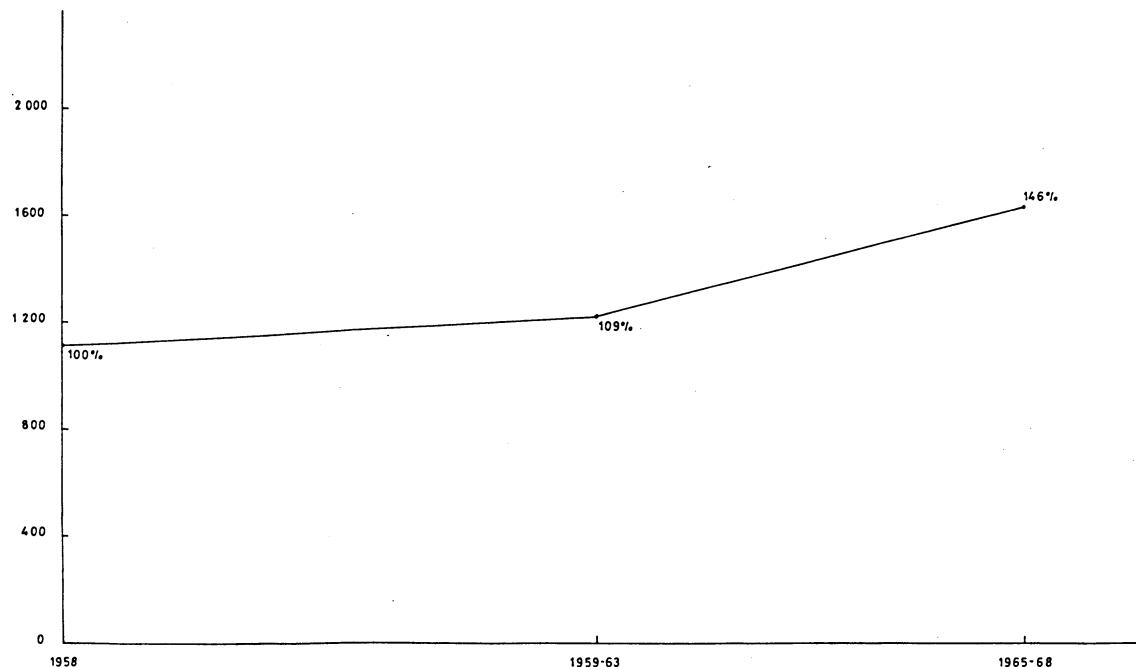




okes

Graph 7

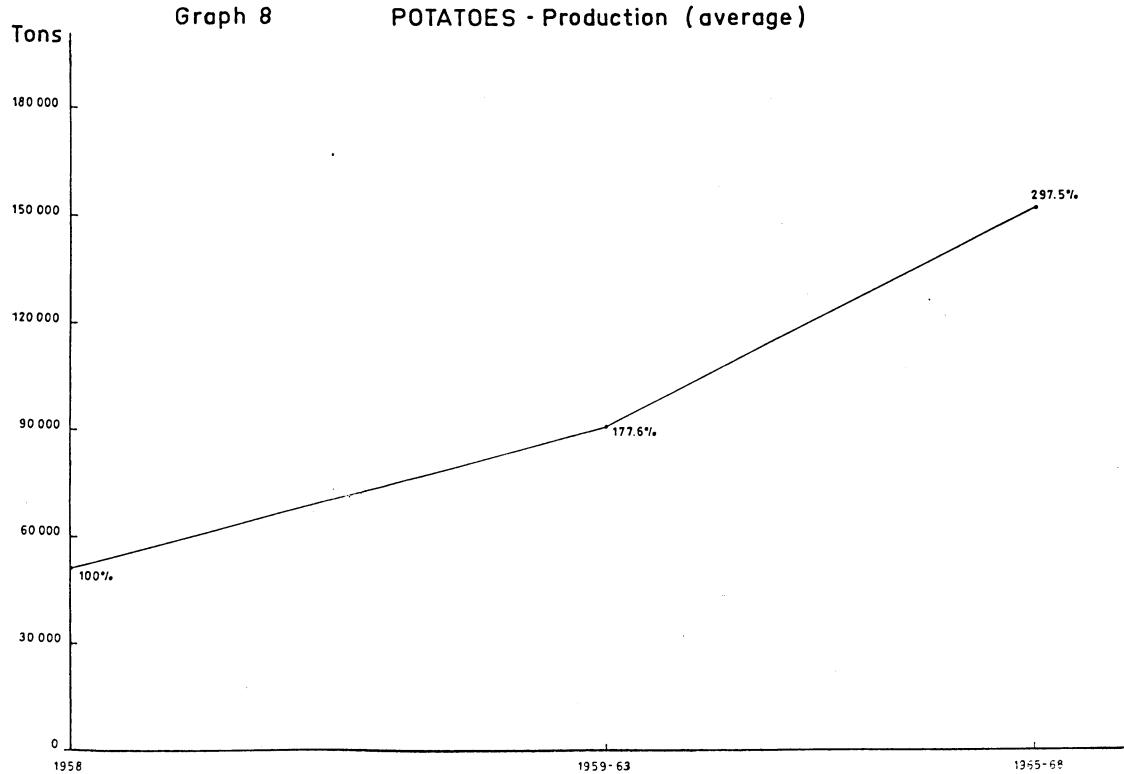
POTATOES - Average yield per donum



Tons

Graph 8

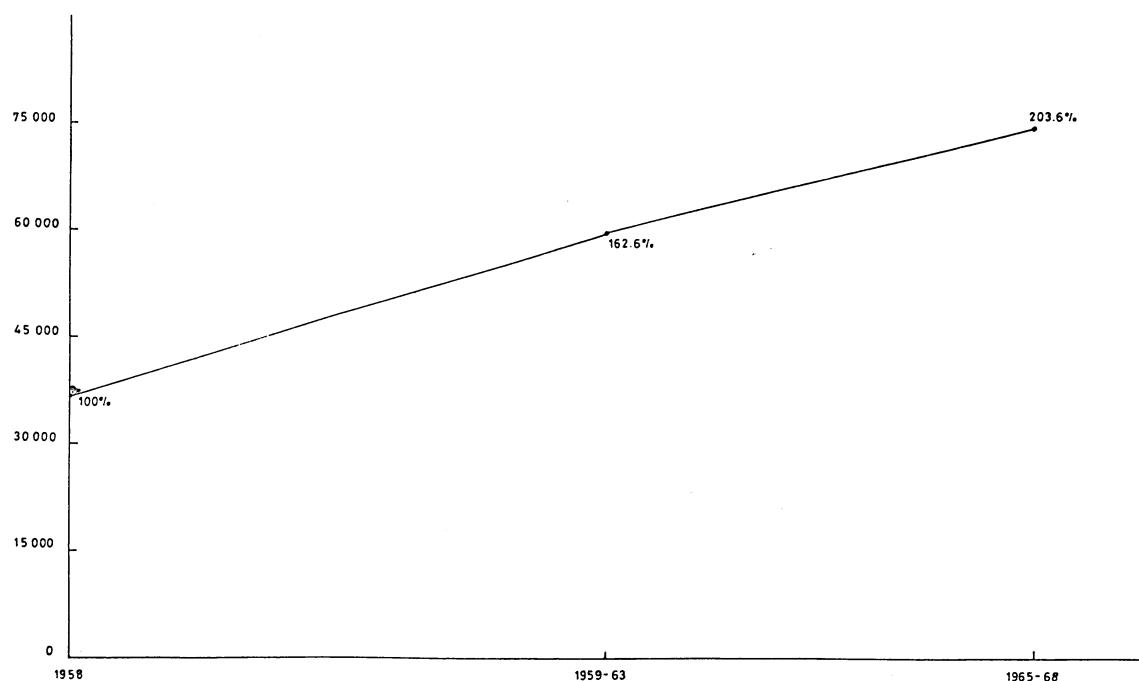
POTATOES - Production (average)



Donums

Graph 9

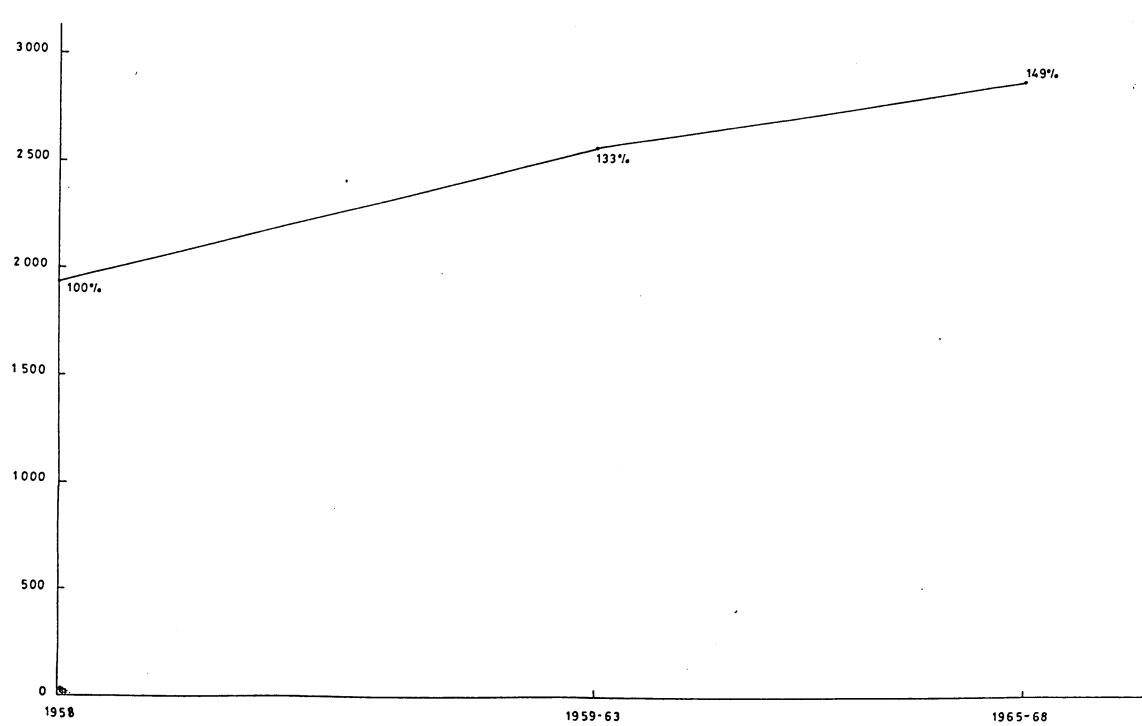
POTATOES - Cultivated area (average)



okes

Graph 10

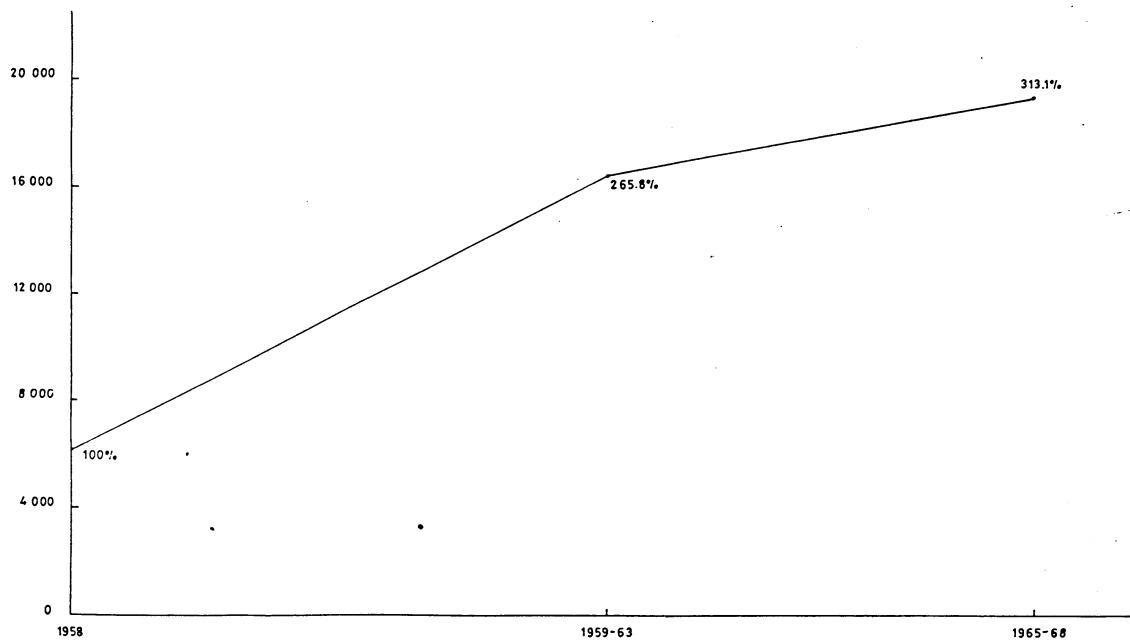
CARROTS - Average yield per donum



Tons

Graph 11

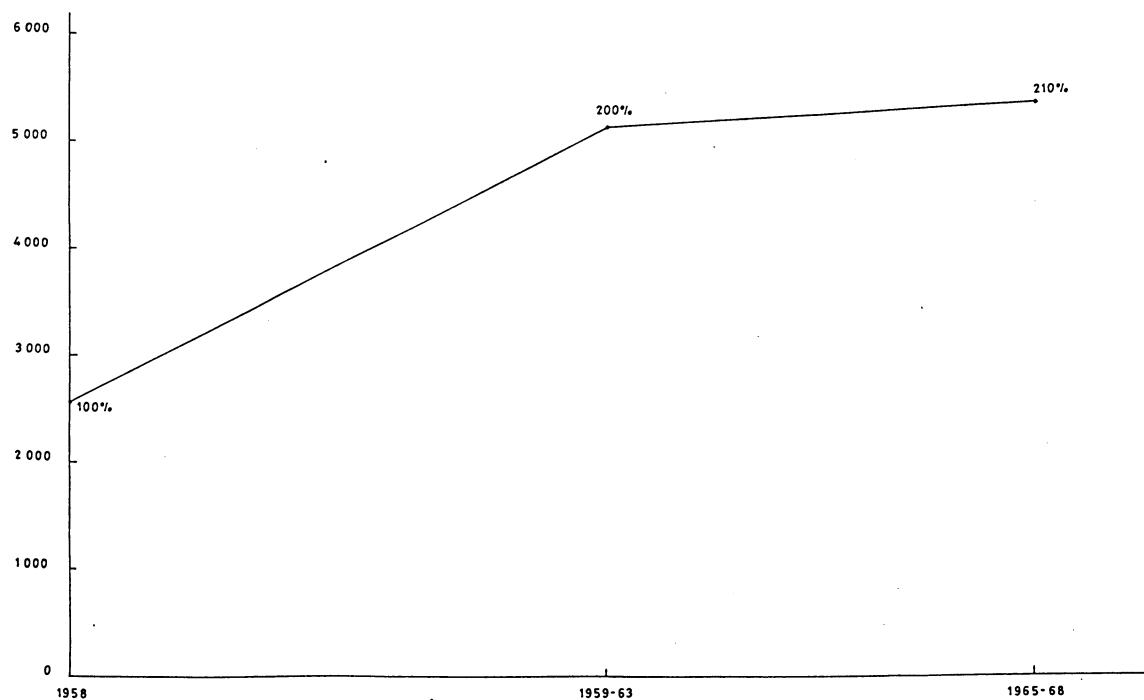
CARROTS - Production (average)



Donums

Graph 12

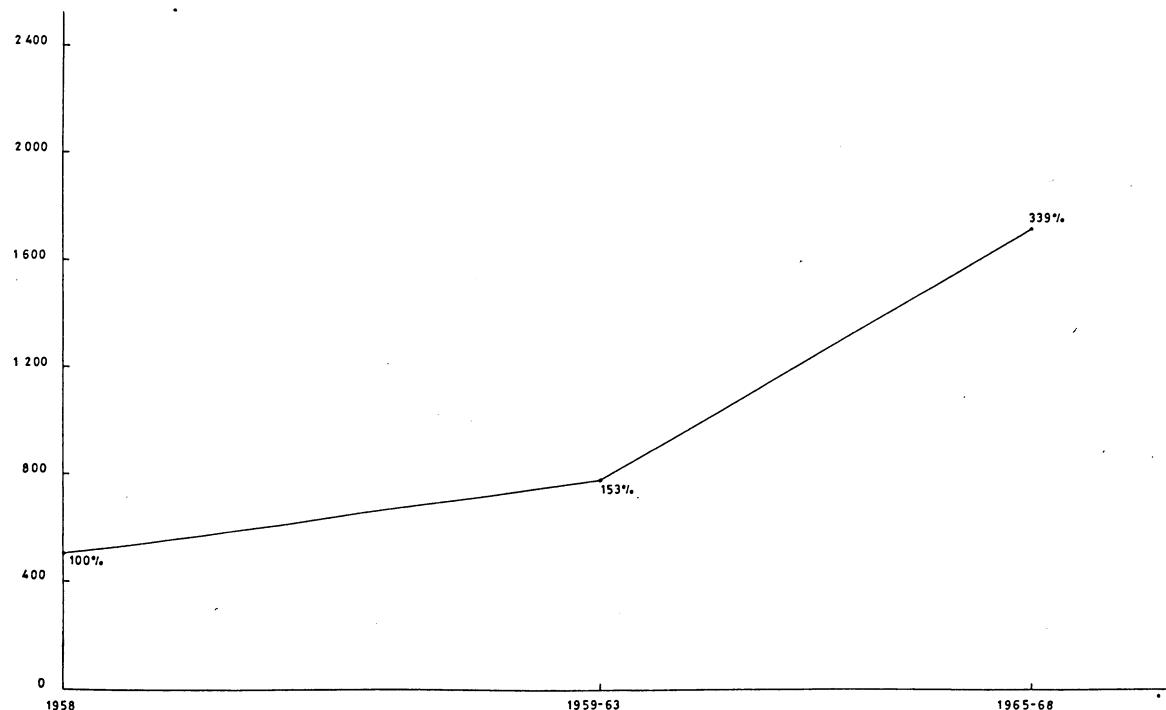
CARROTS - Cultivated area (average)



okes

Graph 13

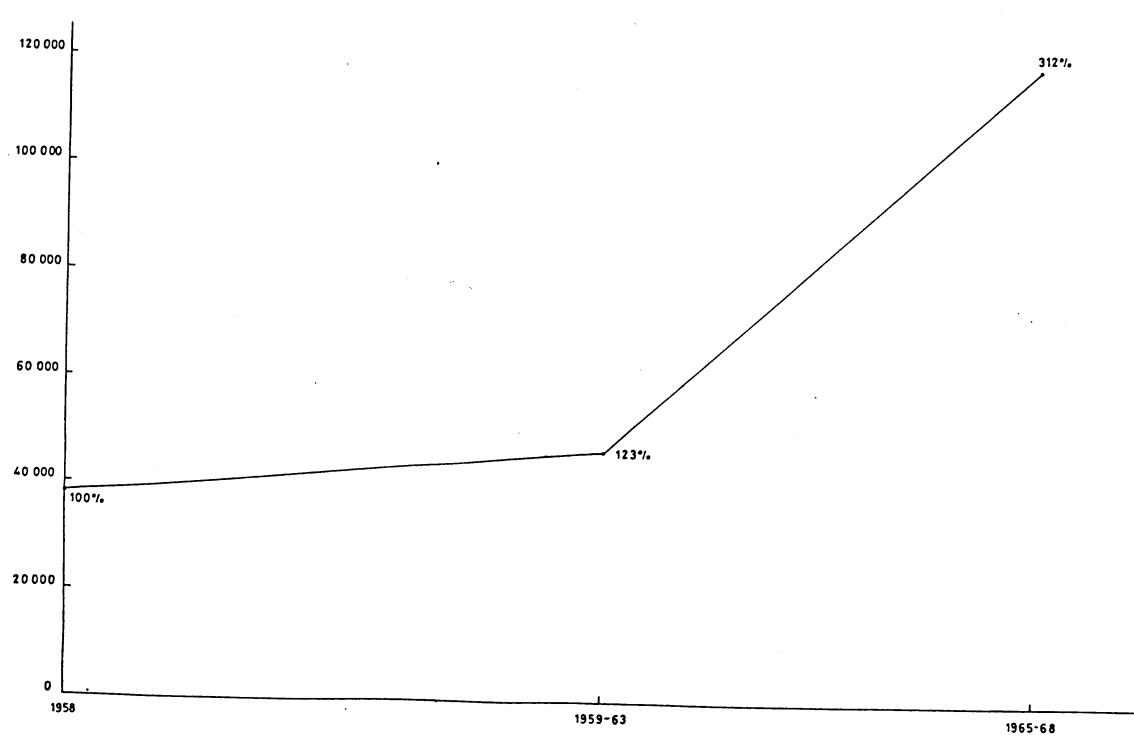
VEGETABLES - Average yield per donum



Tons

Graph 14

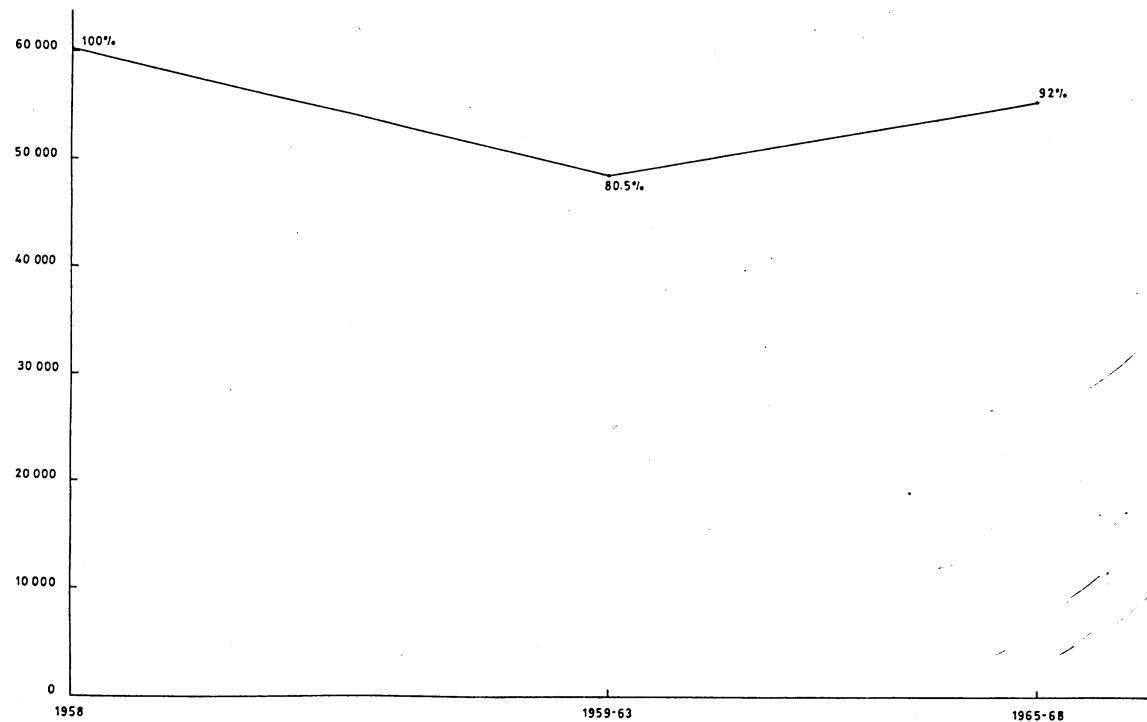
VEGETABLES - Production (average)



Donums

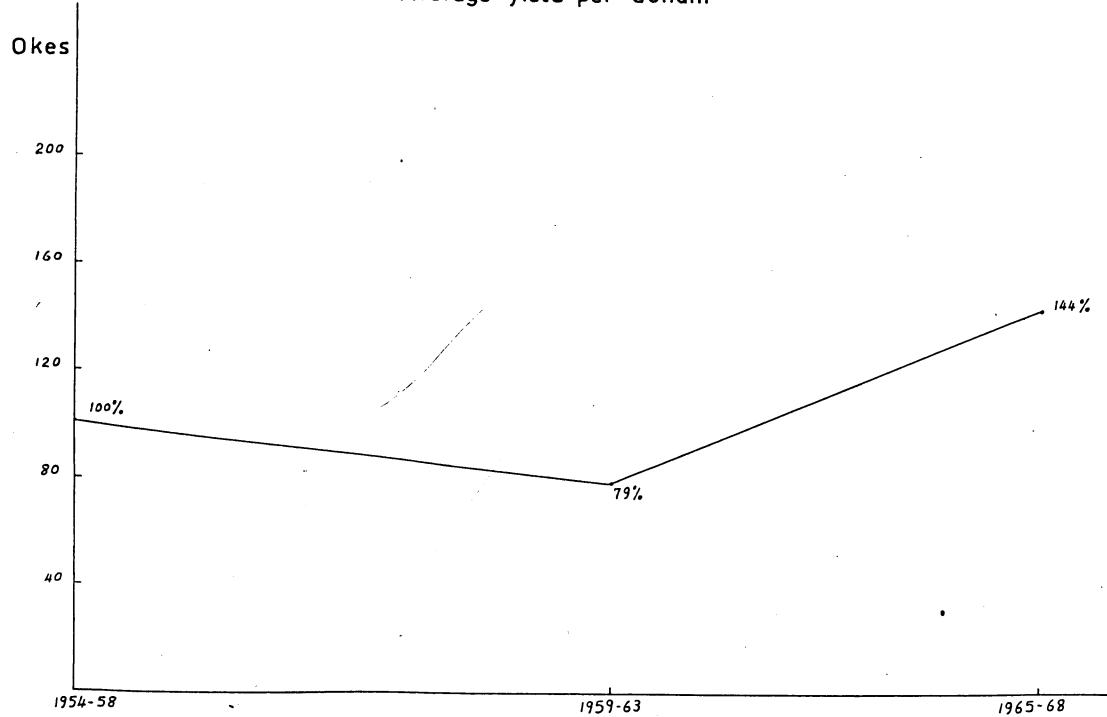
Graph 15

VEGETABLES - Cultivated area (average)



Graph 16

WHEAT - Average yield per donum



a & b Cereals and Fodders

The area under wheat decreased from 586,000don.(aver.1954-58) to 480,000 donums or by 18% (average acreage of the period 1965-68) while the area cultivated with barley has increased from 424,000 donums to 577,000donums i.e. by 36%. During the same period the area cultivated with fodders for green expanded from 166,882donums to 186,975 donums or by 12%. These changes are in full agreement with the objectives of the agricultural extension programme as described above.

As far as the production and yields are concerned a noticeable progress is observed in wheat cultivation where total production increased by 17% despite the decrease of wheat acreage, and the per donum yield by 44%. During the previous five-year period 1959-63 there has been a decrease of 21% in the per donums yield of wheat.

The production of barley has also increased by 23% although the per donum yield declined by 11% in the period 1959-63 and by 10% in the following period. These unfavourable results which occurred in the 1959-63 wheat period and 1959-63 and 1965-68 barley periods can definitely be attributed to the mostly unfavourable weather conditions which prevailed for 3 and 2 years respectively during these periods.

Although the area cultivated with fodders for grain decreased by 29% the per donum yield was raised by 35% in 1965-68 compared to 1958 figures.

Graphs I6-24 show these changes. Graphs (i) to (iv) of the appendix, show annual fluctuations for wheat and barley.

C.Tobacco

I) Yellow leaf tobacco

During the period 1958-68 the area cultivated with yellow leaf tobacco was expanded from 8,916 in 1958 to 20,179 donums(average of 1964-68)i.e. it increased by 126%.Total production was respective 327,346 okes and 940,733 (187% increase) and the yields per donum increased by 27% and reached 47okes per donum compared with 37okes donums in 1958.

C2) Virginia tobacco

The cultivation of this variety began in 1962 in a limited area of 48 donums. During the recent two years(1967-68) there has been a sudden increase both of the area under virginia tobacco and the total production. However the per donum yield of these two years (53 okes) was less than the average of the whole period(56 okes). The total acreage in 1968 amounted to 1,467 donums, the total production to 69,826 okes and the per donum yield to 47 okes.

Graphs 25 to 29 show tobacco acreage, production and yields per donum from 1958 to 1968.

d) Carobs

In the period under consideration (1958-68) the area cultivated with carob-trees expanded from 224,700 donums to 246,600 donums or 10% (average of 1965-68). Total production was raised from 40,312 tons to 54,500 tons-average production of 1965-68 which indicates an increase of 35%. A fairly good improvement is also observed in yields per donum* which increased by 52 okes per donum or 35%.

Graphs 30, 31 & 32 show carob averages for yield, total production and cultivated area for the years 1958, 1959-63 and 1965-68. Graphs V and VI of the appendix show analytical data.

e) Olives

Quite a remarkable progress is noticed in the production of olives. Although the area under olive-trees has increased by 6% only or 1,250 donums, the total production as well as the per donum yield* in the period 1965-68 more than tripled compared to 1958. During this period production of olives increased from 6,220 to 21,325 tons i.e. an increase of 243%, and yields per donum increased from 22 okes to 76 okes. i.e an increase of 245%.

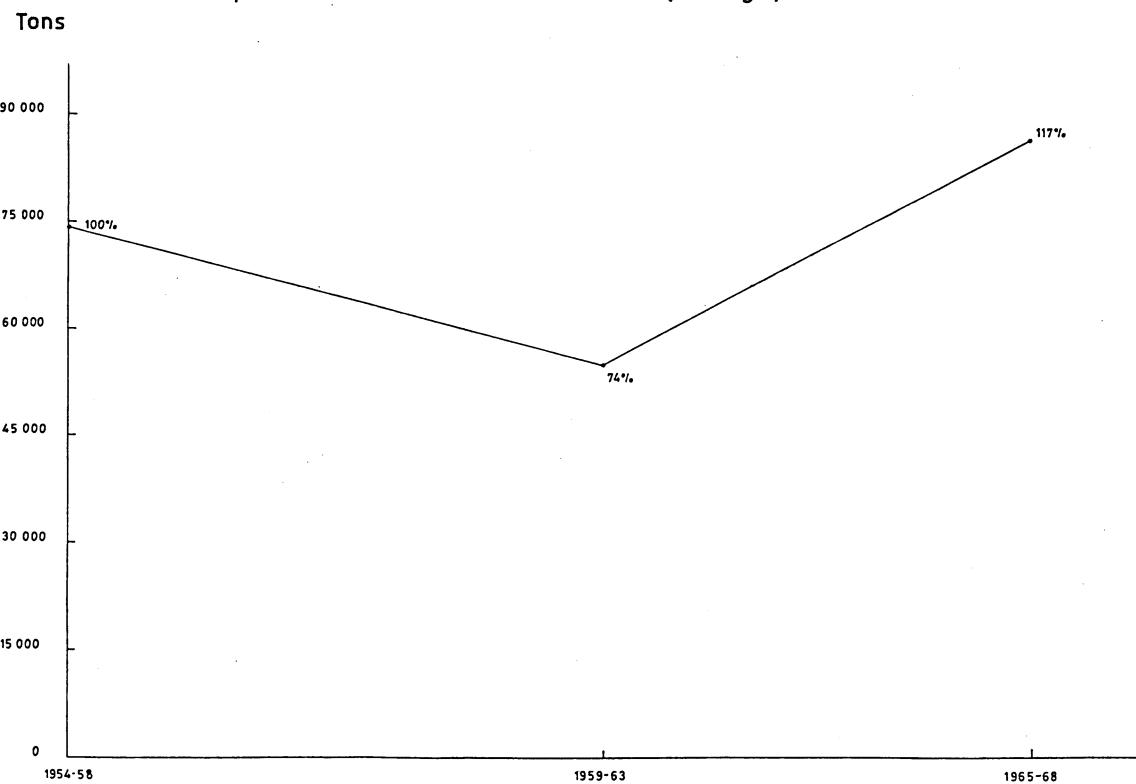
Graphs 33, 34 and 35 show olives averages for yield, production and area for the years 1958, 1959-63, 1965-68.

Graphs VII and VIII of the Appendix show annual changes in area and total production.

Note 2. The calculation of yields/donum for carobs and olives is based on the acreage of these trees in the year 1958, in relation to the annual production. That is because carob and olive trees require more than 10 years to give any significant production. The planting of such trees was rather limited before 1958.

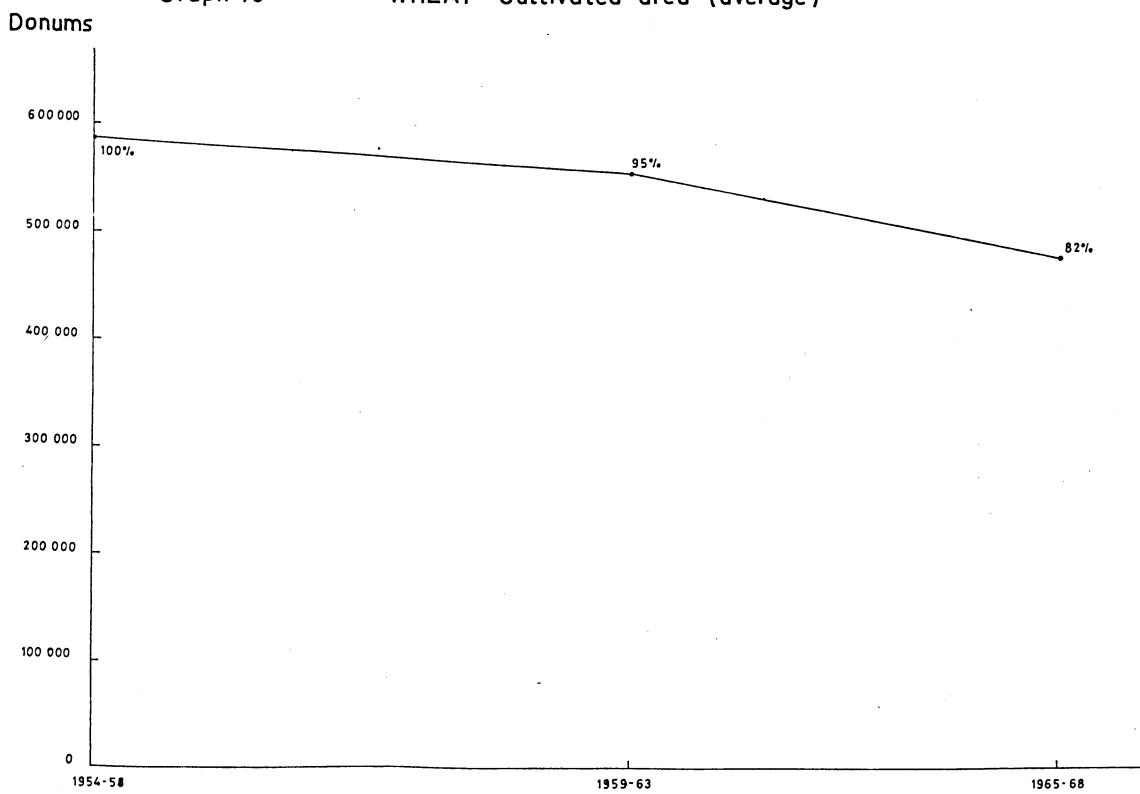
Graph 17

WHEAT - Production (average)



Graph 18

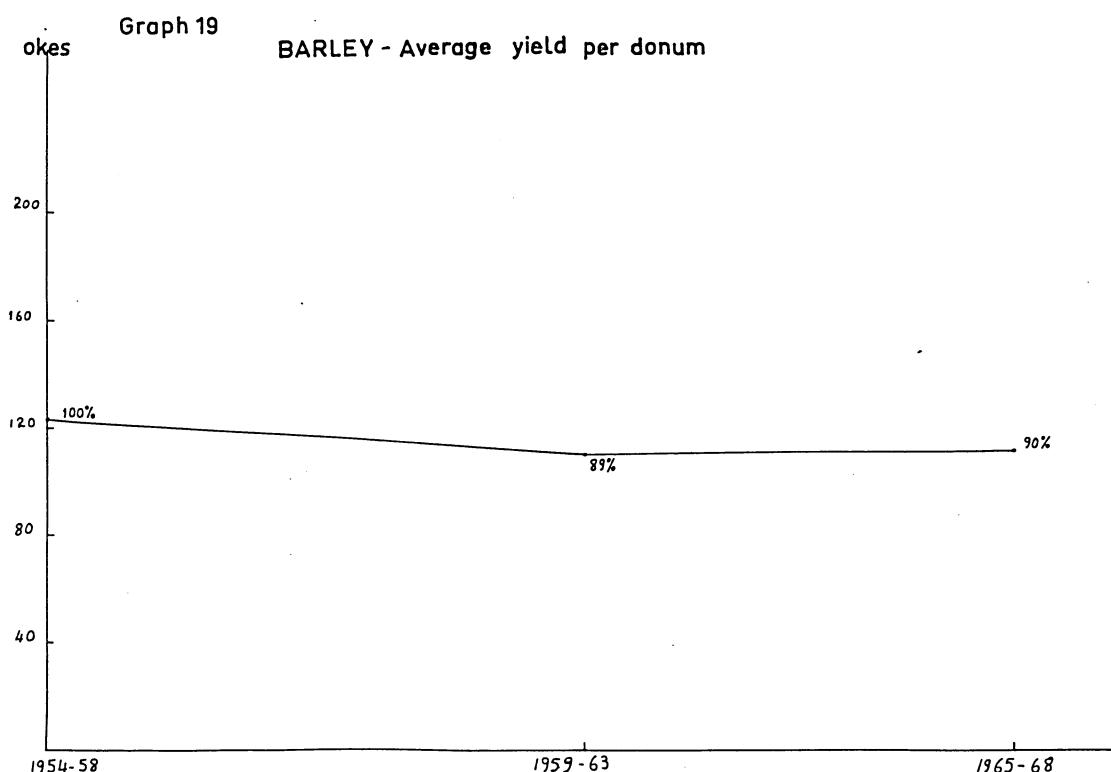
WHEAT - Cultivated area (average)



okes

Graph 19

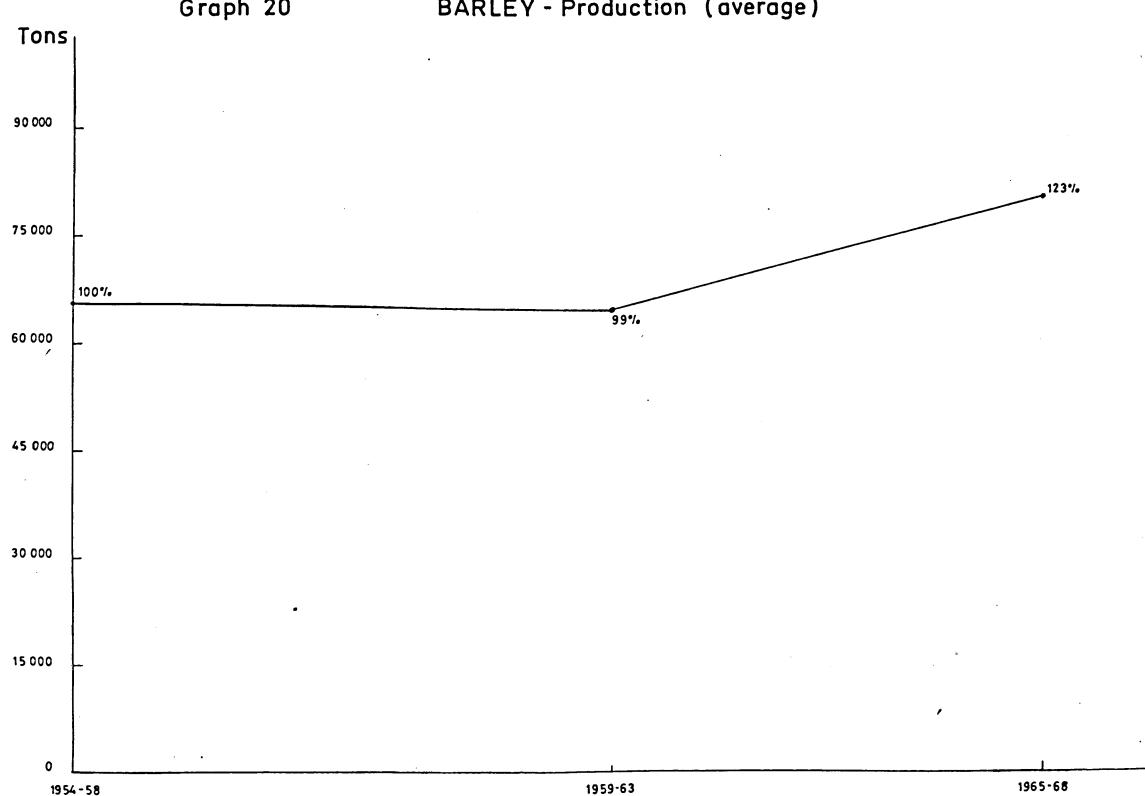
BARLEY - Average yield per donum



Tons

Graph 20

BARLEY - Production (average)



Donums

Graph 21

BARLEY-Cultivated area (average)

600 000

500 000

400 000

300 000

200 000

100 000

0

1954-58

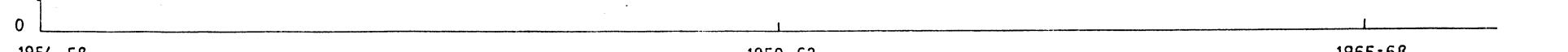
1959-63

1965-68

100%

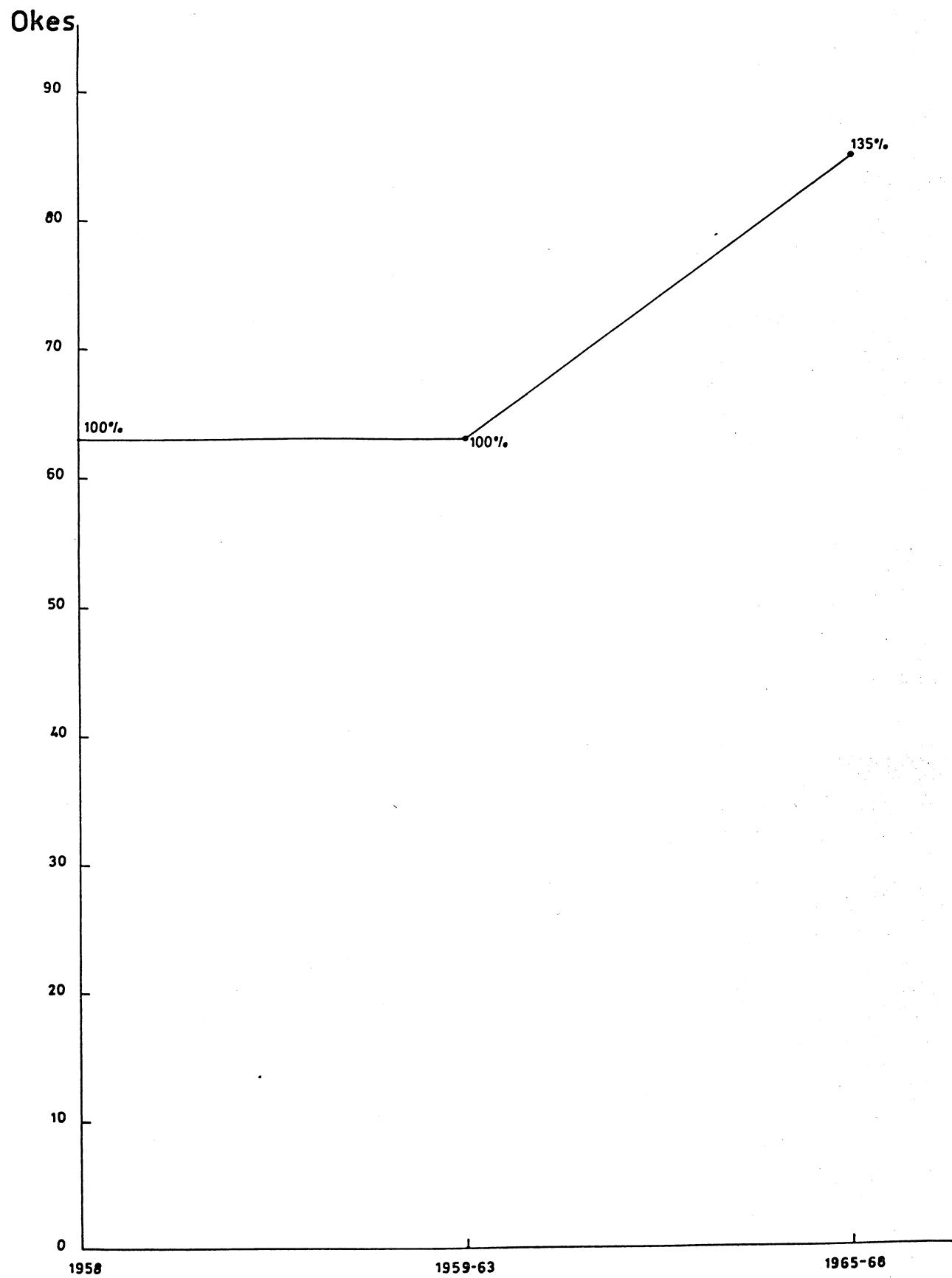
111%

136%



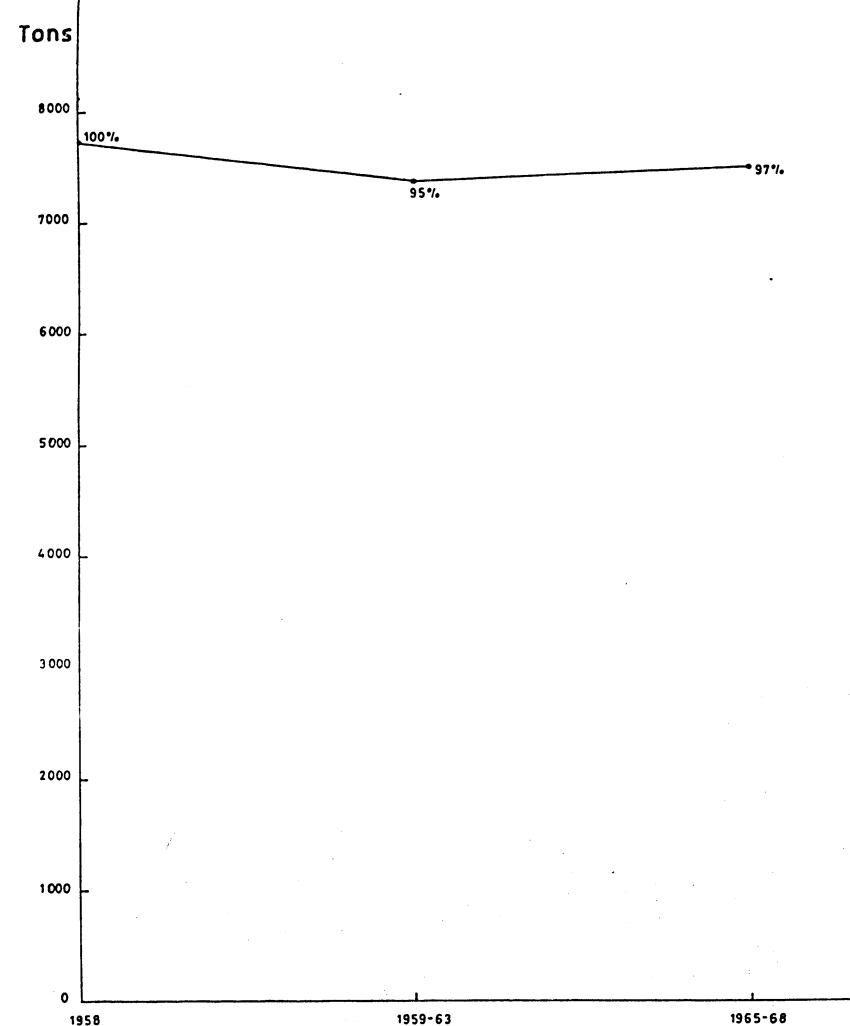
Graph 22

FODDERS - Average yield per donum



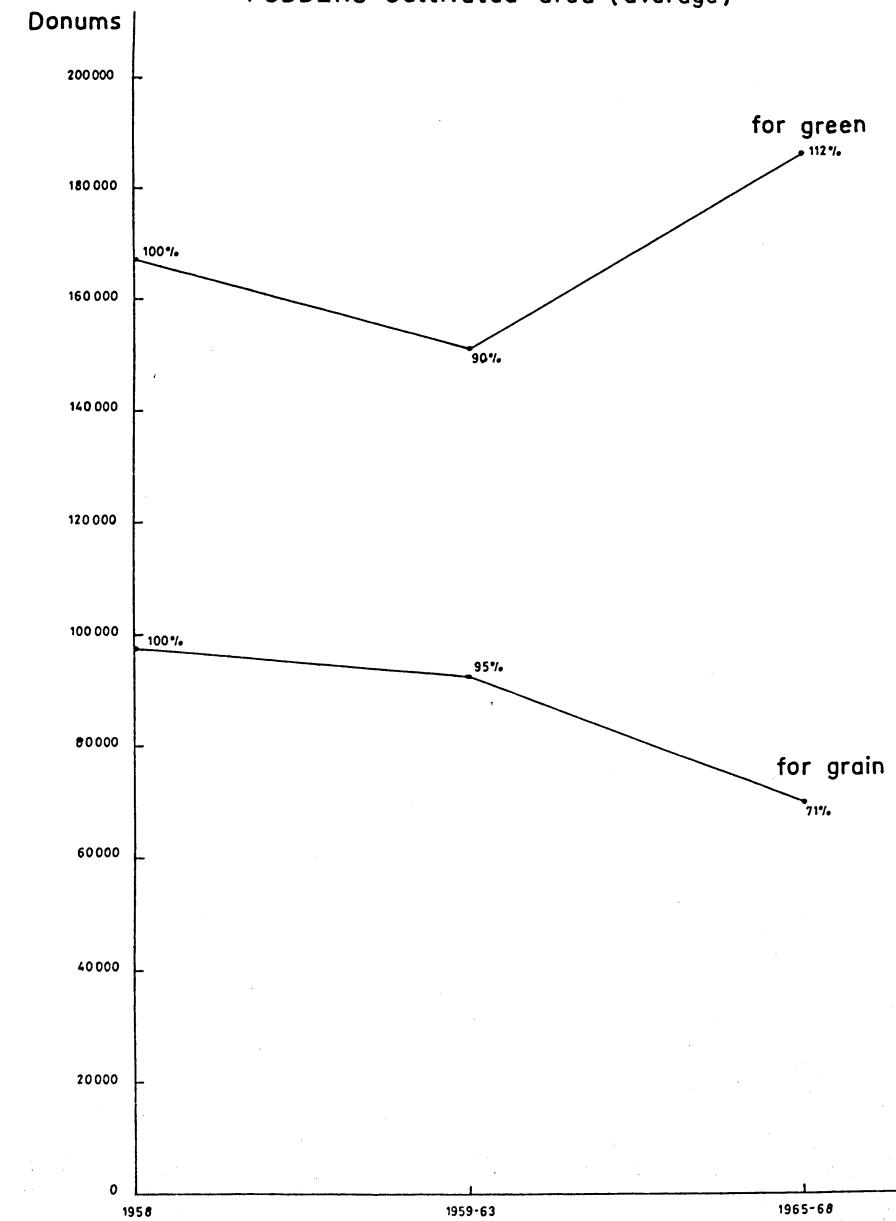
Graph 23

FODDERS-Grain production (average)



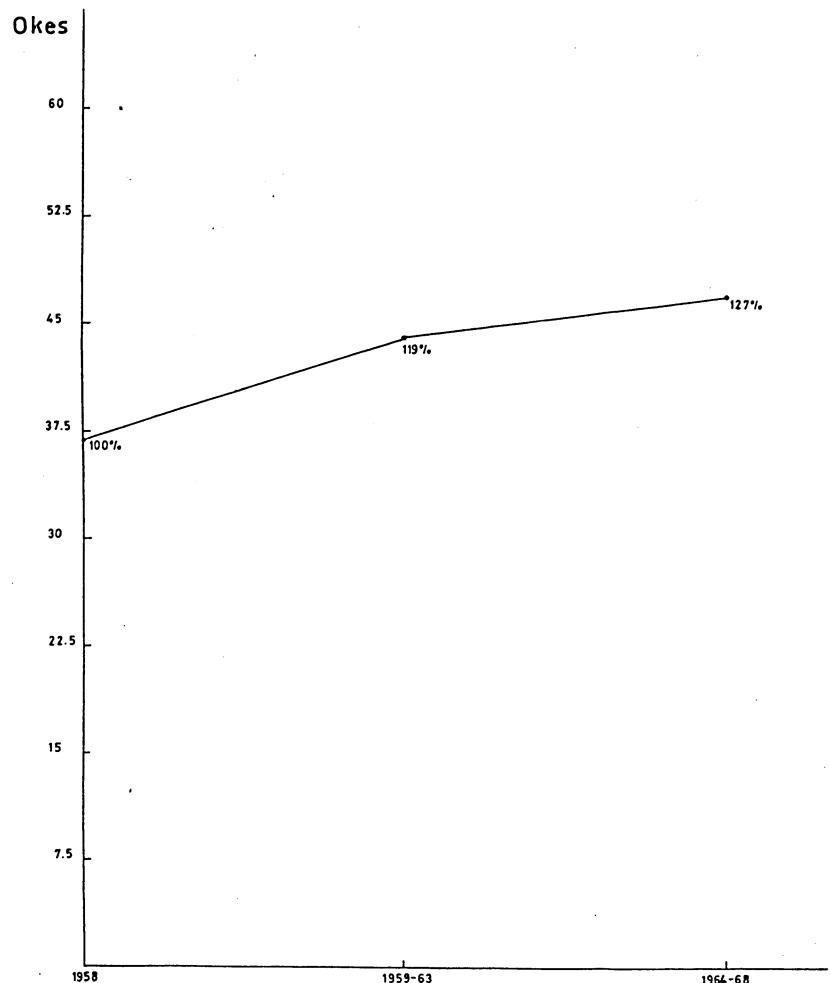
Graph 24

FODDERS-Cultivated area (average)



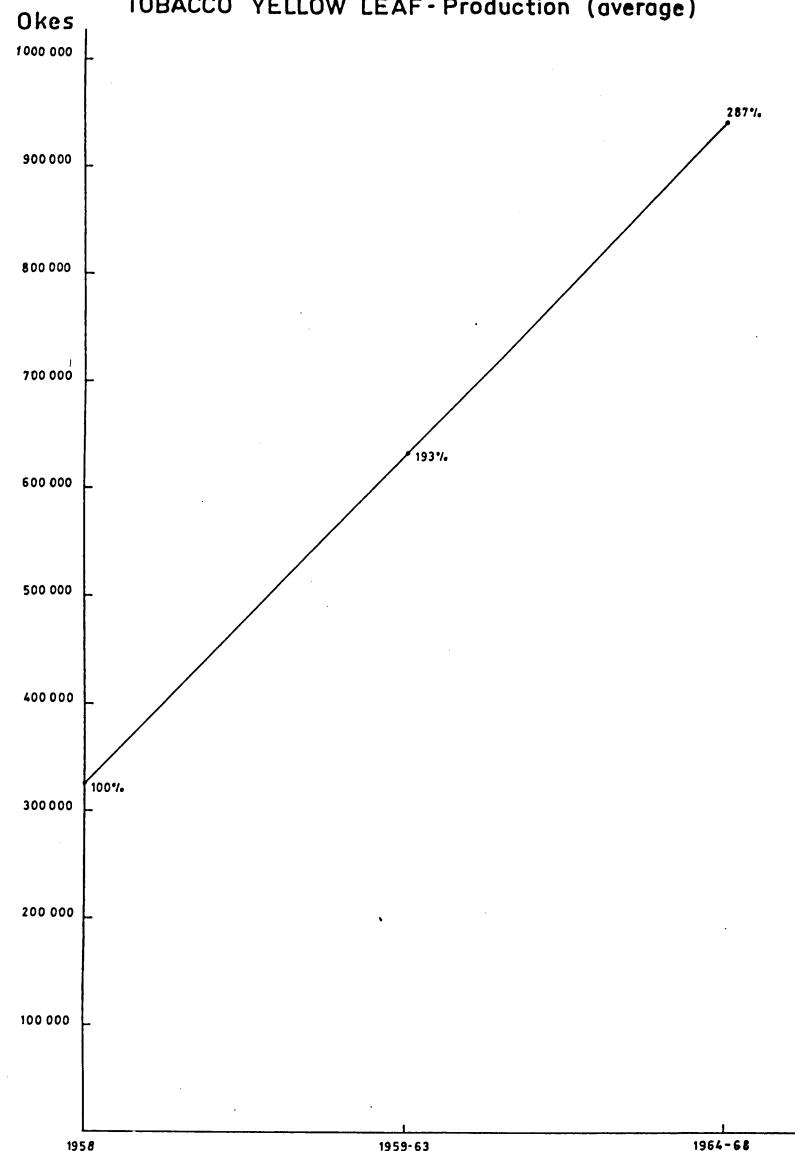
Graph 25

TOBACCO YELLOW LEAF -Average yield per donum



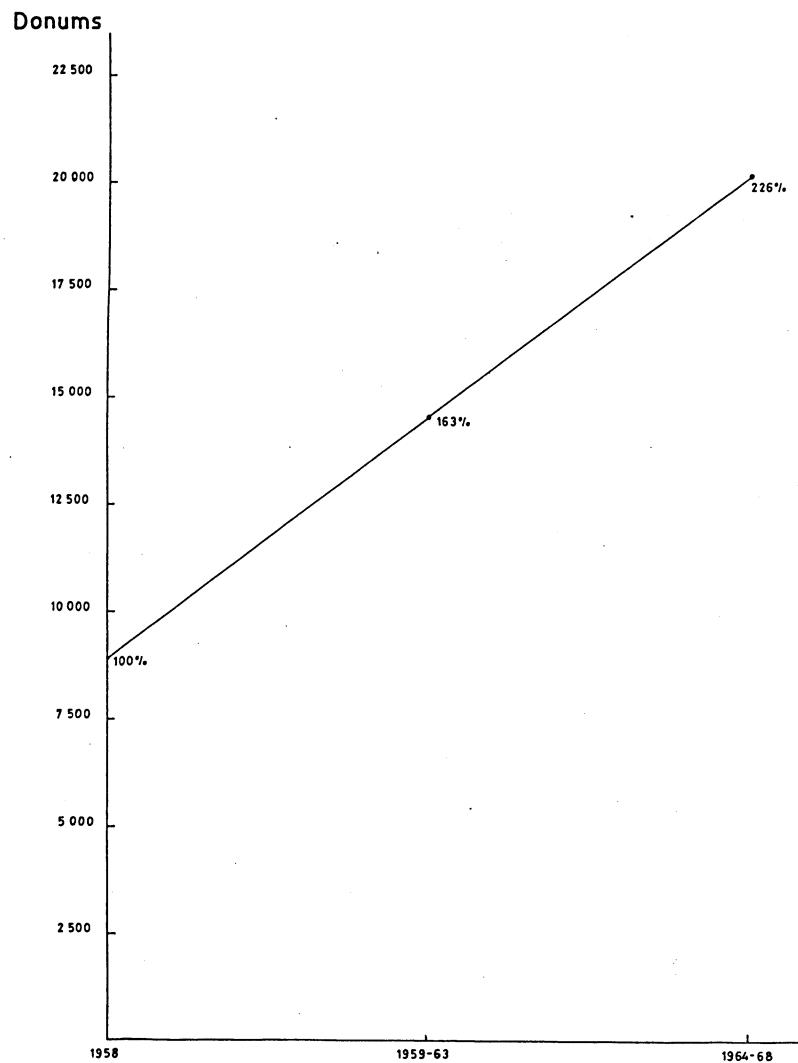
Graph 26

TOBACCO YELLOW LEAF - Production (average)



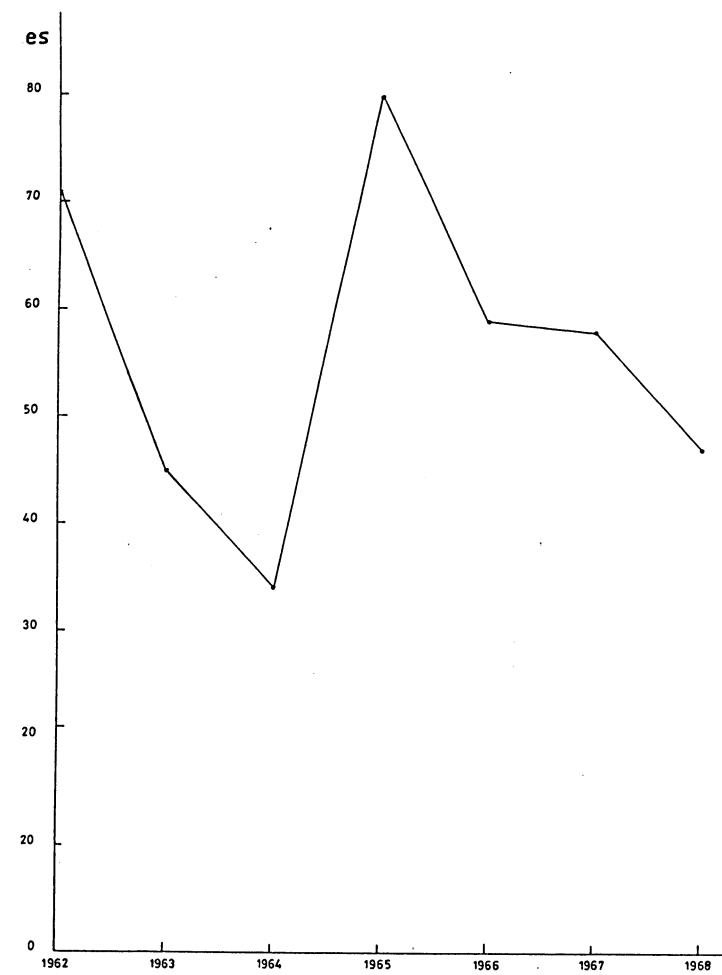
Graph 27

TOBACCO YELLOW LEAF-Cultivated area (average)



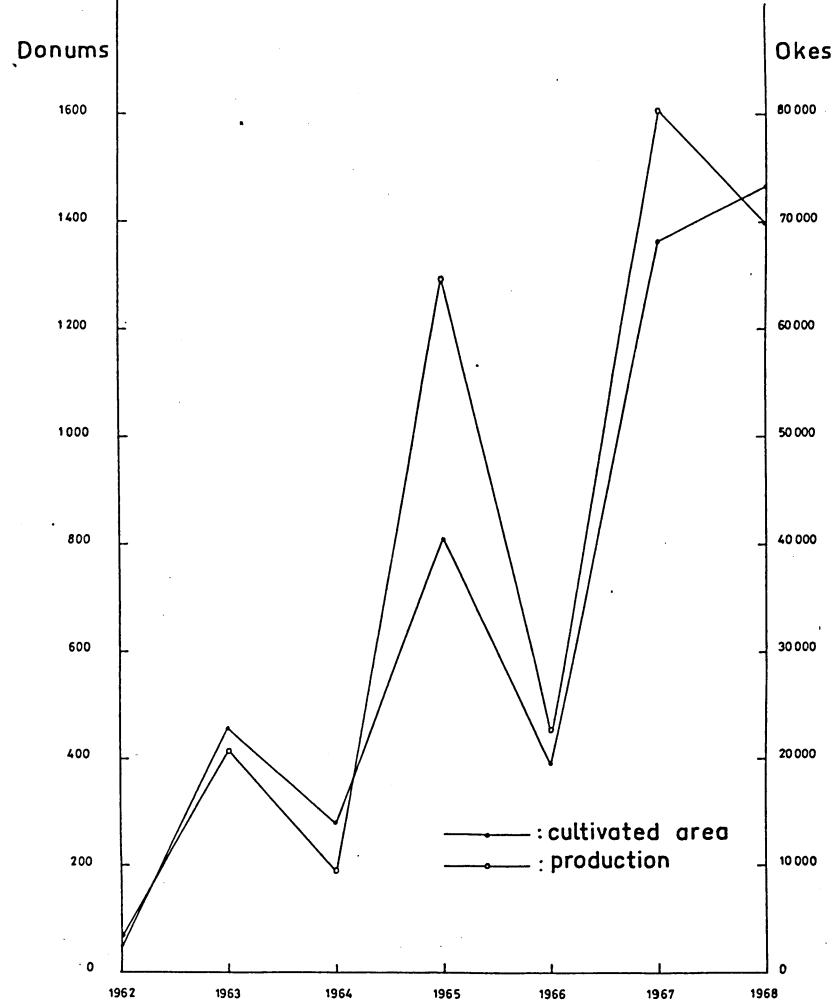
Graph 28

TOBACCO VIRGINIA-Average yield per donum



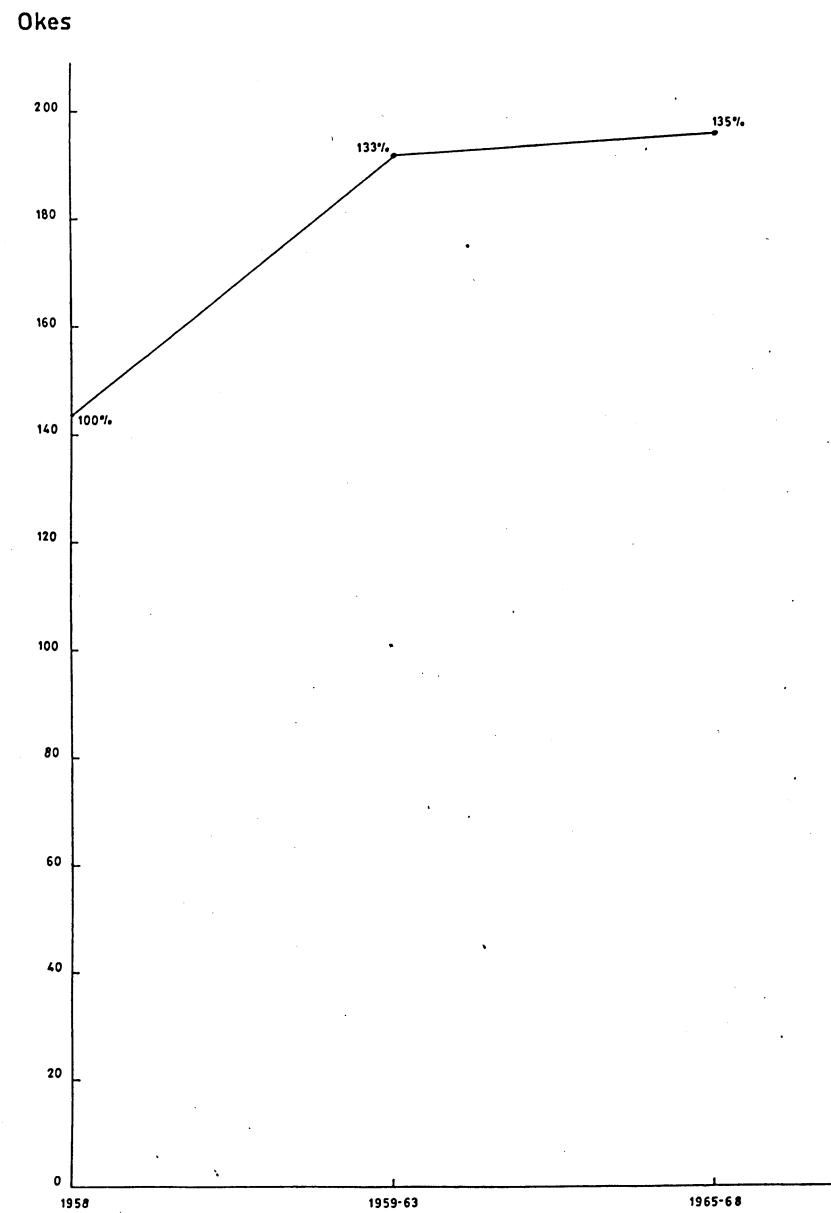
Graph 29

TOBACCO VIRGINIA-Total cultivated area and production



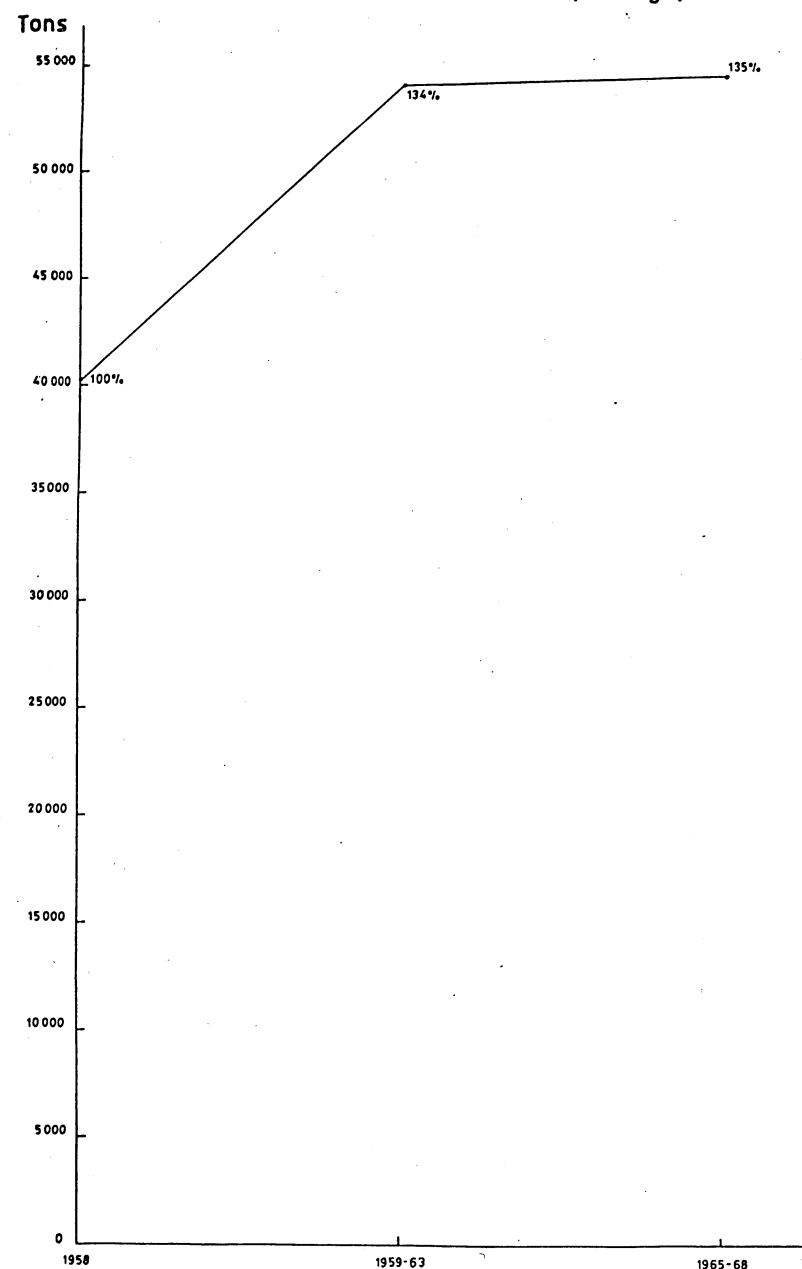
Graph 30

CAROBS - Average yield per donum



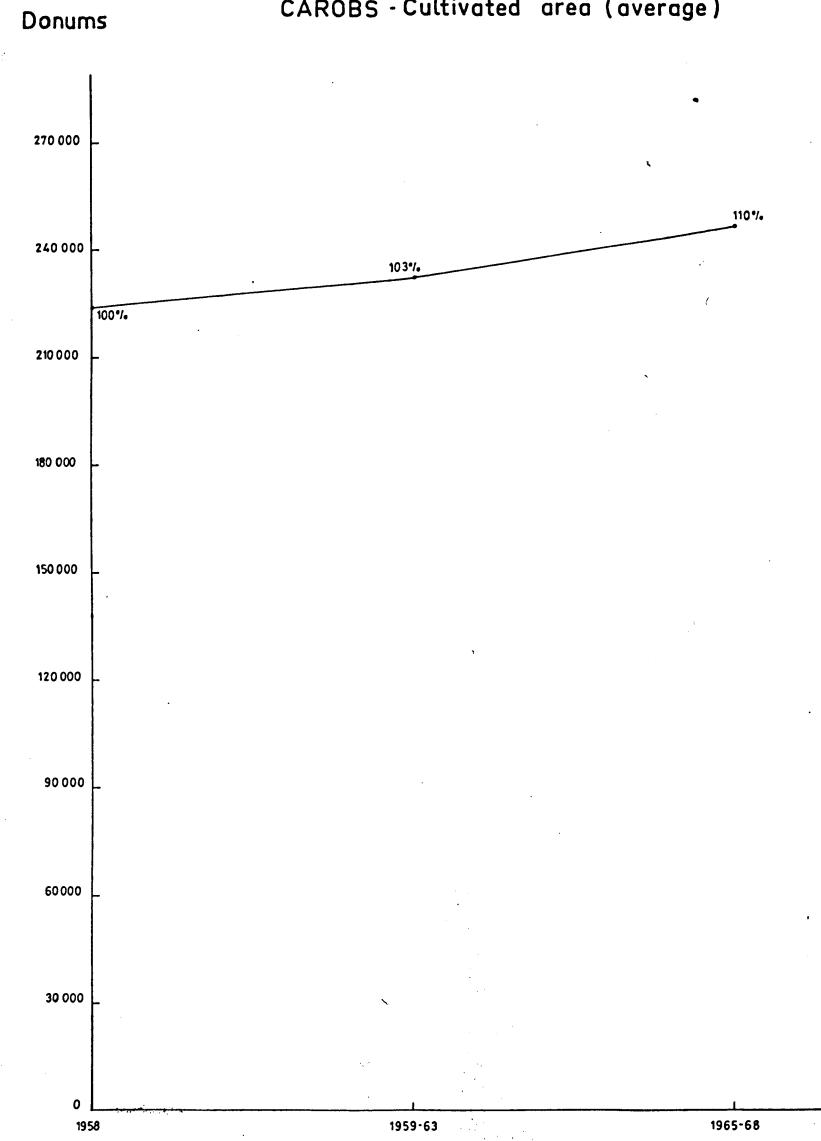
Graph 31

CAROBS - Production (average)

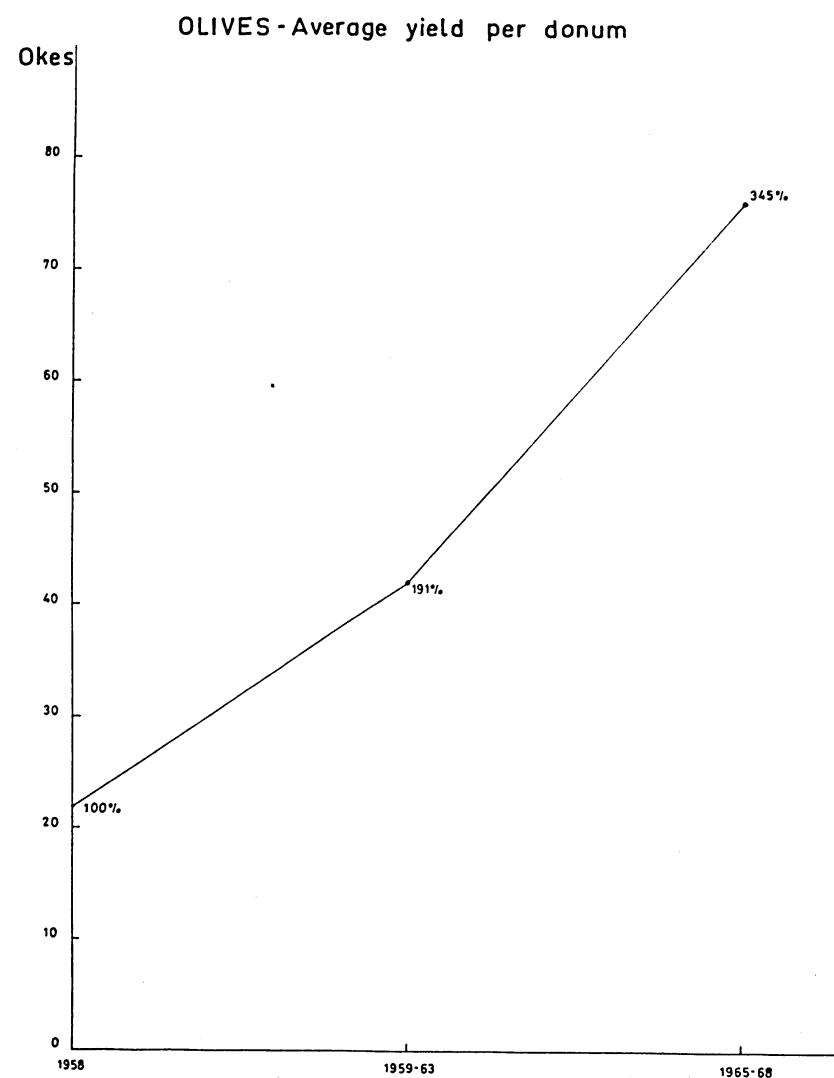


Graph 32

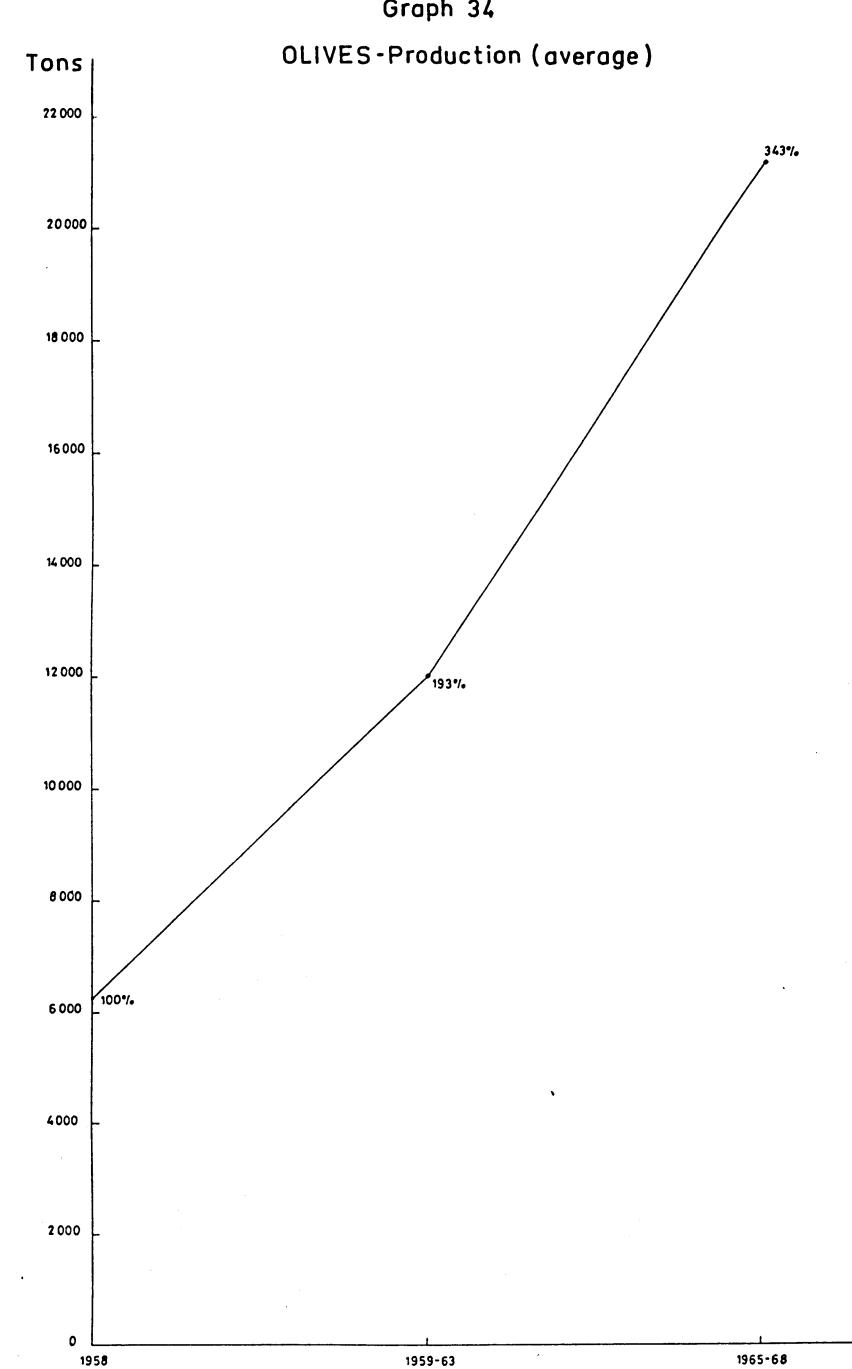
CAROBS - Cultivated area (average)



Graph 33



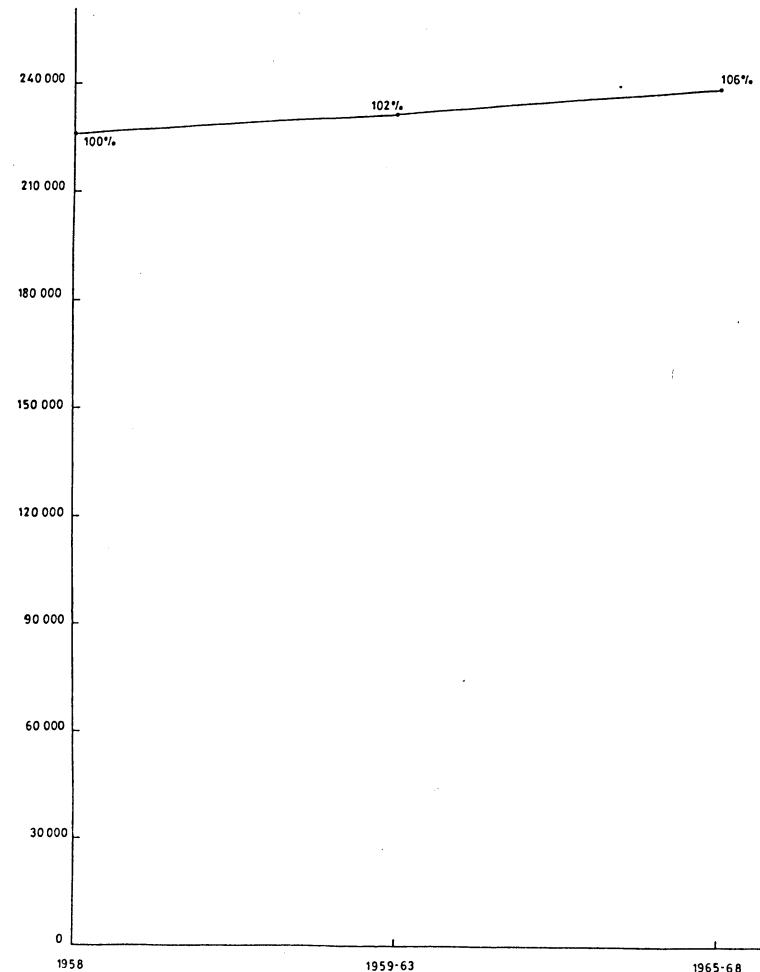
Graph 34



Graph 35

OLIVES - Cultivated area (average)

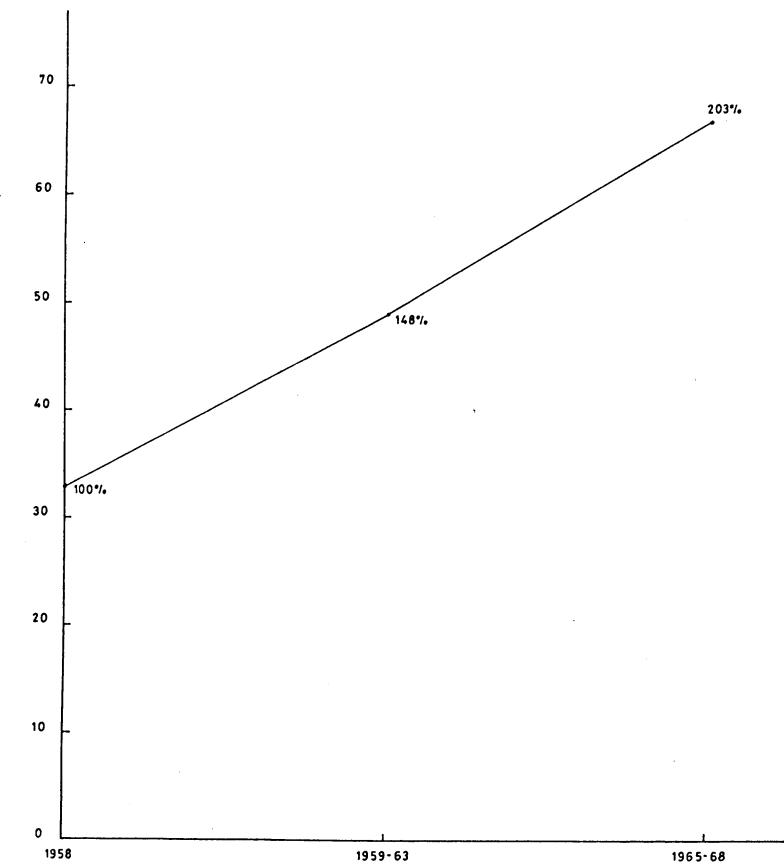
Donums



Graph 36

ALMONDS - Average yield per donum

Okes



f) Almonds

Total production of almonds has been raised from 1,494 tons in 1958 to 3,932 in 1965-68 (average) which indicates an increase of 163%. Respectively, the yields per donum* during the same period increased from 33 okes to 67 okes i.e. an increase of 103%. In both cases the increase can be easily considered as vertical, since the expansion of areas cultivated with almond trees present a slight increase of 16% only.

Graphs 36, 37 & 38 show almond averages for yield, production and area for the years 1958, 1959-63, 1965-68.

g) Vines

During the period 1958-68 total production of grapes and yields per donum have almost doubled, while the area under vines increased by 31% only. Total production of grapes in 1958 amounted to 68,750 tons while the production of 1965-68 averaged 144,000 tons (109% increase). In 1958 the per donum yield* was as low as 275 okes and in 1965-68 it was raised to 515 okes, i.e. an increase of 87%.

Graphs 39, 40 and 41 show averages for vines, for yields, production and area, for the years 1958, 1959-63, 1965-68.

III. Animal Husbandry

The main sectors of the livestock industry in Cyprus are:

1. Cattle, for meat and milk production. The importance of cattle as draft animals is progressively being reduced, as mechanization increases its share.
2. Sheep and goats, mainly for meat and milk. Wool from sheep is a secondary product.
3. Pigs
4. Poultry

* The per donum yields of almonds and vines is based on five-year back-dated periods and the respective (average) production.

a) Meat Production

Total production of meat has substantially increased. In the nine-year period 1960-68 total production for all kinds of meat has risen from 6,900 tons to 22,773 tons, which means an increase of 230%. A higher rate of increase is observed during the recent years. (Graph 42)

b) Milk Production

Milk production as a whole has increased by 77% having been raised to an average of 49,933 tons during 1966-68, as compared to 28,200 in 1960. A marked accelerated trend has been noticed since 1963. (Graph. 43)

c) Wool Production

Wool production has remained rather stagnant though a slight increase of 7% has occurred during the whole period on nine years. (Graph 44).

d) Egg Production

From 1960 to 1968 egg production has increased by 76% and the total quantity raised from 4.6 million dozens to 8.1 million dozens. (Graph 45).

Graphs IX to XVI in the appendix, show annual developments of animal population and production for the period 1960-1968.

III.a. Bee-Keeping

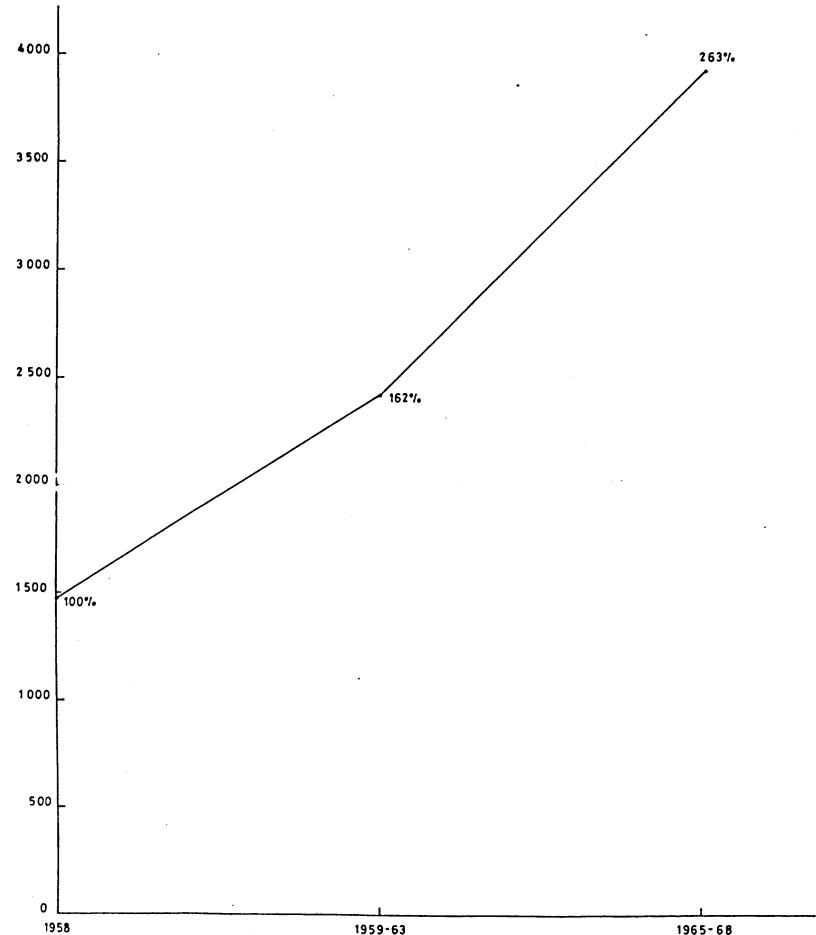
Honey production

Production of honey which in 1959 amounted to 23,300 okes, has been multiplied almost by eight-times in the period 1965-68 reaching the amount of 182,500 okes, That means an increase of 683%. A high trend is noticed from 1964 onwards (Graph 46).

Graph 37

ALMONDS - Production (average)

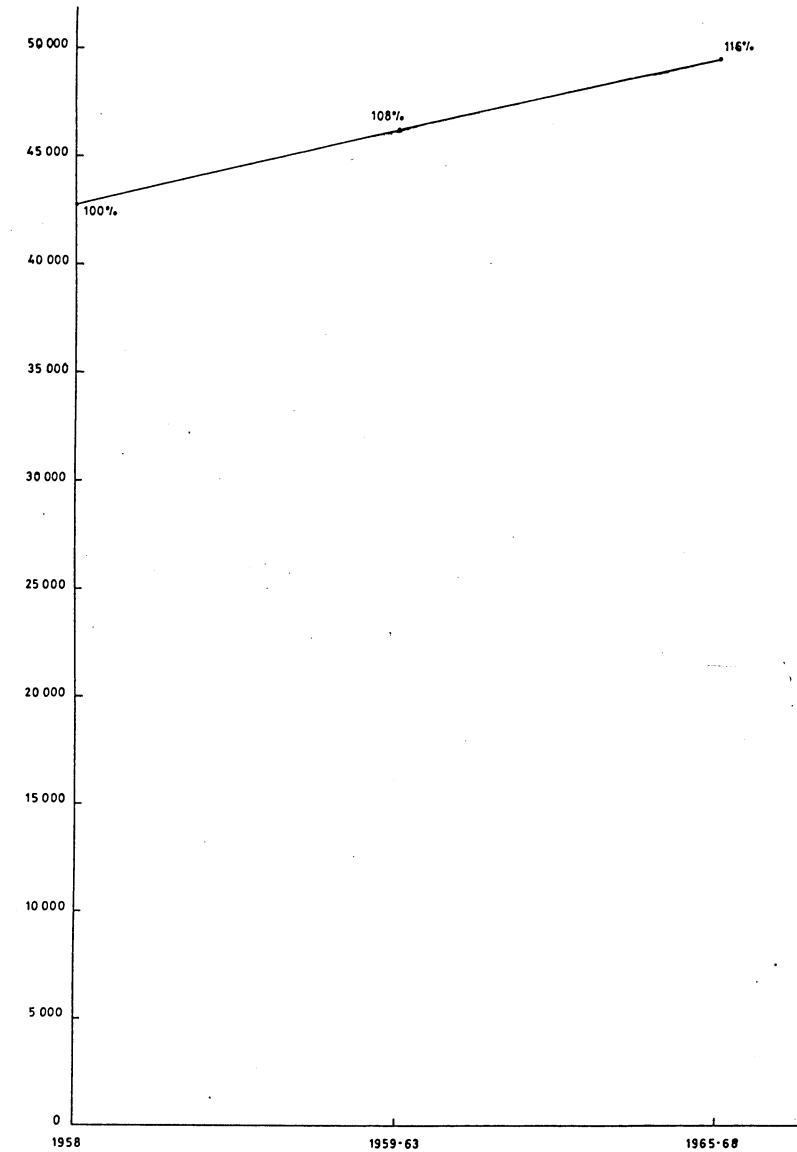
Tons



Graph 38

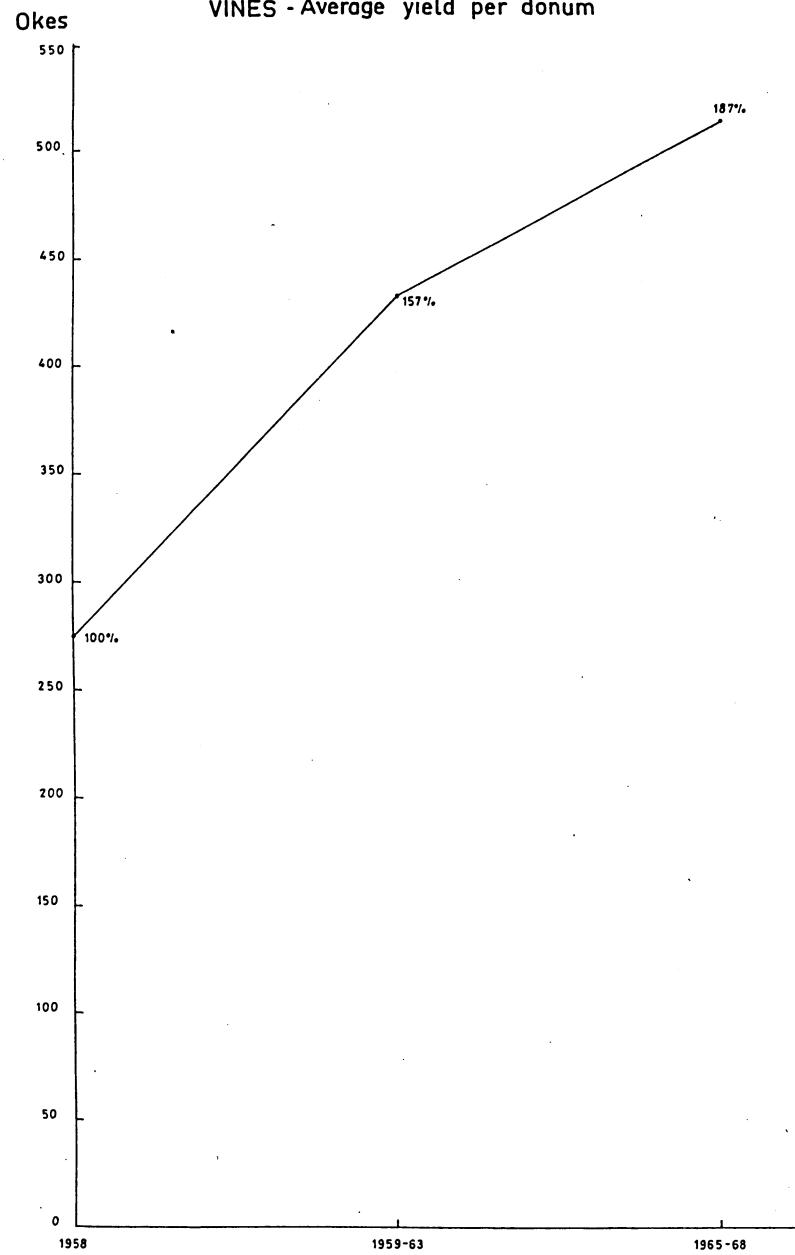
ALMONDS - Cultivated area (average)

Donums



Graph 39

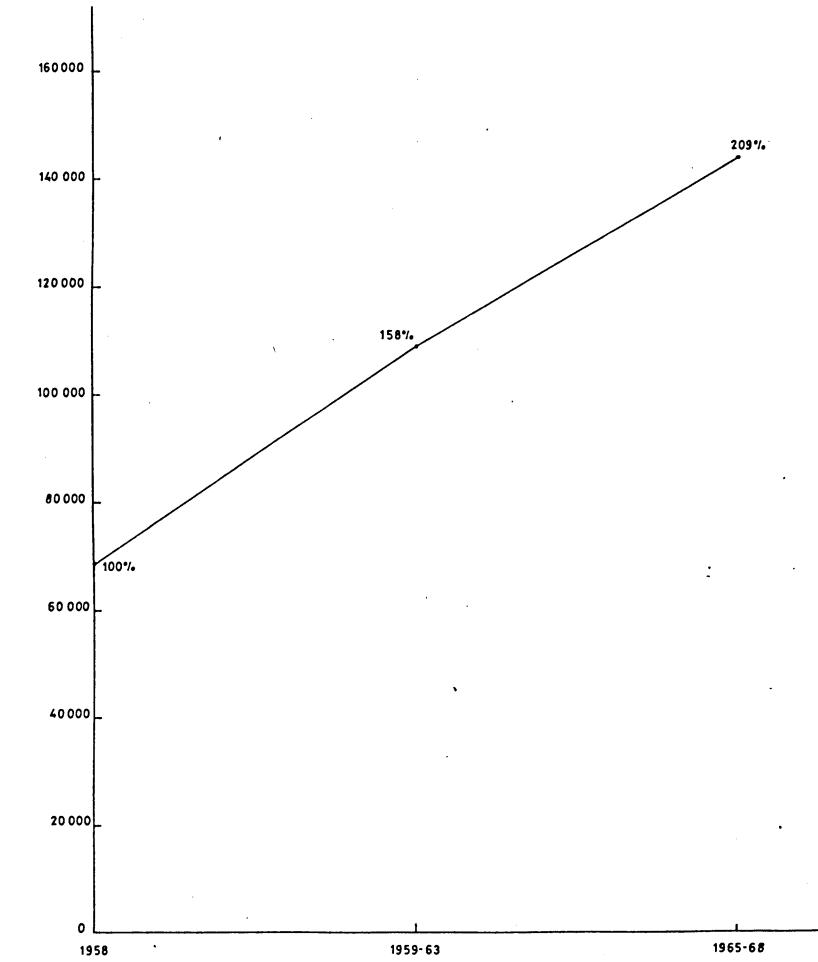
VINES - Average yield per donum



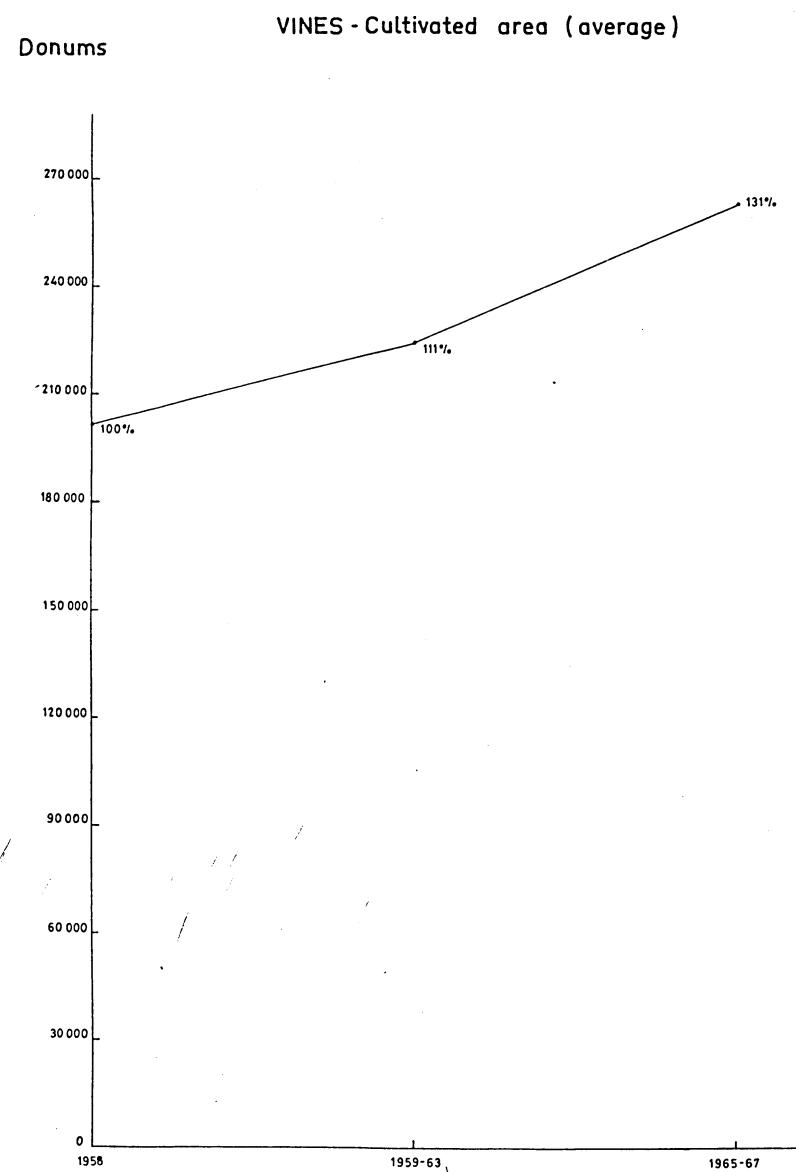
Graph 40

VINES - Production (average)

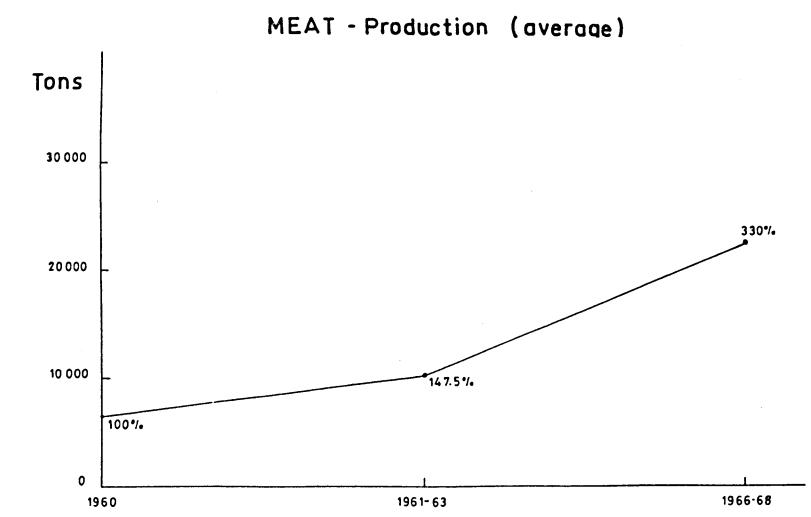
Tons



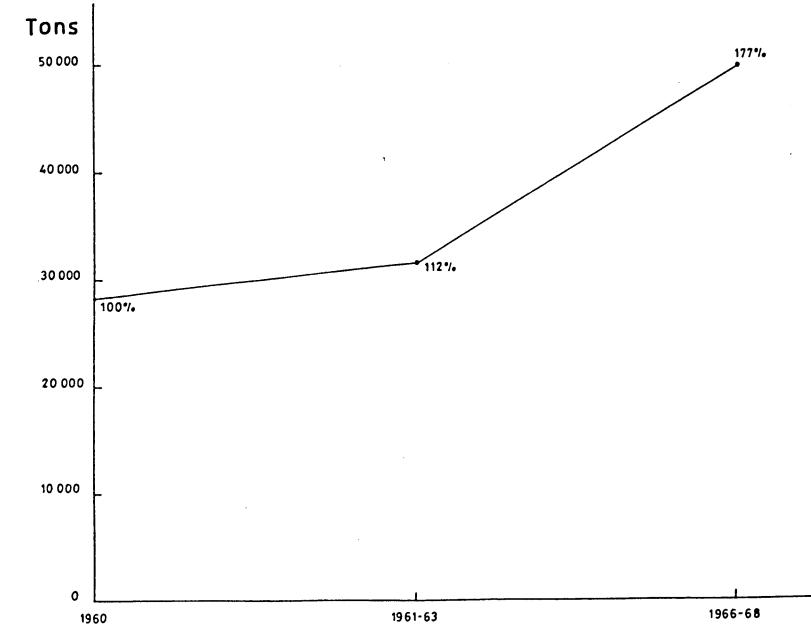
Graph 41

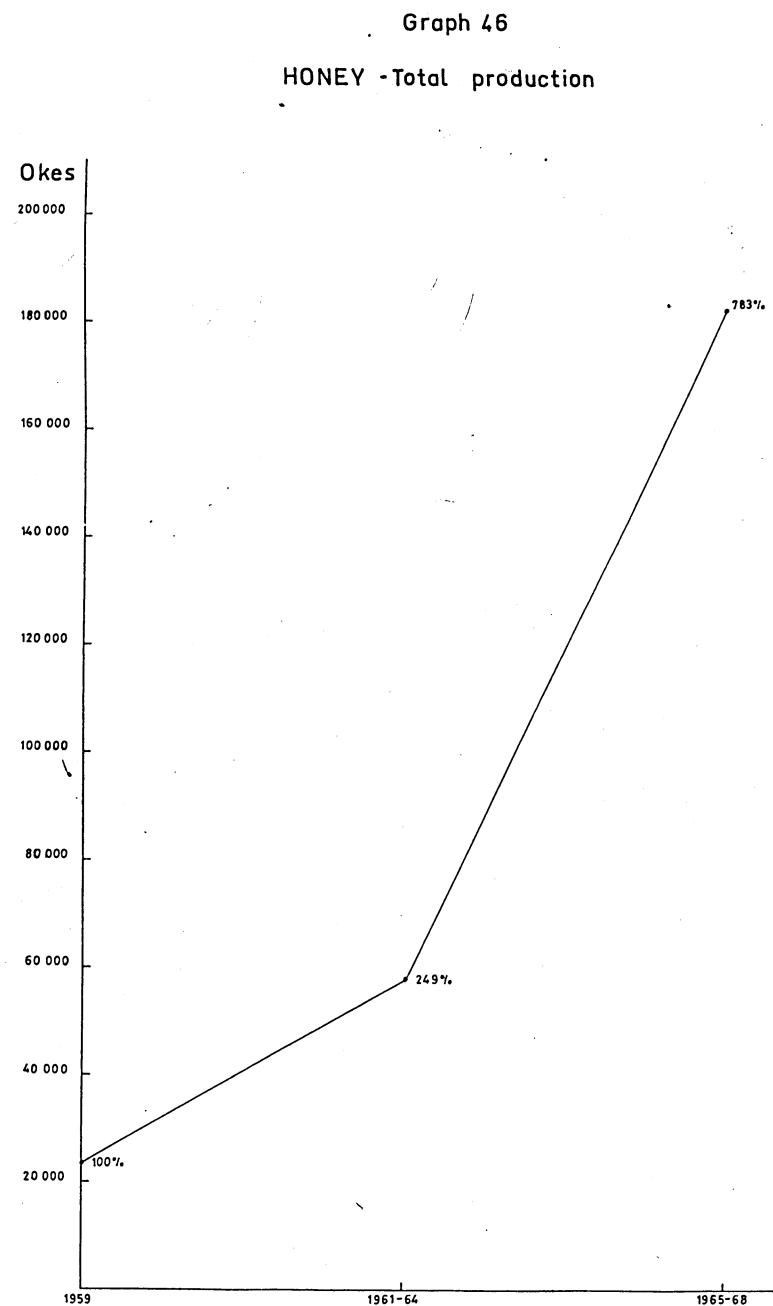
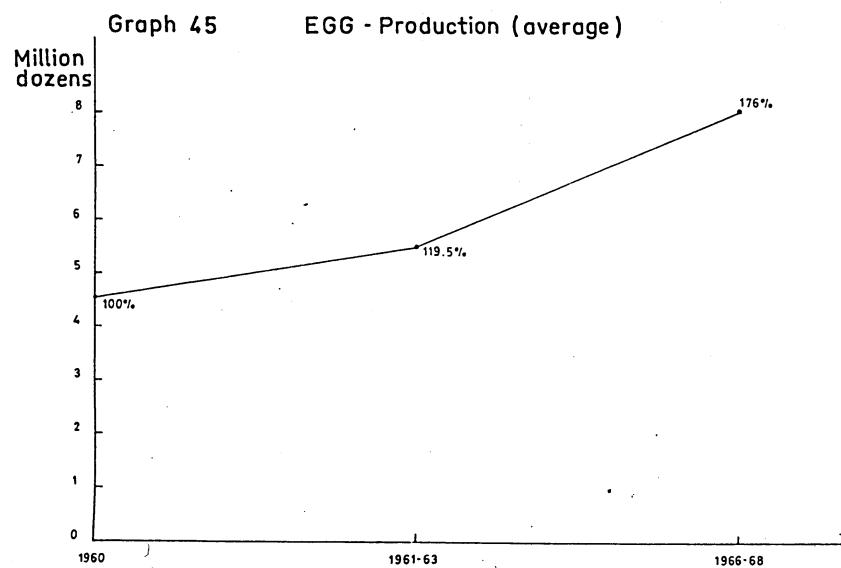
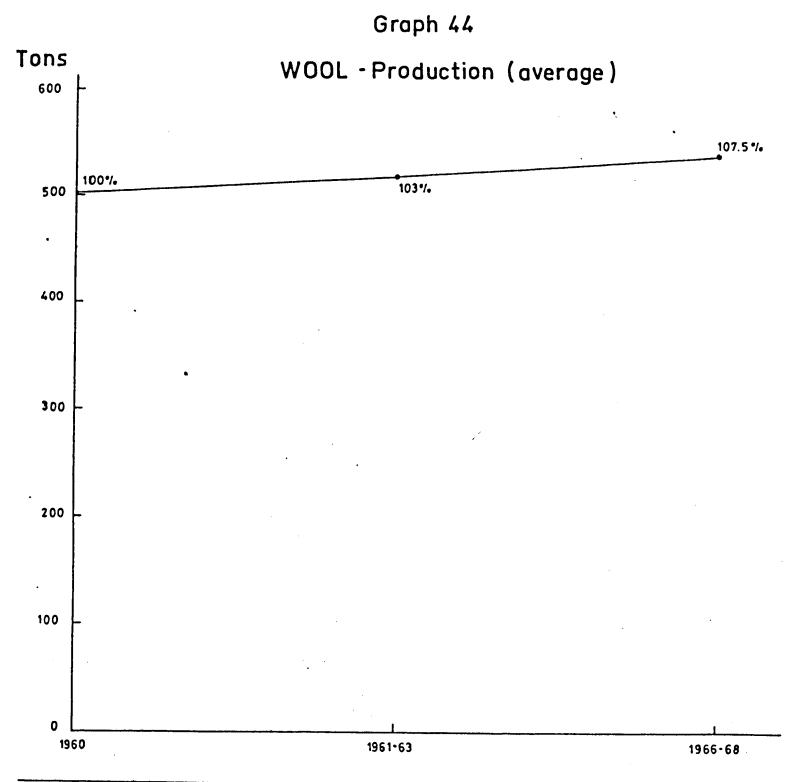


Graph 42



Graph 43 MILK - Production (average)





IV. Gross Agricultural Income

Gross agricultural income (including both crop production and animal husbandry) has remarkably increased during the period 1958-68. In the first five year period 1959-63 this income was raised to £23,322,659 which if compared to 1958 figure (£20,054,390) indicates a 16% increase. A faster rate of increase (92%) is shown in the four-year period 1965-68, when the average income of this period reached £38,681,491.

The income from crop production amounted in 1958 to £14,304,390, in 1959-63 to £16,220.859 (annual average), and in 1965-68 to £26,706,366 (average) effecting thus an increase of 13% and 86% respectively. It must be noted that almost regular fluctuations are observed, during the period under consideration, which are caused mostly by weather conditions. Obviously these fluctuations are reflected in the total income.

On the other hand the income from animal husbandry is deprived of such fluctuations and presents a steady gradual increase during the whole period. In 1958 this income amounted to £5,750,000, in 1959-63 to an annual average £7,101,800, or 23% increase, and in 1965-68 to £12,284,815 or 113% increase. A higher rate of increase is noticed in the four-year period 1965-68, especially in 1968 when the annual income from animal husbandry climbed to £15,465,860.

Gross agricultural income from £20,054,390 in 1958 reached £43,621,640 in 1968 which indicates an increase of 117.5%. Income from Crop production rose from £14,304,390 in 1958, to 28,155,780, and that of Animal Husbandry from £5,750,000 in 1958 to £15,465,860 i.e. by 96.8% and 169.0% respectively. These changes are shown in graph 47.

V. Inputs used in Agriculture.

The main inputs used in agriculture, which have been considered here, are

- a) Fertilizers
- b. Chemicals, mainly for plant and animal protection.
- c. Extension of irrigation facilities.
- d. Capital formation including purchases of agricultural machinery.

a. Fertilizers

The use of fertilizers has increased by 26,178 tons or 39% during the period 1958-1968 i.e. a linear increase of the quantity, used despite the 67% increase in fertilizers' prices since 1963. (Graphs 48, 49).

b. Chemicals

Total quantity of chemicals used in agriculture, mainly for plant and animal protection purposes, has increased by 114%, i.e. from 688 tons in 1958, to 1474 in 1965-68 (four year average). This despite the fact that prices of these inputs during the same period increased by 120% (Graphs 50, 51).

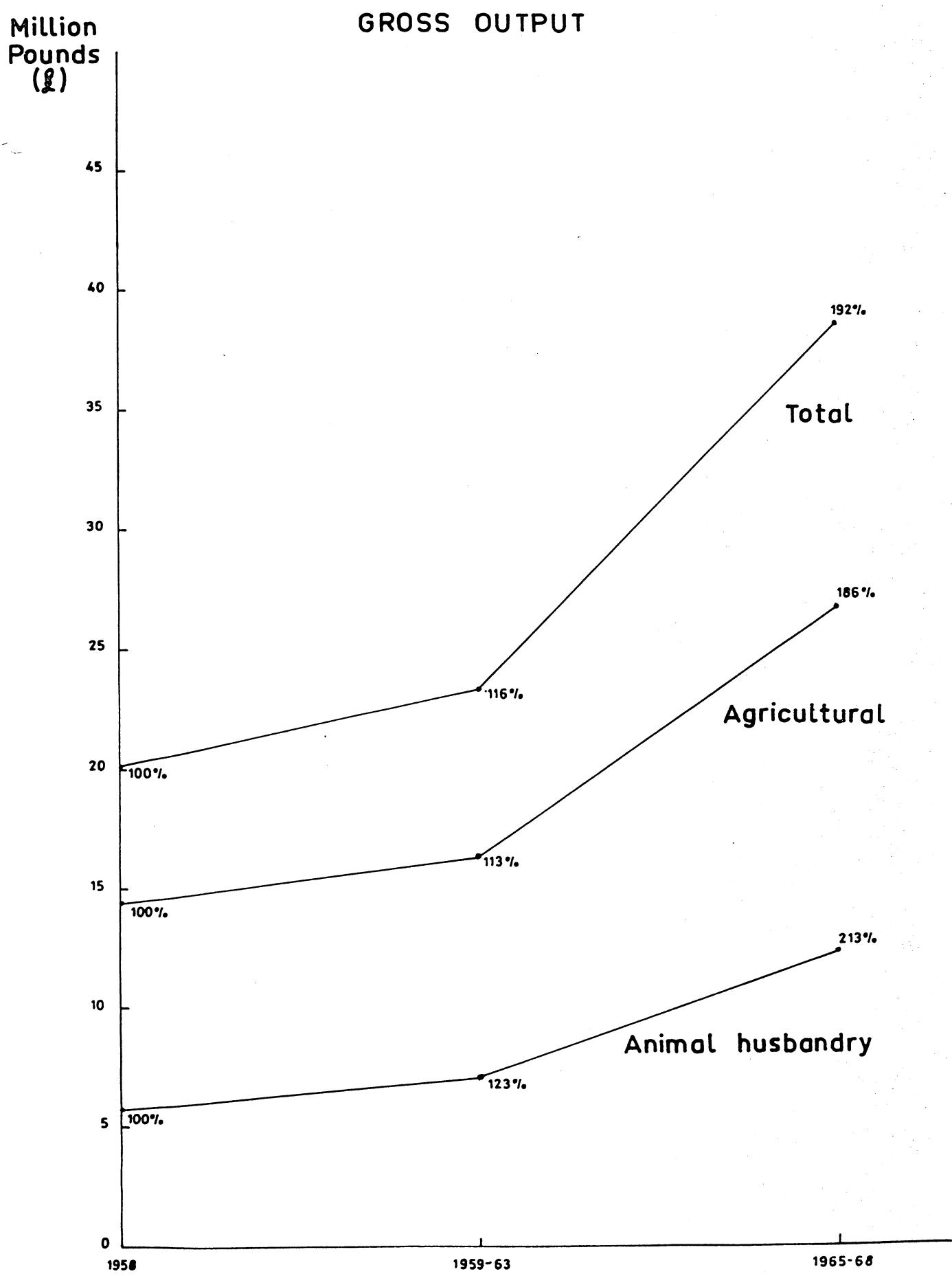
c. Irrigation

From 1958 to 1968, some 165,800 donums have been added to the irrigated land, which represents an increase of 27%, thus raising the total irrigated ^{area} to 763,300 donums. (Graph 52).

d. Capital formation

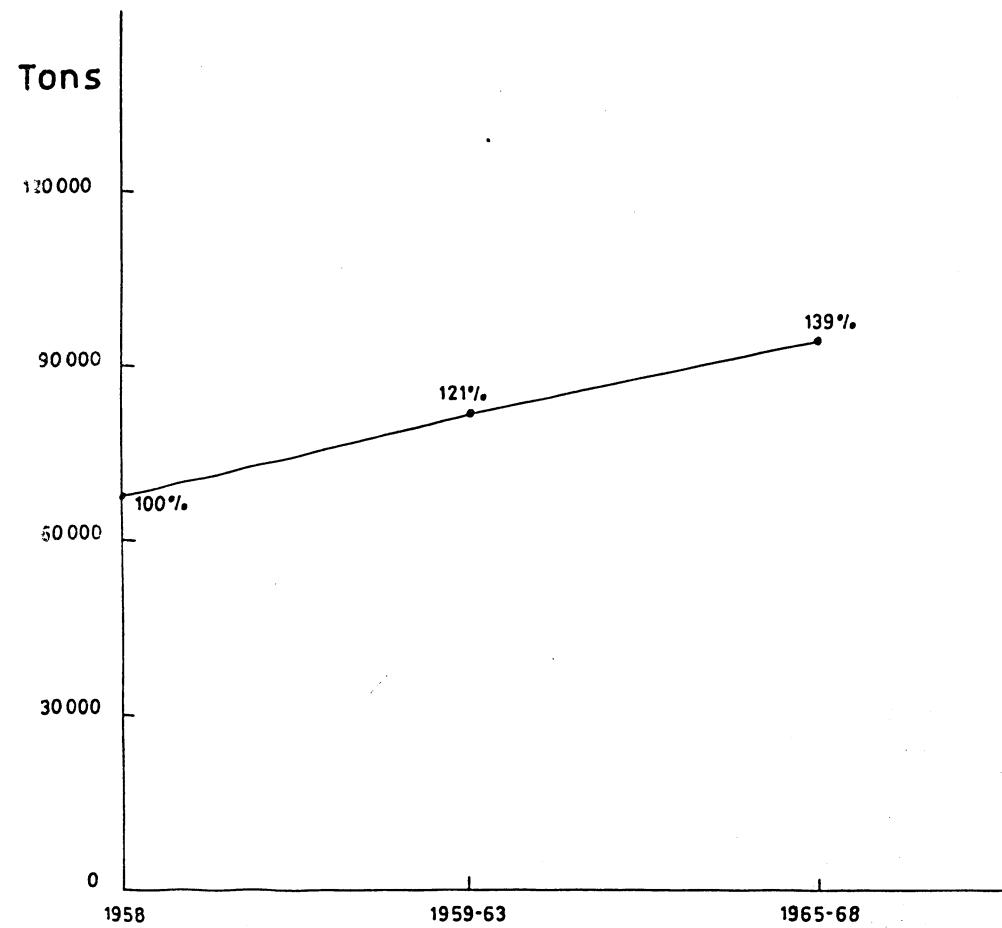
In 1958 total capital formation amounted to £1,700,000. In the following period 1959-63 the average annual capital formation was raised to £2,060,000 and during 1965-68 to

Graph 47



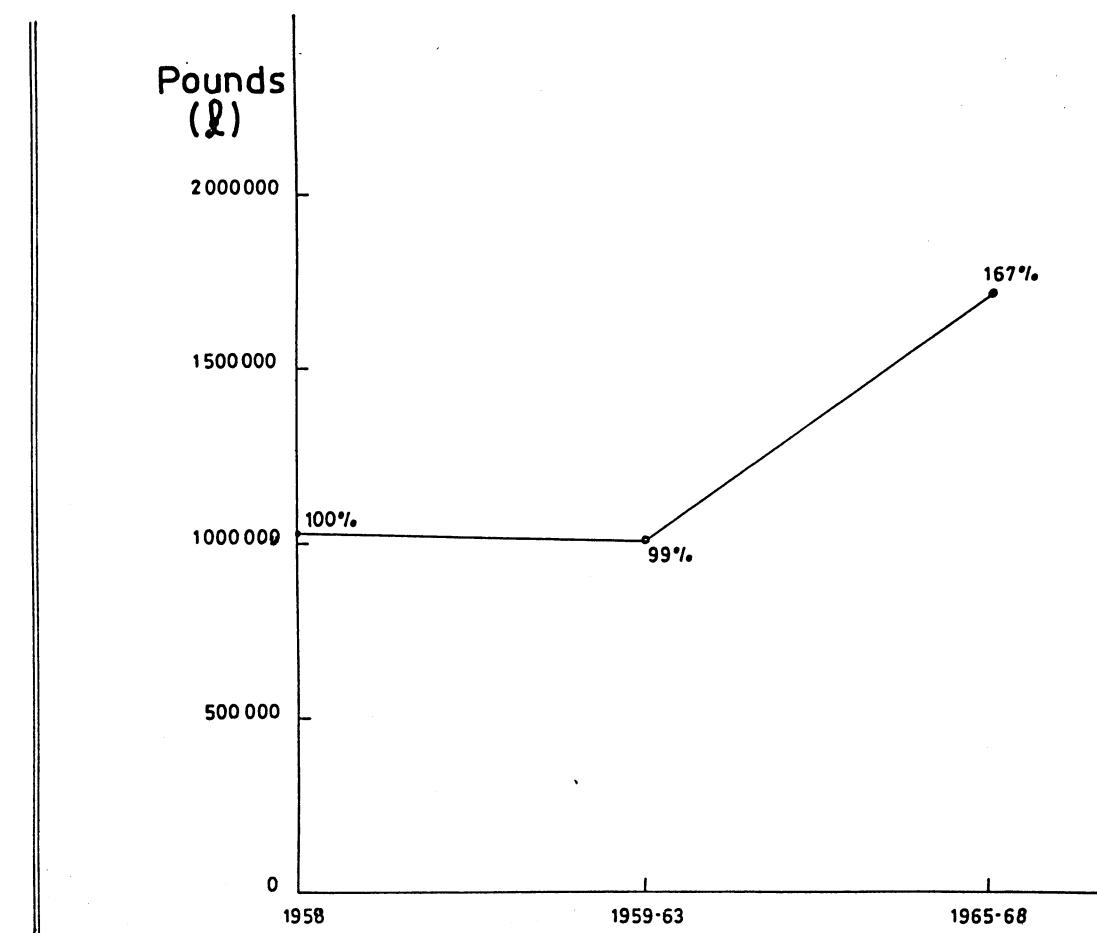
Graph 48

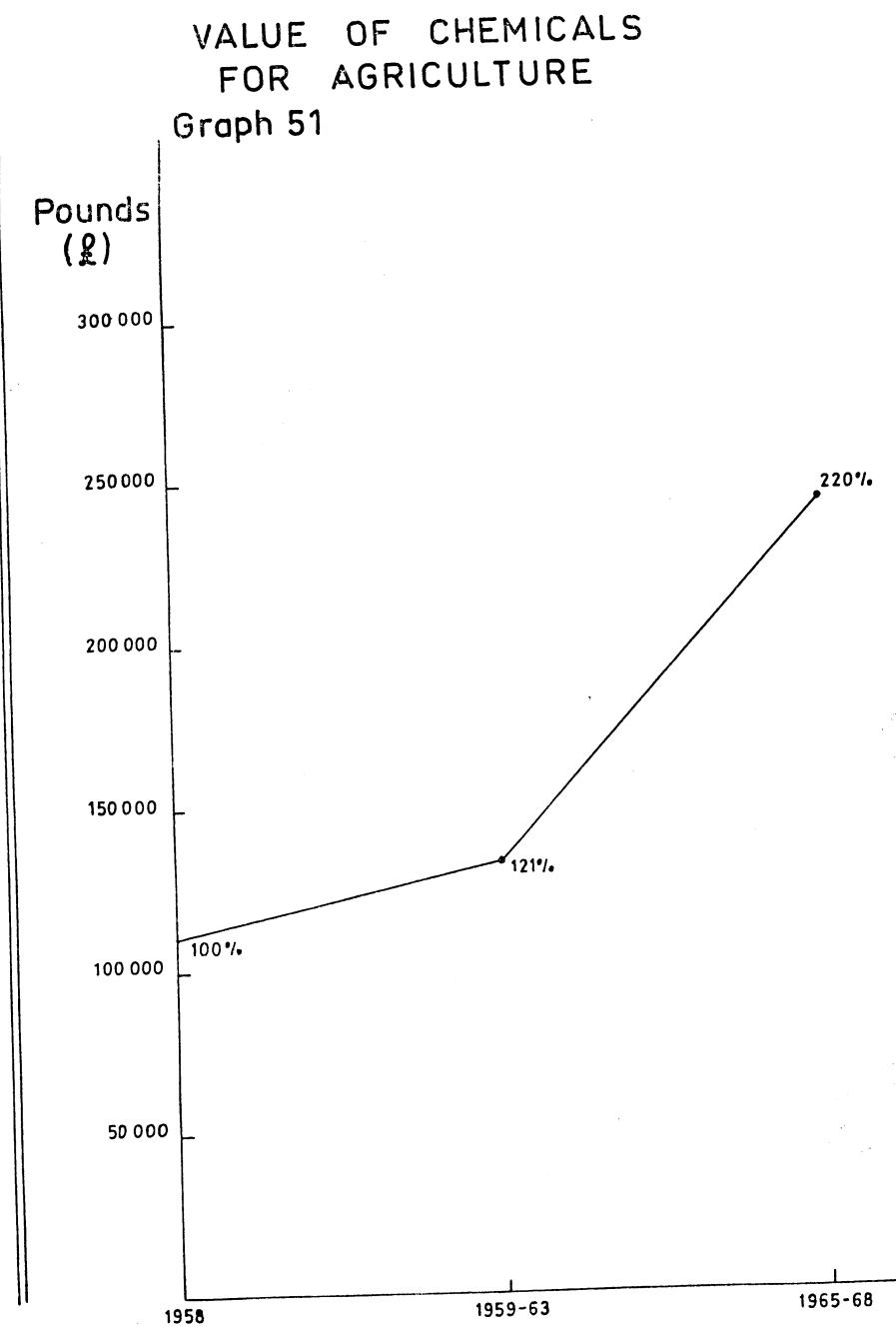
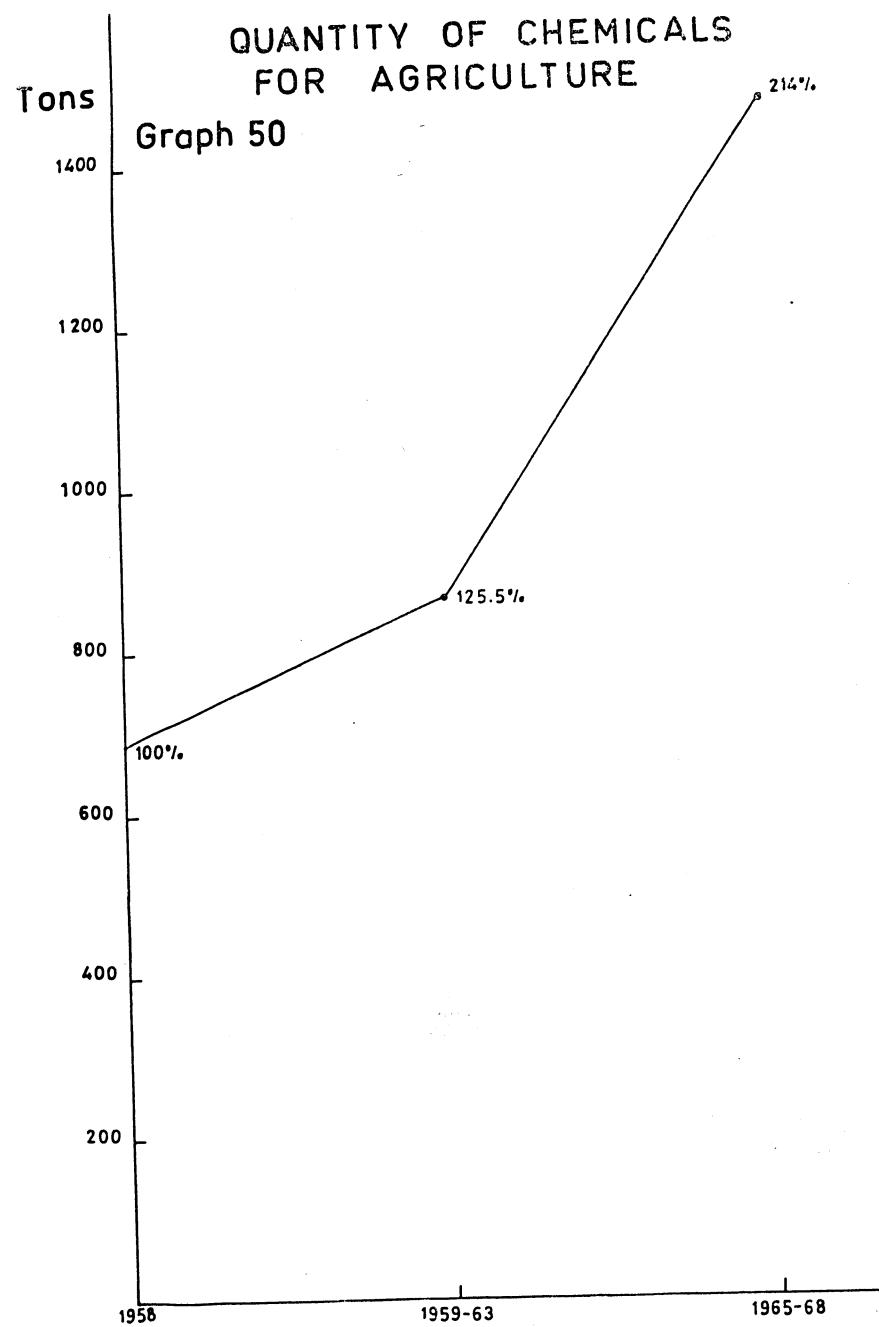
QUANTITY OF FERTILIZERS



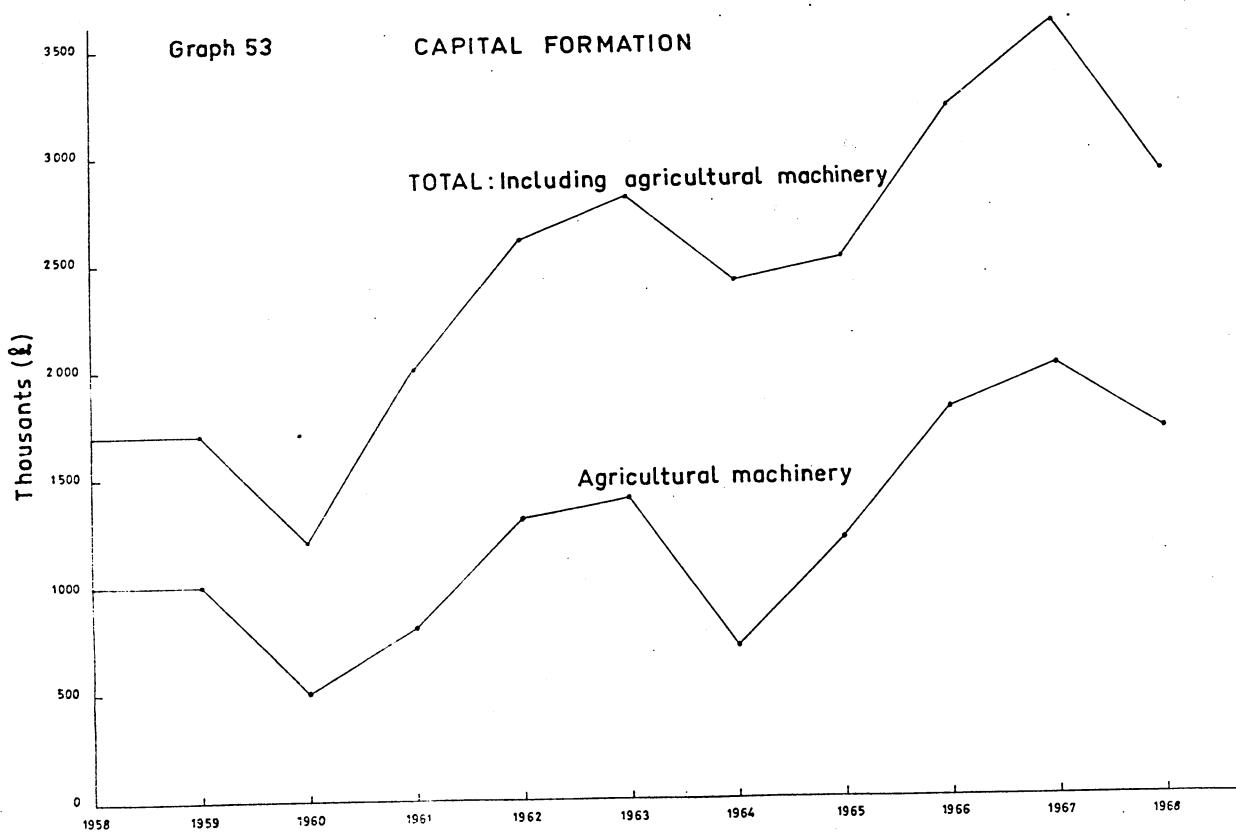
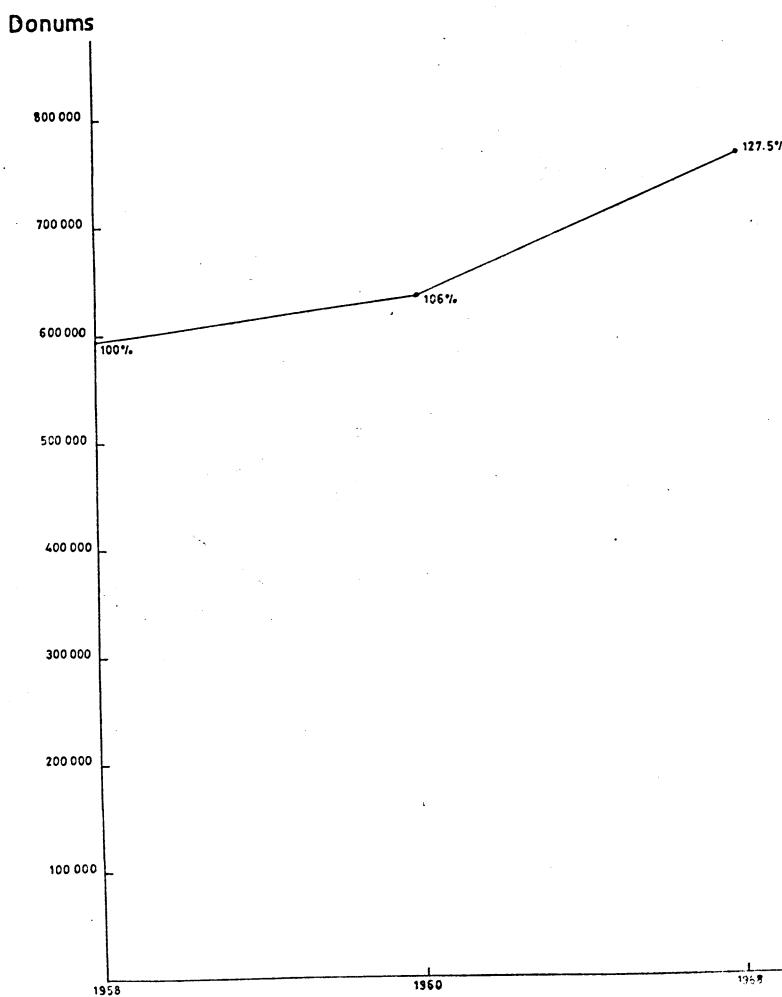
Graph 49

VALUE OF FERTILIZERS



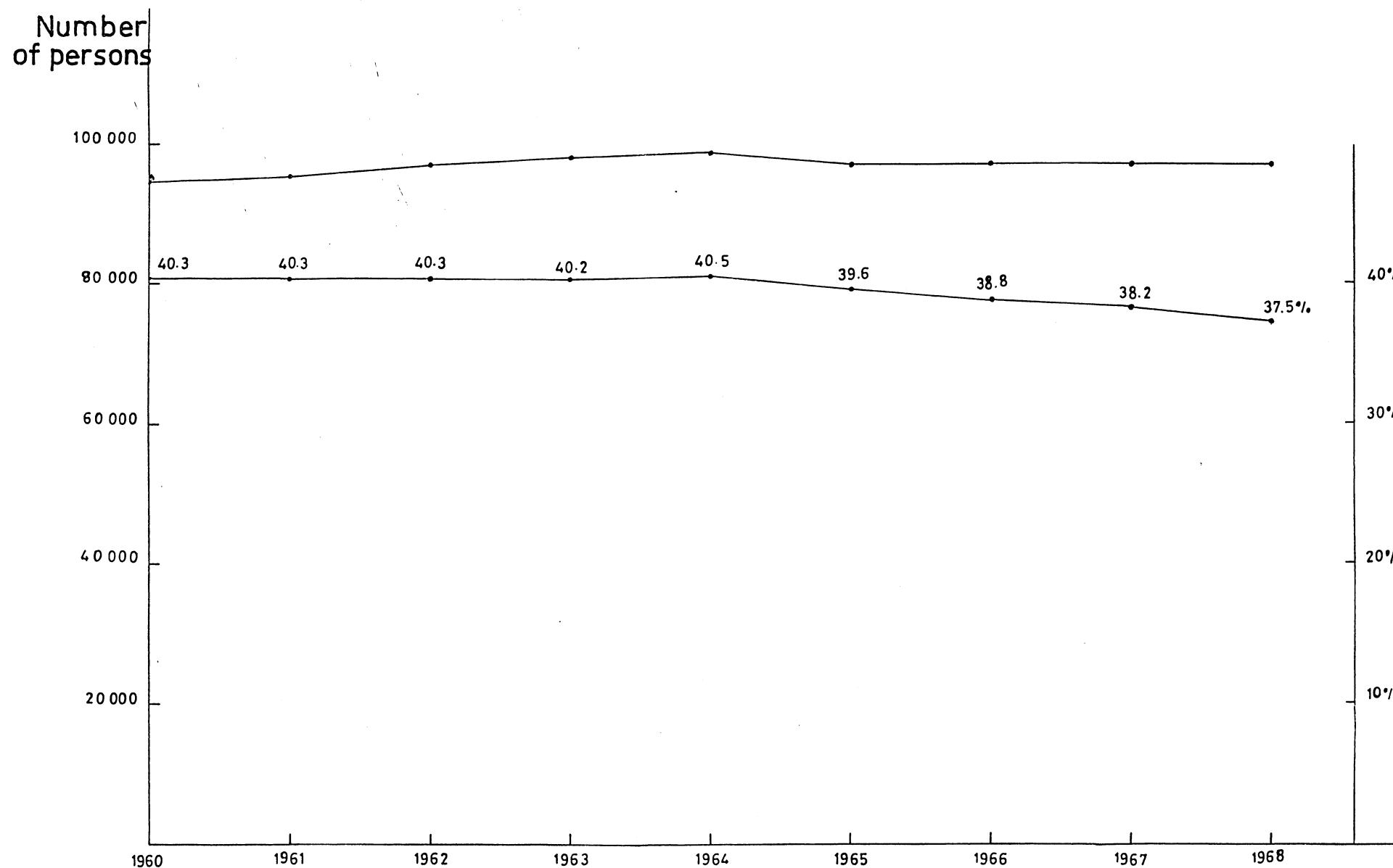


Graph 52
TOTAL IRRIGATED AREA



Graph 54

Number and percentage of the active population employed in agriculture



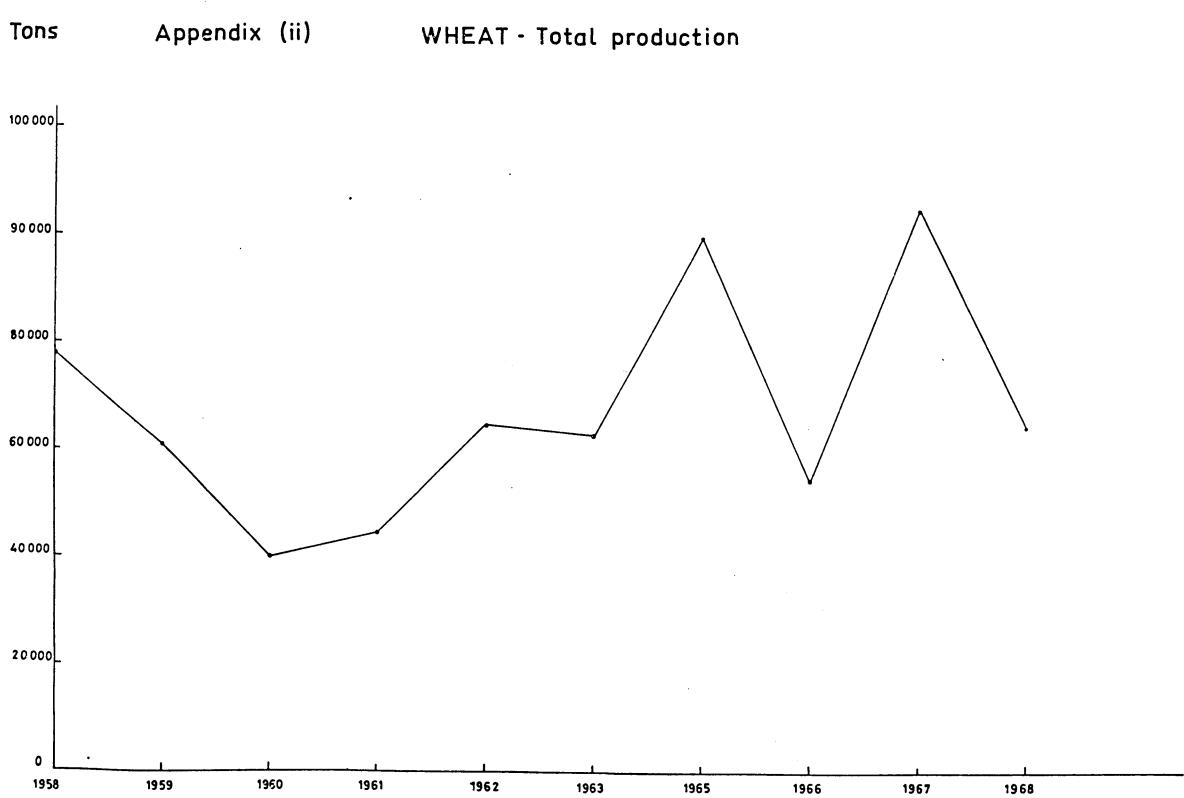
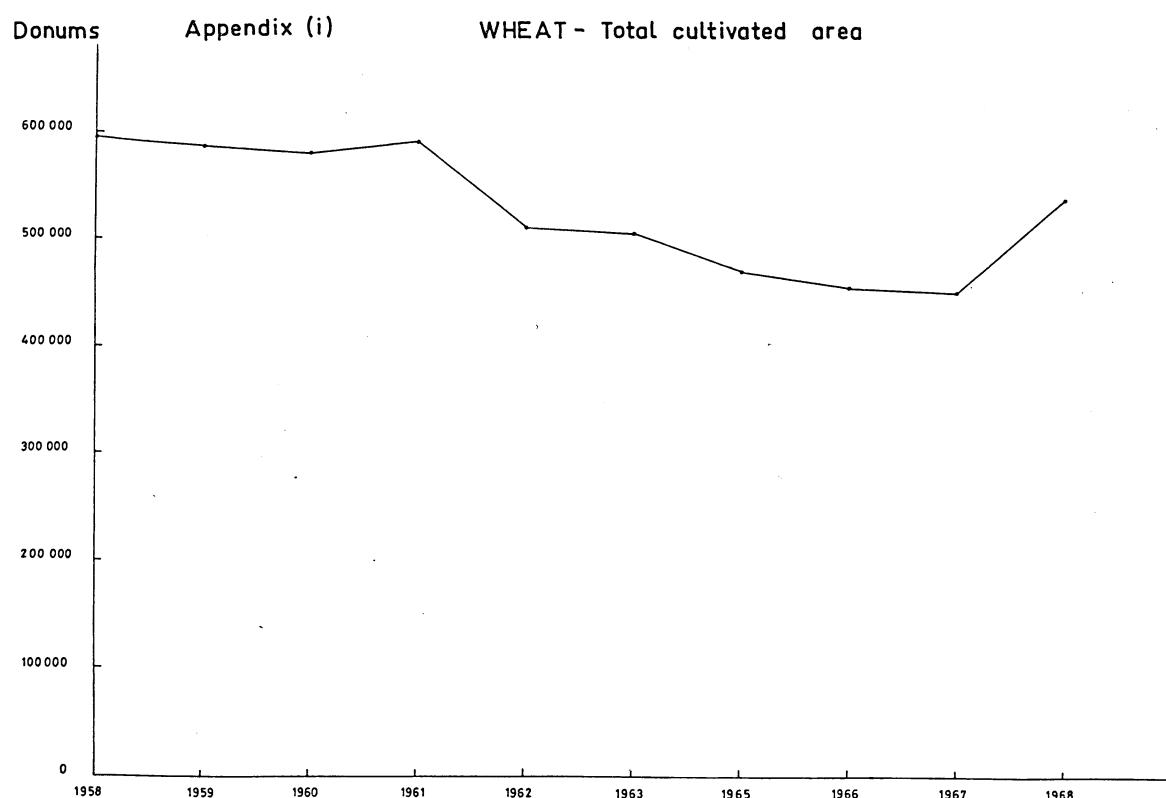
£3050,000. These figures indicate an increase of 21% and 79% respectively. However, during the period under consideration wide fluctuations are shown. The first gap in the formation * of capital for agriculture is noticed in 1960—year of economic depression and the second one in 1964 due to the unstable political situation. Another decline, though a relative one, is also noticed in the year 1967-68. On the other hand, high peaks are observed in 1962-63 and in 1966-67. These fluctuations are entirely reflected in the formation of capital for agricultural machinery purchases.

Purchases of agricultural machinery amounted to £1 million in 1958 and the average during the period 1959-63, presents exactly the same figure, but in the last period 1965-68 this figure was raised to 1,675,800 i.e. a 67.5% increase (See graph 53 and XVII in the Appendix).

VI. Population employed in Agriculture.

Total number of the economically active population employed in agriculture has increased from 94,800 in 1958, to 97,000 in 1968 i.e. by about 2%. However, the percentage of this population in relation to the total active population has declined from 40.3% to 37.5% during the same period. This can be attributed to the absolute increase of population generally and to constant increase of employment outside agriculture (Graph 54).

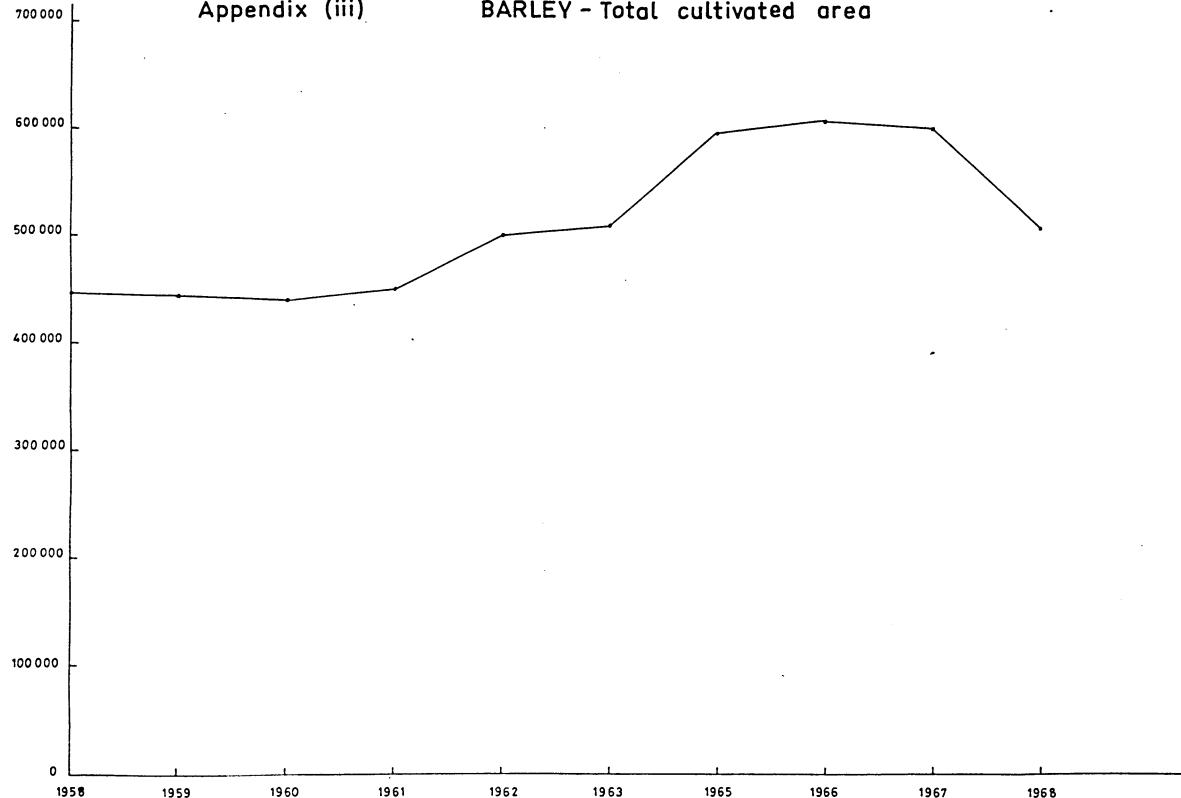
* Capital formation refers to purchases of machinery, equipment and cars used in the agricultural sector, to new nonresidential buildings and other constructions.



Donums

Appendix (iii)

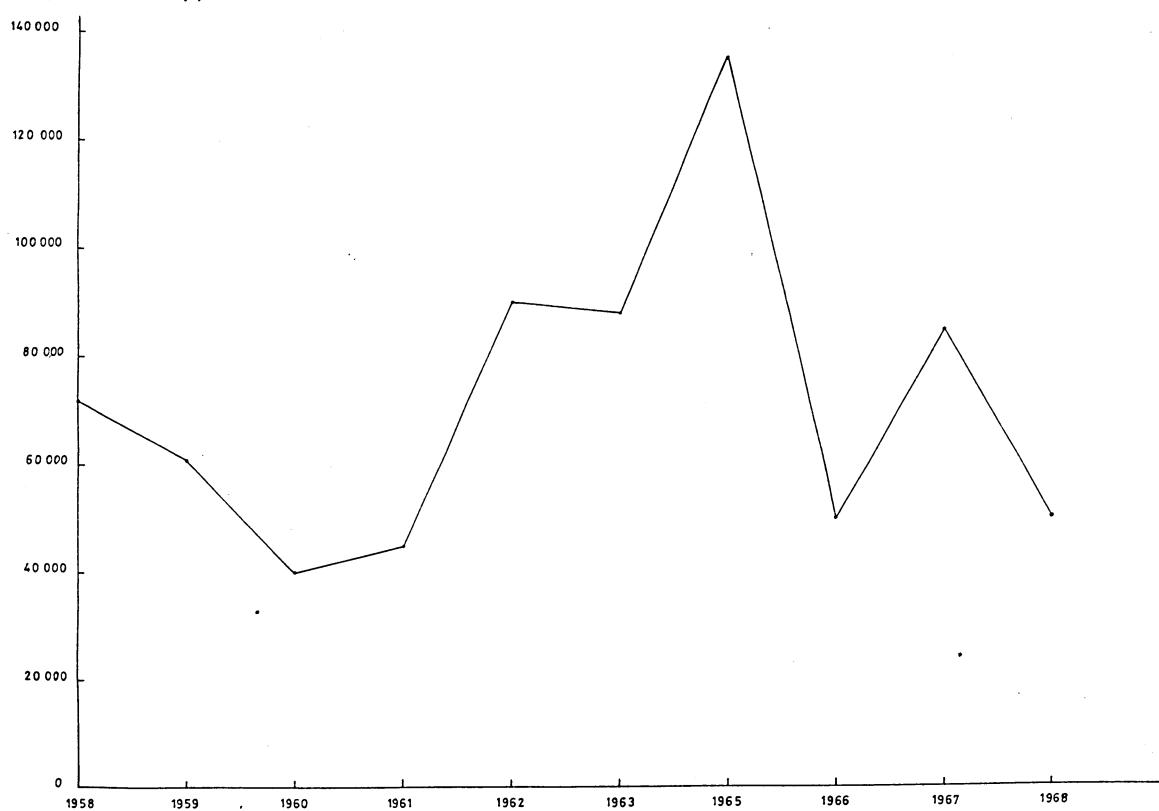
BARLEY - Total cultivated area



Tons

Appendix (iv)

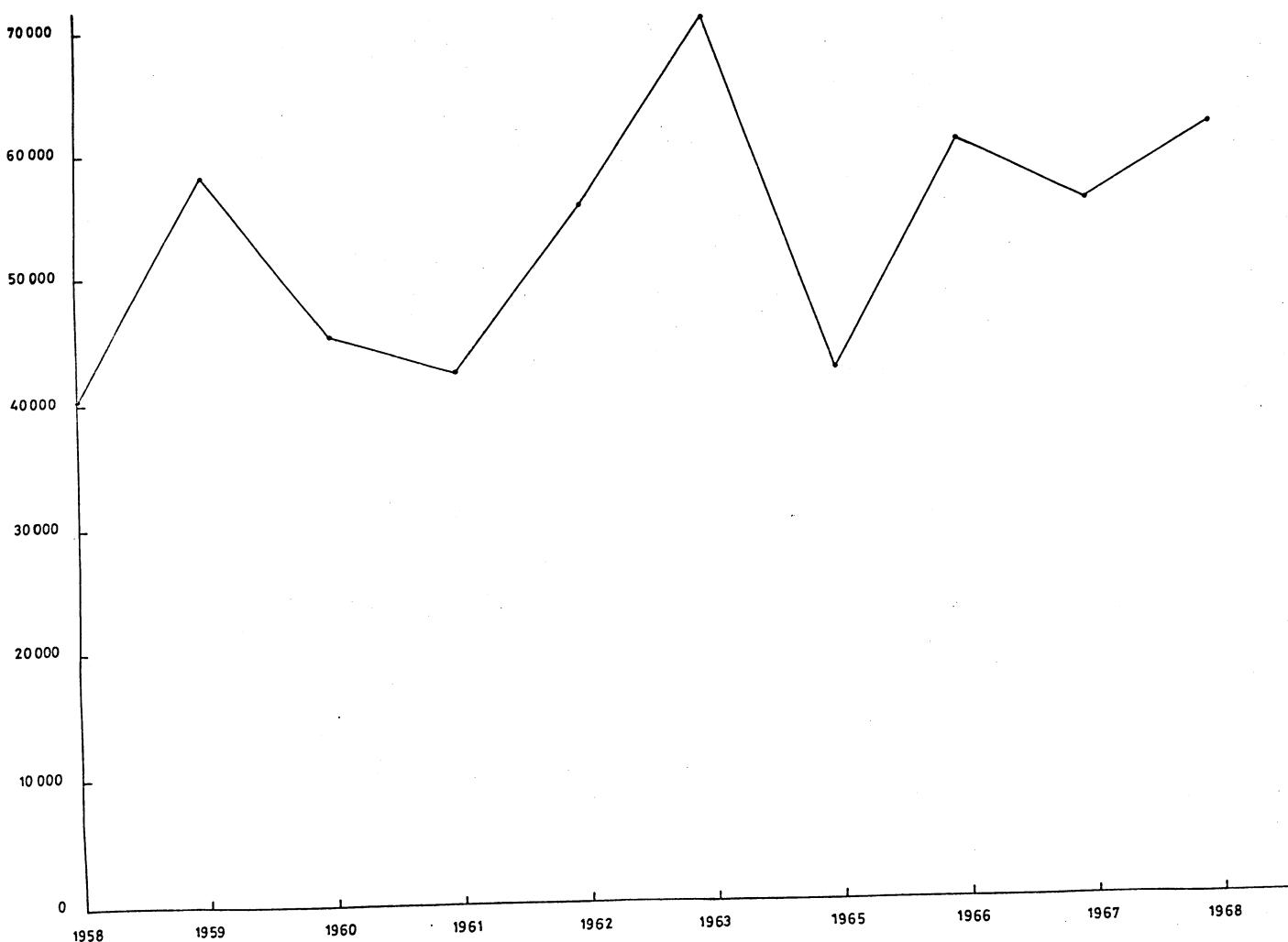
BARLEY - Total production



Tons

Appendix (v)

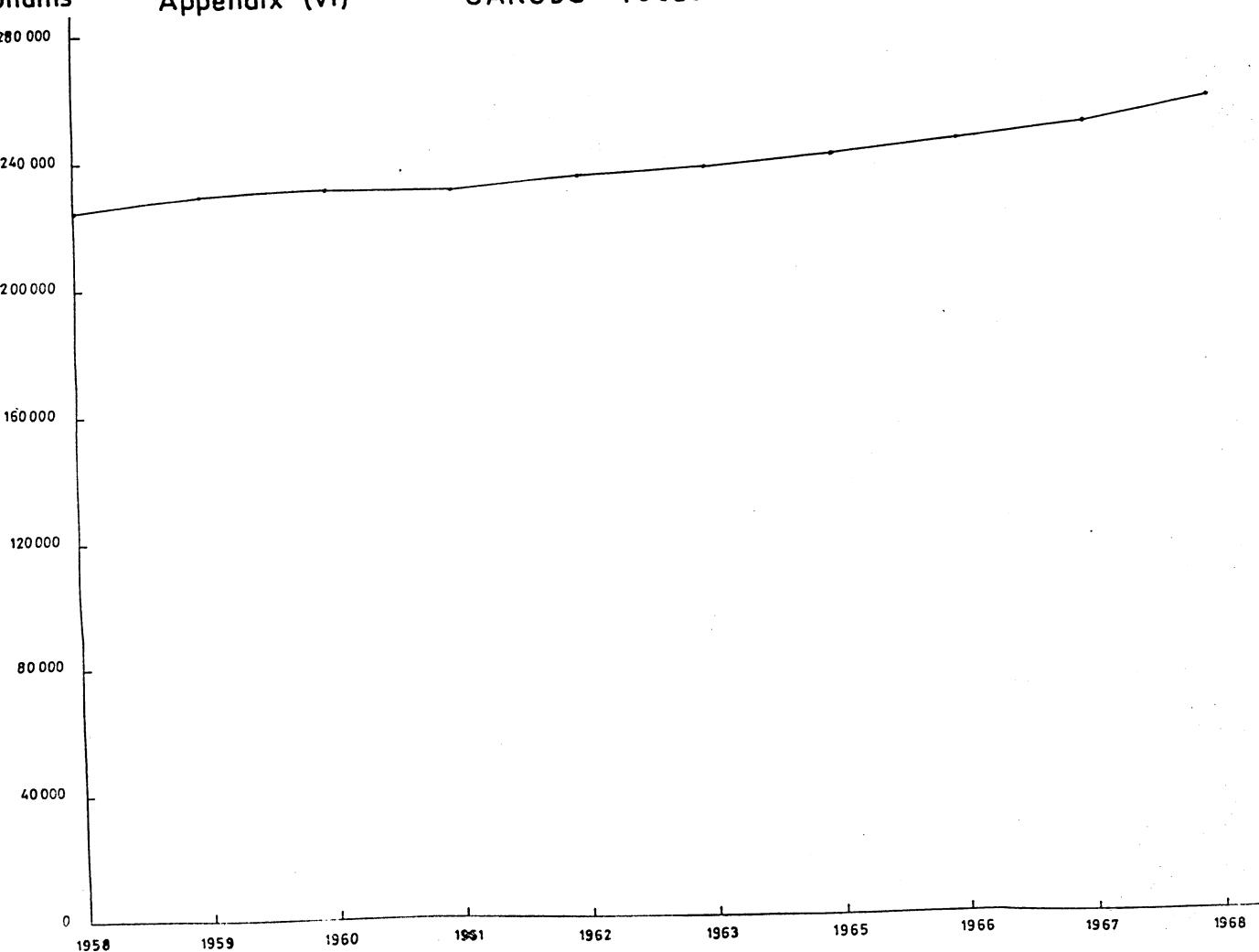
CAROBS - Total production

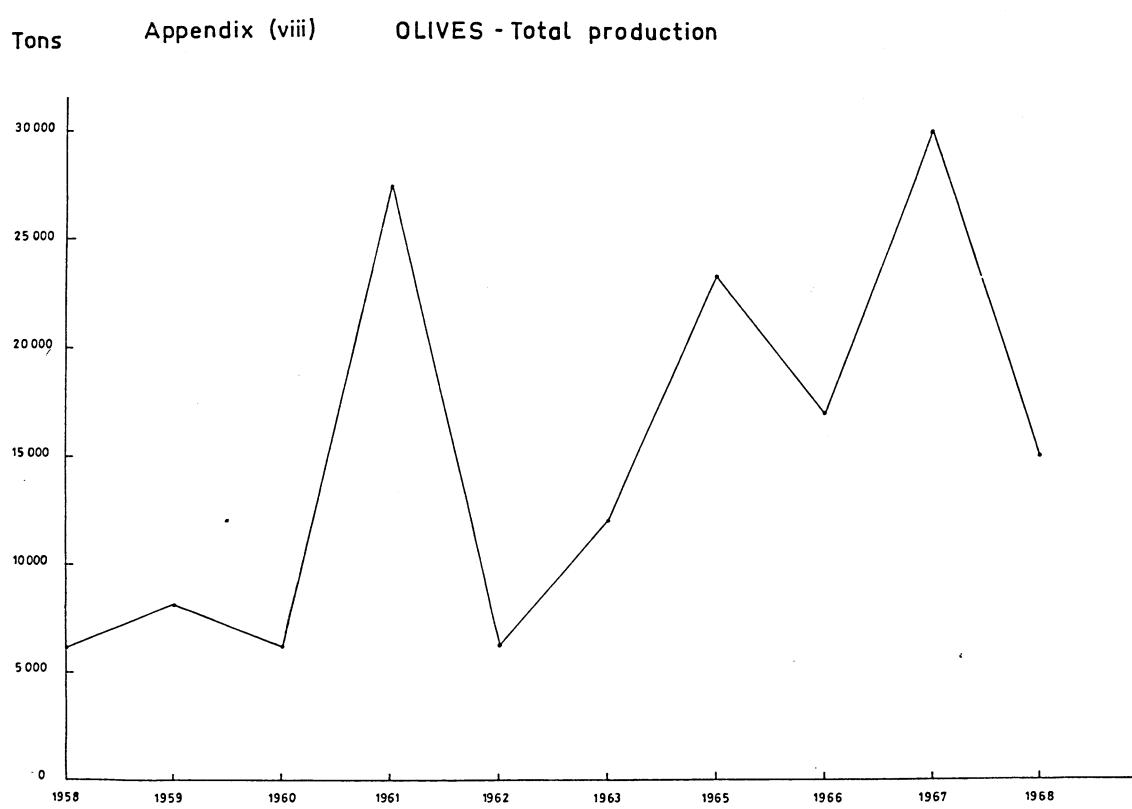
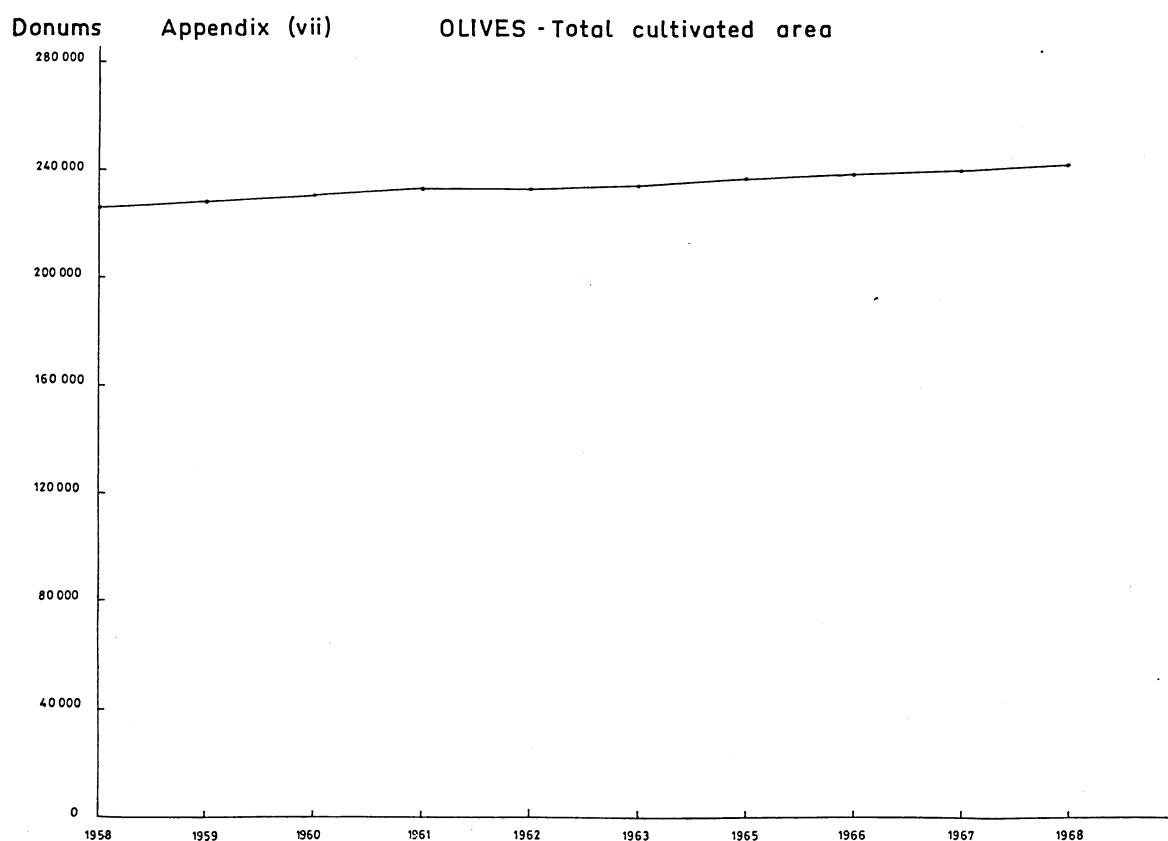


Donums

Appendix (vi)

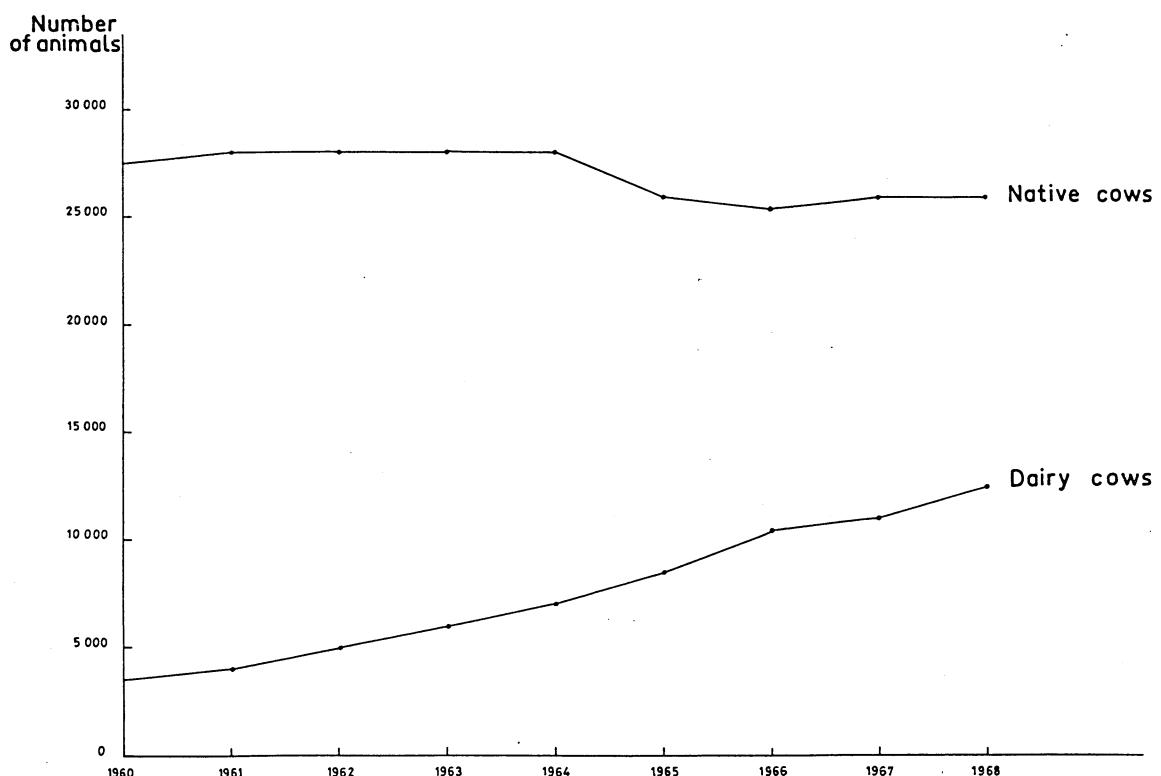
CAROBS - Total cultivated area





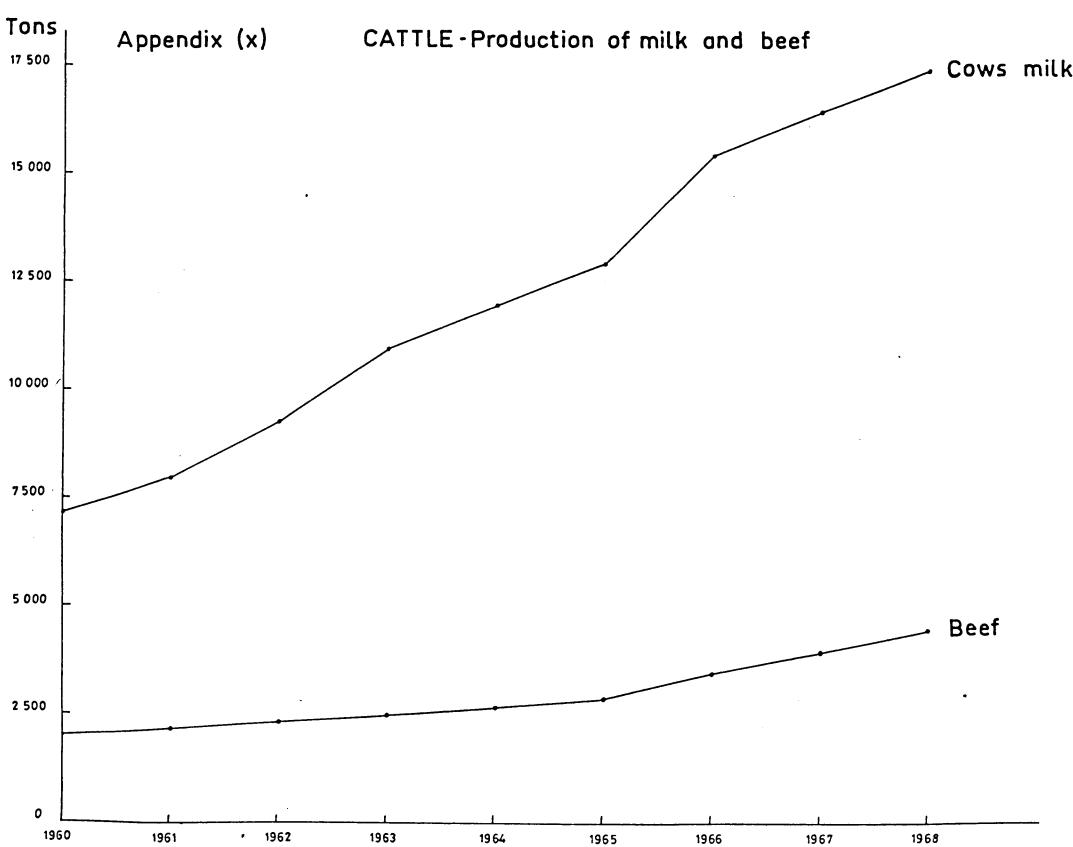
Appendix (ix)

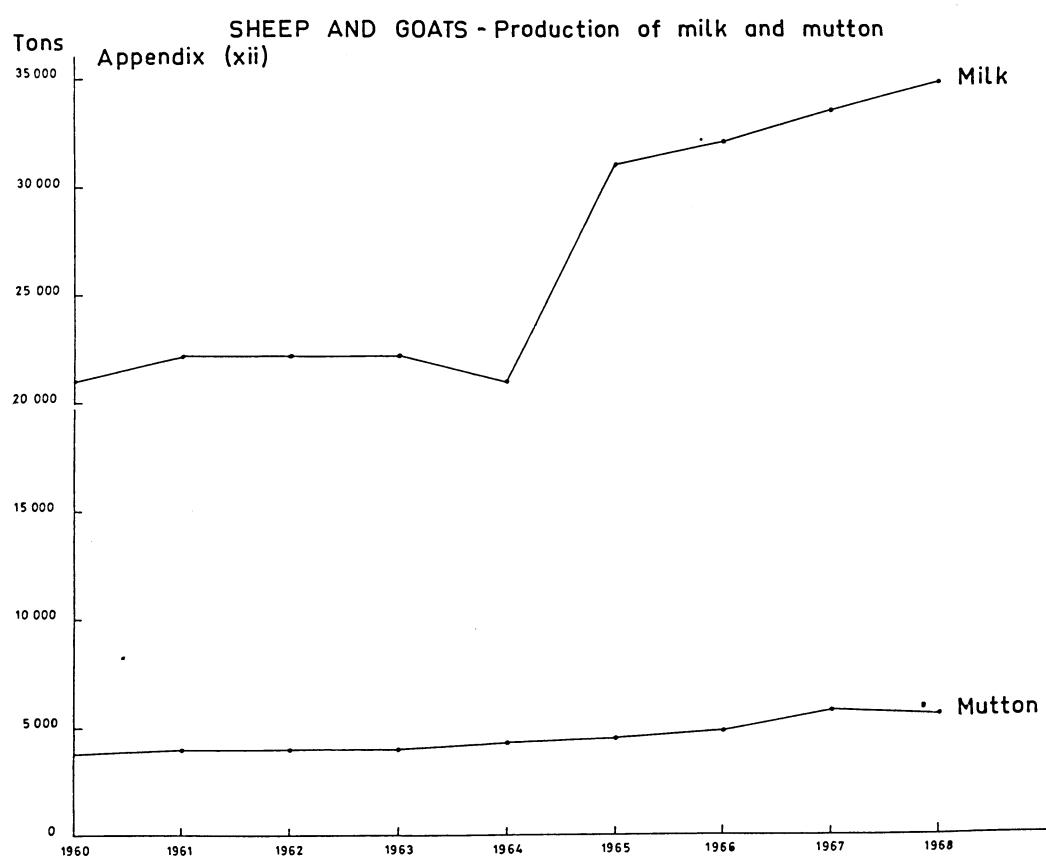
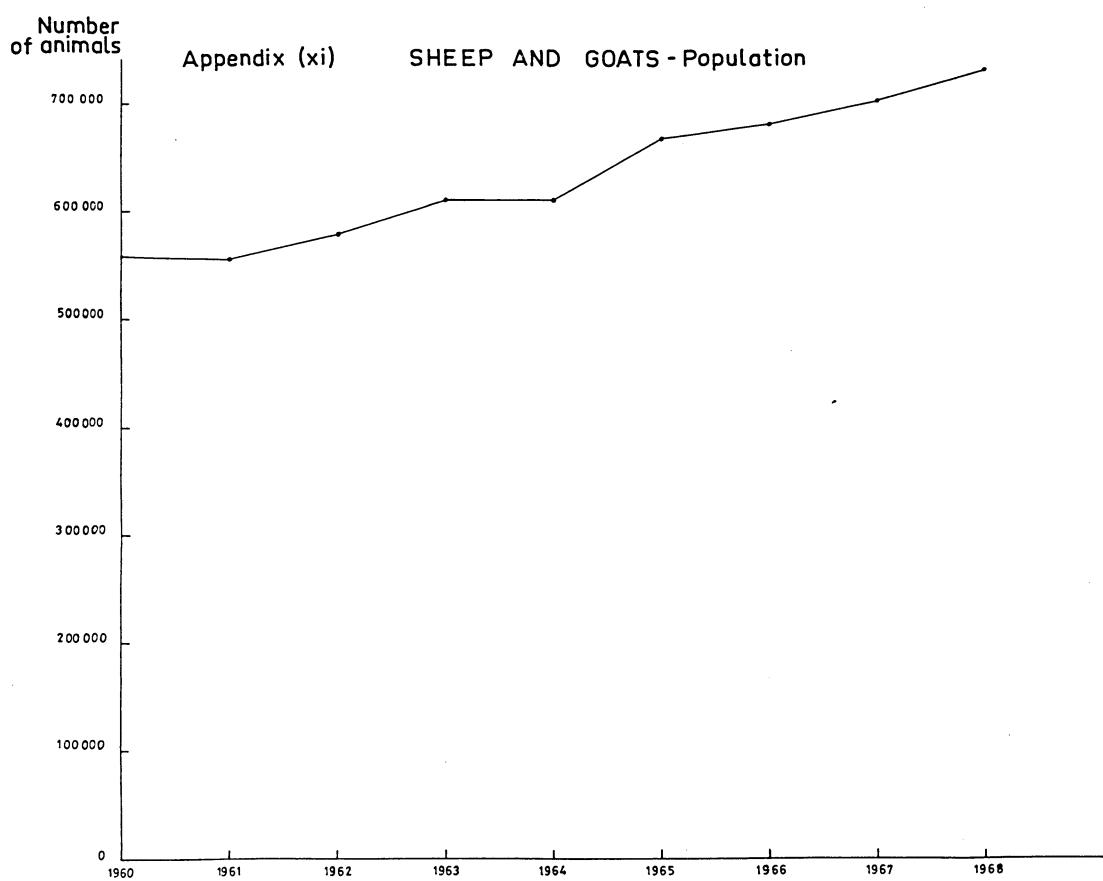
CATTLE - Population

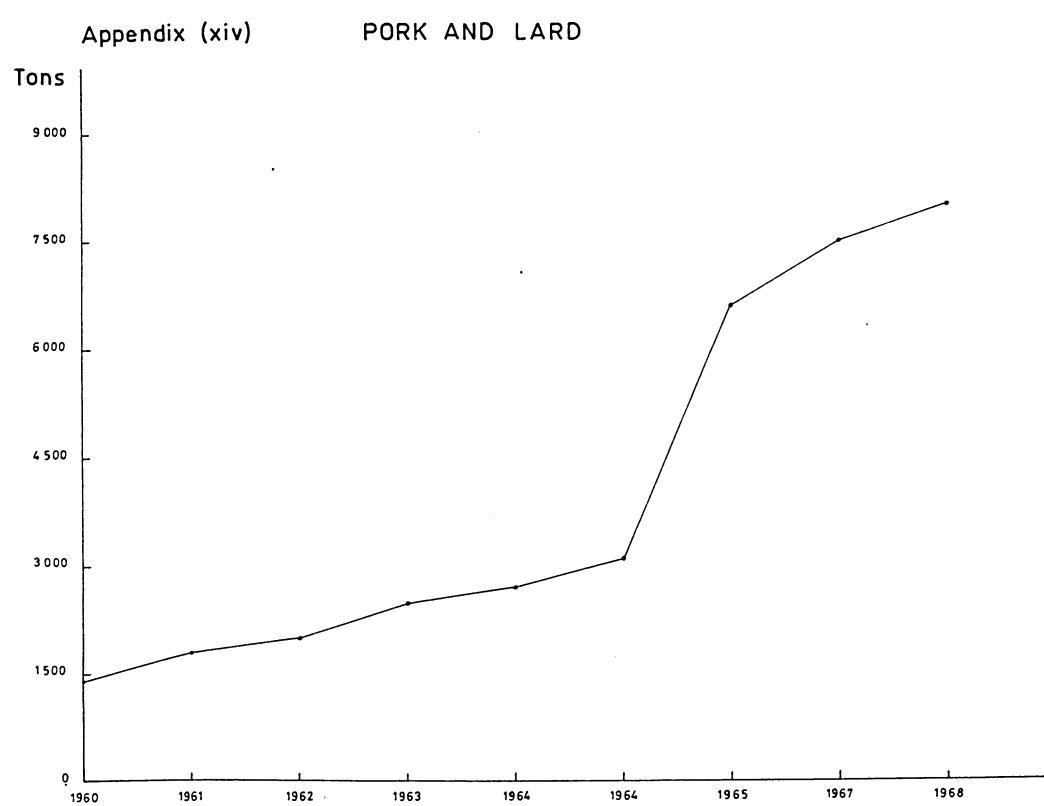
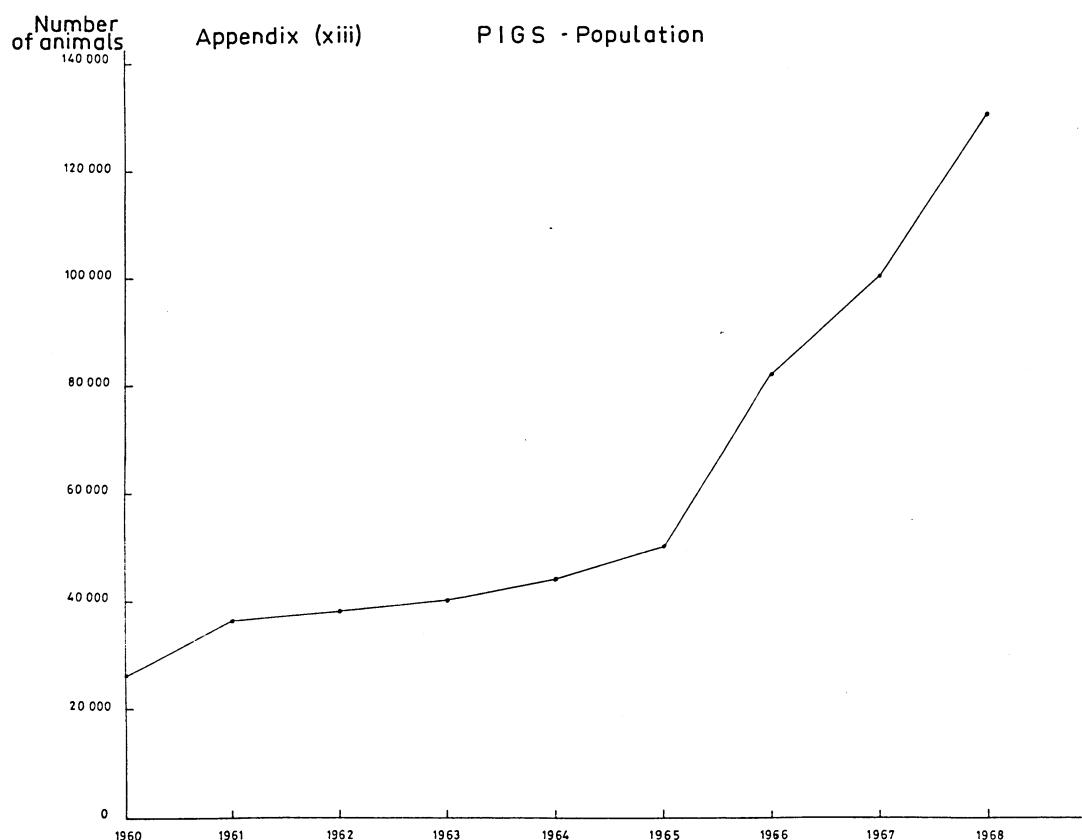


Appendix (x)

CATTLE - Production of milk and beef

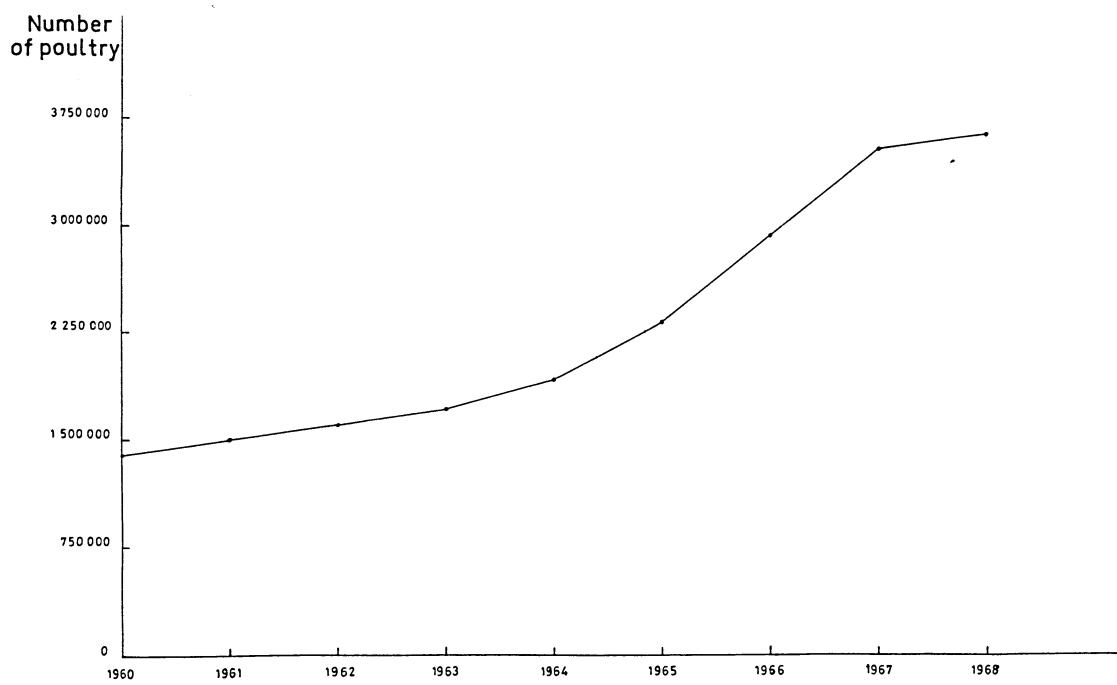






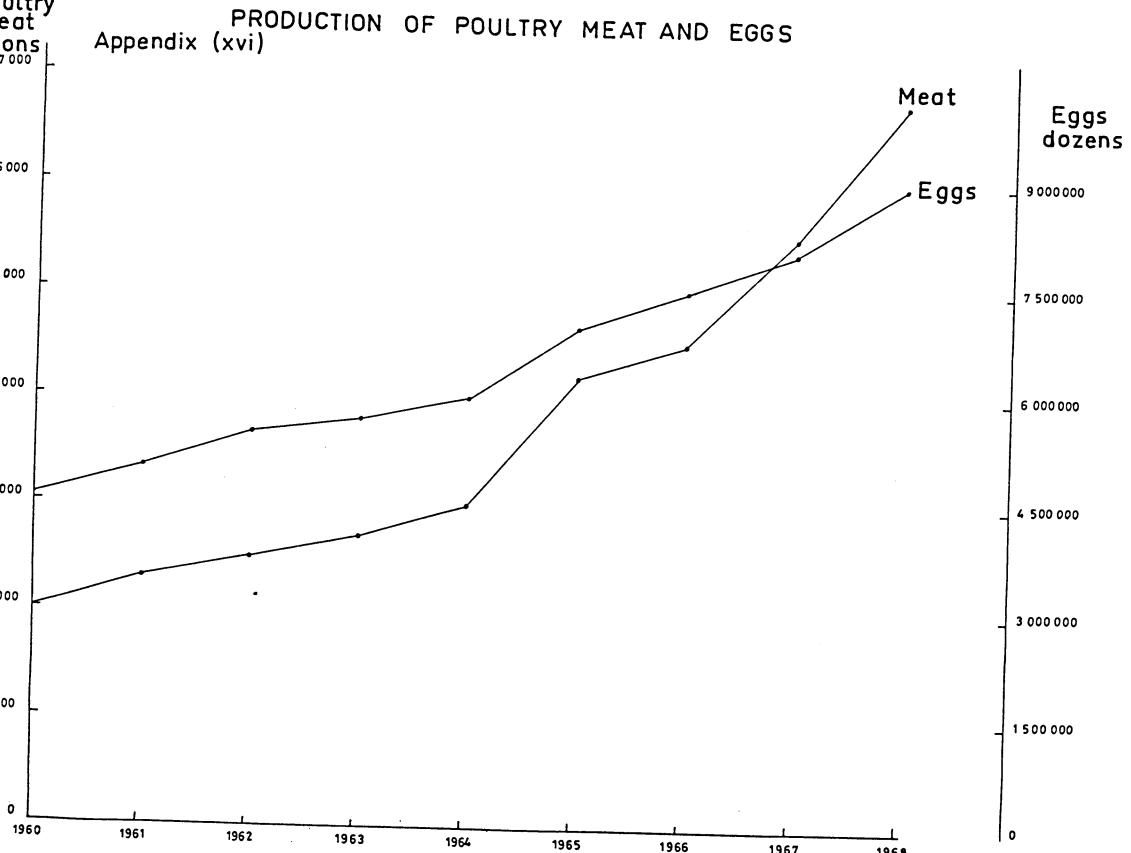
Appendix (xv)

POULTRY - Population



Poultry meat
Tons

PRODUCTION OF POULTRY MEAT AND EGGS



Appendix (xvii)

INCOME

