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GENERAL AGREEMENT ON TARIFFS AND TRADE

Group on Cereals

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SUBMISSION BY THE AUSTRALIAN DELEGATION

The Australian delegation submitted a paper in connexion with the discussion on item (ii) of document TN.64/C/W/1:

> Factual Data, Projections and Exchange of Information Permitting Each Participant to Form an Opinion of the Effects on Production, Marketings and Market Access of Commitments Offered by the Countries Participating in the Current Negotiations: Wheat and Major Coarse Grains.

This paper is attached.

CE/W/4

G.A.T.T. CEREALS GROUP

Item II: Factual Data, Projections and Exchange of Information permitting each Participant to form an Opinion of the Effects on Production, Marketings and Market Access of Commitments offered by the Countries Participating in the Current Negotiations: Wheat and Major Coarse Grains

Australia

It was agreed at the July Session of the Group that Members would submit before 20th September, 1965, papers setting out for their own country the data required. The Australian delegation outlined at that time a procedure for the exchange of information - (see Australian Statement - Item 2, Spec.(65)74, 16th July, 1965). The following papers have been prepared on the basis of that document.

For convenience the papers are divided into two parts. The first deals with the provision of factual data and explanations of past trends in production, consumption, exports and carryover stocks. The second examines the factors likely to affect Australia's future grain production and assesses possible future trends in production, consumption, etc. on the basis of certain stated assumptions. The crops covered are wheat, barley and oats.

PRODUCTION

1. Wheat production in Australia as elsewhere is a function of the area sown to wheat and the yield per hectare obtained therefrom. Over the long term there has been a significant increase in wheat production in Australia which has been primarily accounted for by increases in yield per hectare. The relative importance of area and average yield per hectare in contributing to long term and recent production trends is illustrated in the following schedule.

COMPONENTS OF WHEAT PRODUCTION : AUSTRALIA
1921 TO 1965(1)
(Index base : 1921-40 = 100)

	1921-40	1941-50	1951-60	1961-65
1. Area of crop	100	89	81	124
2. Average yield per hectare	100	103	136	156
3. Total production	100	93	112	195

(1) Year shown refers to crop year ended 30 November - i.e. 1965 refers to 1964-65 crop year.

2. Since production trends are a function of area sown and yield it is proposed in the following analysis to examine trends in each of these elements separately. Details of area, yield per hectare and production are given in the accompanying tables and graphs.

A. Wheat Area

3. The area sown to wheat in Australia shows wide fluctuations. This is fully demonstrated in Graph I attached. The factors affecting the area sown to wheat are:

(a) seasonal conditions particularly those before and at sowing time;
(b) the relative profitability of wheat as compared to alternative forms of land use, mainly sheep and wool;
(c) ready availability of markets for the wheat produced; and
(d) the availability of land suitable for wheatgrowing. This sets an upper limit to total wheat acreage in Australia.

4. From time to time other factors intrude themselves, e.g. the War period 1939-45 saw a sharp contraction in wheat area in Australia for reasons not specifically related to any of the above.

5. Wheat area has reached high levels in very recent years but it should be emphasized that the area planted to wheat is still not as high as that planted in 1930-31.

(i) The Period 1946-51

6. With the ending of the War and the return to normal conditions the area devoted to wheat entered a short expansionary

phase. The initial increase in 1945-46 reflected to a large extent the return of normal seasonal conditions and the removal of acreage restrictions which had operated during the War. It was also assisted significantly by a marked improvement in many other factors, of which the clearing of accumulated stocks and the improvement in the long-run outlook for wheat on world markets were of major importance. World prices also rose sharply at this time and this led to a steep rise in prices paid to producers.

7. By 1947-48 the wheat area had recovered to the levels attained in the immediate pre-War years. From that year until the early 1950's; however, the total area recorded a series of consecutive reductions. These reductions occurred despite the fact that many of the major factors such as seasonal conditions, stock holdings, market outlook and the availability of markets were favourable for wheat production.

8. The main factors which appear to have contributed to this downward trend in area were:

(a) a continuing shortage of the essential plant and equipment required for wheatgrowing and also a shortage of fertilizers (superphosphate); and
(b) the price of wool was showing a sharp upward trend and farmers tended to concentrate on this much less capital intensive industry at the expense of wheat.

(ii) <u>The Period 1952-59</u>

9. This period was one of relative stability in wheat area. However, there were two years, 1956-57 and 1957-58, when seasonal factors intruded themselves. In the first of these years there was widespread and severe flooding over wheatgrowing areas. In the second there was a critical drought.

10. In the earlier part of this period there had been a build up of stocks as traditional markets began to shrink as a result of increased domestic production in those markets. This stock build up sharply discouraged growers from expanding their wheat area. The stocks were eliminated as a result of the poor seasonal years mentioned above.

(iii) <u>The Period 1960 to Date</u>

11. Since 1960 all major factors - seasons, relative profitability of wheat and most importantly, markets - have acted to encourage an expansion of wheat area. This has been a unique period in the history of Australian wheat area. It is most unusual to have such an extended period of good seasons. It is more unusual to have those good seasons coincide with a period of sustained low wool prices. It was even more unusual to have these two circumstances coincide with the opening up of vast new markets, first in China and later in Russia. The combination of these three factors acting together have been responsible for the marked rise in wheat area. Already one of these factors, i.e. the seasonal one has altered. In the coming year there will be a reduction in wheat area in Australia due to a severe drought in the important northern wheatgrowing areas of New South Wales. The other two factors are still operating and those wheatgrowers in areas favoured by a good season have planted heavily.

12. The opening of new markets has been a most critical factor in this expansion. Generally speaking wheat is not stored on farms in Australia. Furthermore the wheat producer receives no payment until his wheat is delivered to the Australian Wheat Board which can only receive deliveries as storage becomes available by the marketing of the previous season's crop. Thus a failure of markets and a build up of stocks would sharply react on producers.

B. Average Wheat Yield Per Hectare

13. The average yield of wheat per hectare in Australia fluctuates sharply from year to year, subject largely to the vagaries of seasonal conditions. Over the longer term, however, there is a clear upward trend in yield. Details of year to year movements and the long-run trend in average yield are given in Table No. 1 and Graph No. 2.

14. Studies of long-run trends in Australian wheat yield indicate three distinct phases. The first stage covers the early development of wheat lands in Australia up until about 1900. In this period the average yield showed a general downward tendency because of the practice of heavy over-cropping and the extension of wheat production into climatically unsuitable areas.

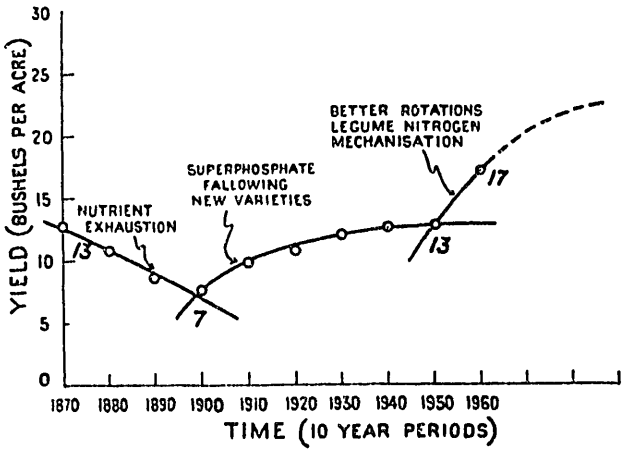


Figure 1

The trend in Australian wheat yields (decennial means) during the past century

15. In the second period, which ranges roughly from about 1900 to the 1950's the average wheat yield recorded an upward trend, tending however during the latter 20 years of this period to become somewhat static. The initial boost to yield in this period can be attributed to:-

(a) the improvement in soil fertility and moisture conservation that resulted from the widespread use of fallowing techniques;
(b) better rotation of crops;
(c) greater use of fertilizer; and
(d) the introduction of wheat varieties more suitable for the wide range of Australian conditions.

The rapid expansion of wheat sowings during the 1930's, however, introduced a series of depressive factors which largely offset many earlier advances. Such adverse features included the extension of wheatgrowing into marginal areas, the depletion of soil fertility, and erosion of over-cultivated land in both favoured and less-favoured cereal regions.

16. During the 1930's and in the years that followed, there began a dominant new factor in the improvement in yield. This was the raising of the fertility of areas of poor soils through fertilized leguminous pastures. The effect of these sown pastures on soil fertility has been to improve existing soil nutrient deficiency, notably the deficiency of nitrogen and to replace the loss of nutrients during the cropping phase. The adoption of this method has meant that in many regions the simple wheat fallow rotation has been replaced by rotations in which there is an alternation of a pasture phase consisting of a ley pasture of leguminous grasses and a cropping phase, the latter either with or without a fallowing component.

17. The main impact of this development became evident only after a considerable lag and it was not until the early 1950's that its affect on yields became apparent. It was at about that time that the third phase in the upward trend in yield commenced. As in the previous phase the pattern was again one of a relative steep increase in yield in the early years as new techniques were adopted, followed by a declining rate of increase as the opportunities for further exploitation diminished. In addition to the stimulus to yield provided through leguminous pastures, other factors such as increased mechanisation, improved cultivation practices, new wheat varieties and greater weed control have provided important contributions during this phase. Greater and improved mechanisation has, for example, enabled more efficient and well-timed seedbed preparation, sowing and harvesting.

18. The above average yield obtained in the past six to seven years, while reflecting in part the long-run advances in technology, has occurred to a large extent because of extremely favourable seasonal conditions. Over the longer-term the effect of seasonal conditions on the average yield has been lessened by the use of improved varieties, by more effective use of available moisture, etc., but, non-the-less, this element still represents the major determinant of yield in any year.

DISPOSAL

(i) Domestic Consumption

19. Total usage of wheat in Australia has remained comparatively static at about 2.0 million metric tons in post-War years. A decline in consumption per head has been offset by an increase in population. Wheat is not used widely as an animal feeding stuff in Australia, except in periods of drought. Even then the usage is small in relation to animal numbers in Australia. The highest figure for stock feed usage was 750,000 tons in 1950-51. It has fallen as low as 250,000 tons in recent years.

20. Wheat retained on farms is used predominately for seed purposes, with only small quantities being held for livestock feeding. The trend in these retentions therefore has

closely paralleled movements in the area sown, falling in the period 1946-47 to 1955-56 and then showing a significant upward movement.

(ii) Exports

21. With domestic usage of wheat accounting for a relatively static quantity each year, changes in production in post-War years have been reflected directly in the volume of wheat available for export. For this reason it is not proposed to describe in detail the trends that have occurred in exports in post-War years. Details of exports of wheat and flour for the period under review are given in Table No. 3.

22. A feature of the export scene since the War has been the substantial rise in the proportion of total shipments of wheat as grain and a corresponding decline in the proportion of exports as flour. This has occurred both because of a rise in the absolute volume of wheat exports and a decline in actual flour shipments. The decline in flour exports has been most marked, actual shipments falling from as high as 1.2 m. metric tons (wheat equivalent) in 1950-51 to 680,000 metric tons (wheat equivalent) in 1962-63. As a proportion of total exports, flour shipments declined during the same period from 34% to slightly less than 11%. A brief recovery occurred in flour exports in 1963-64, when sales were made for the first time to the U.S.S.R.

C. Carry-over Stocks

23. Reference has already been made to the brief periods of stock accumulation in Australia. Details of stocks held are set out in Table No. 2.

PART II - PROJECTIONS

INTRODUCTION

24. In addition to the provision of factual data on production, marketings and market access, Item 2 of the agenda requires that projections of production and marketings be made which would permit each participant to form an opinion of the effect on these elements of the proposals contained in country papers submitted on May 17, 1965. In its paper of that date Australia set out detailed proposals for the world wheat trade. These proposals envisaged action by importers to restrain production; a system of minimum import prices with differentials for quality; minimum import prices at a level "which represents a remunerative return to efficient producers"; each exporting country should align its level of production with available outlets; assurance of supplies to importers within a price range; and arrangements for the non-commercial disposal of wheat on a multi-lateral basis. Against that background the Australian delegation proposes in this part of its paper to set out projections of Australian wheat production and exports.

25. Projections for the agricultural sector of the economy are always difficult. They are even more difficult in the case of Australia where the wheatgrowing areas are subject to wide climatic variation. Australia probably has a more variable and erratic climate in its wheatgrowing areas than any of the other major wheat-producing regions of the world.

26. In its paper submitted to the Group at its last session (Spec(65)74) the Australian delegation outlined a procedure for tackling Item 2 of the agenda. In that paper the Australian delegation suggested that projections might be made for a period of 10 years ahead. In suggesting such a period the Australian delegation was aiming to avoid a confusion between projections and forecasts - a confusion likely to arise when projections are made for a short period. It must be emphasized that the figures in this paper are projections and not forecasts. However as the Group decided that projections would be made only as far forward as 1970, the projections in this paper have been related to that date.

27. It must be further emphasized that they do not presume that the levels of wheat area and production given will be attained precisely in the year 1970-71. More truly they represent what is probably the upper limit of wheat area and production in Australia on the basis of known technology.

28. In looking at the potential for wheat production in Australia, it needs to be borne in mind that climate and general environment impose a severe limitation on the area available for wheat production. The figures given below are getting near to the upper limit. Whether or not they will be achieved in 1970-71 or in any other year will depend on whether several important assumptions which are described below are met.

29. In Part I it was noted that past wheat sowings have been determined principally by three factors, seasonal conditions, relative profitability and market outlets, with a fourth factor - the total area suitable for wheatgrowing - setting an upper limit. In projecting the future wheat area it is necessary to make certain assumptions about these factors, and their expected effect on sowings. For the purposes of these projections it has been assumed that the first three of these factors will remain unchanged over the next five years. That is, it is postulated that all major influencing factors will continue to favour wheatgrowing - this is a generous assumption, which would require:

(a) a continuation of the present relative profitability of wheatgrowing vis-a-vis wool and other competing products;
(b) market outlets being available for any increased production; and
(c) good seasonal conditions all over Australia.

30. The probability of all these assumptions being met, particularly the latter, is remote. In addition at the present level of wheat area the principal and overriding limiting factor to expansion becomes the availability of further land suitable for wheatgrowing. If there are to be increased plantings beyond the 1964-65 level of 7.2 m. hectares, additional land must be diverted from other farm uses, or the wheat belt must be extended into new regions. Neither of these two alternatives appears to offer any significant scope for a safe increase in the total available area.

31. The increased area sown to wheat in the last few years has been the result of the almost full utilisation (consistent with sound cultural practice) of wheat lands in the established wheatgrowing regions. In addition there has been a movement towards wheatgrowing in regions which are considered to be climatically unsafe for wheatgrowing. The present dry season in northern New South Wales and Queensland has sharply reminded wheat producers of the climatic uncertainty of these areas. /In northern New South Wales in the coming season practically no wheat will be produced - this same region planted about 400,000 hectares in 1964-65./

32. Expansion of wheatgrowing into new areas involves, almost invariably, movement into climatically less favourable regions. The generally good seasonal conditions of recent years has meant that in some regions the wheat belt has already been extended into areas which can not be maintained permanently on the basis of normal rainfall conditions. Some expansion in new areas being developed, e.g. in Western Australia can be expected, but in these regions also, climatic and environmental factors are likely to provide an effective limitation to any major increase in area.

33. Clearly no precise figure can be given of the area which could be utilised for wheat production. Estimates carried out on a region by region basis suggest that the maximum area in the foreseeable future could lie between 7.3 and 8.1 m. hectares (18 to 20 m. acres). It must be re-emphasized that achievement of this area would require that all the basic assumptions in para. 29 (a), (b) and (c) are realized. The assumption that market outlets will permit the ready disposal of any larger crops is an important one. In the event of a

reduction in the market outlets for Australian wheat then this projected maximum area will not be reached and, depending on the extent of the reduction in market outlets, actual plantings could fall substantially below the current level. Nevertheless for the purposes of these projections we have made the assumption that the maximum area planted to wheat might be between 7.3 and 8.1 million hectares.

B. Average Yield Per Hectare

34. The factor which will have the greatest influence on the average yield over such a relatively short period as five years is seasonal conditions. Other factors such as expanded use of pasture leys in the rotation, improved mechanisation and new varieties will continue to contribute to the general upward trend, but as the major impact of these features was experienced during the period 1950-60 - when the average yield rose by 33% - their effect over the next five years will probably be relatively small. In projecting the average yield per hectare forward it has been assumed that good seasonal conditions will be experienced.

35. The method used to arrive at an estimated average yield has been to extrapolate forward the segment of the (free hand) trend curve relevant to the recent yield expansion. This method provides an average yield for 1970-71 of approximately 1.4 metric tons per hectare (almost 21 bushels/acre). By recent standards, and given that any further expansion in the wheat area must include some less favourable regions as well as increased sowings in areas with below average yield (e.g. Western Australia), this estimate is, if anything, optimistic. But once again, for the purposes of these projections, we have thought it more useful to the Group to take an optimistic assumption.

C. Production

36. The projection of production is derived from the projections of wheat area, and average yield per hectare described above. Naturally, the same assumptions and qualifications apply.

37. A wheat area of between 7.3 million hectares and 8.1 million hectares, with an average yield per hectare of 1.4 metric tons per hectare, would produce between 10.2 million metric tons and 11.3 million metric tons. Commercial deliveries would be reduced by the quantity of wheat retained on farms, and on the basis of the projections would be between 9.65 million metric tons and 10.75 million metric tons.

DISPOSAL

(i) Export

38. A key element in the projections of production was the availability of market outlets to absorb any increased supplies. Since more than 80% of Australia's commercial deliveries of wheat are exported this means principally export outlets. Projections of future disposal patterns, therefore, are linked directly with the projections of wheat area, yield and production. Given that all the assumptions in para. 29 (a), (b), (c) were met then exports would rise

almost in line with production. An offsetting factor would be the small increase in domestic usage projected. It is assumed that carry-over stocks will not be a significant factor in the disposal pattern.

(ii) Domestic Utilization

39. On the basis of trends in domestic usage of wheat in the post-War period there would appear little possibility of any major increase in the off-take by this market by 1970. Commercial domestic utilization is projected to rise by 1970-71 to approximately 1.7 m. metric tons. This level compares with commercial domestic usage in 1963-64 of 1.56 m. metric tons.

40. Putting all these components of the projections together we get a possible range of results which are summarized in the following table.

SUPPLY AND DISPOSAL OF WHEAT : AUSTRALIA

1962-63 TO 1964-65 AND PROJECTIONS TO 1970-71

	1962-63	1963-64	1964-65(a)	1970-71(b)
	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons
Carry-in Stocks	478	628	552	680(d)
Commercial Deliveries	7777	8379	9420	9650-10750
Total Supplies(c)	8255	9007	9972	10330-11430
Home Consumption(c)	1405	1560	1960(e)	1700
Exports	6222	6895	7192	7950- 9050
Total Disposal	7627	8455	9152	9650-10750
Carryover Stocks	628	552	820	680

(a) Preliminary Estimates.
(b) Projected on basis of assumptions and qualifications in the text.
(c) Excludes retentions on farms.
(d) Nominal figure only.
(e) Home consumption was above normal in this year due to drought feeding of stock.

TABLE NO. 1

AUSTRALIA: WHEAT AREA, AVERAGE YIELD AND PRODUCTION

Prewar Averages and Years 1946-47 to 1964-65

Year	Area	Average Yield	Production
	'000 hectares	Metric ton per hectare	'000 metric tons
5 Year Average 1929-30 to 1933-34	6,358	0.79	5,021
5 Year Average 1933-34 to 1938-39	5,253	0.80	4,201
1946-47	5,334	.60	3,192
1947-48	5,617	1.07	5,991
1948-49	5,092	1.02	5,191
1949-50	4,953	1.20	5,940
1950-51	4,720	1.06	5,015
1951-52	4,202	1.04	4,347
1952-53	4,132	1.29	5,313
1953-54	4,351	1.24	5,388
1954-55	4,319	1.06	4,589
1955-56	4,114	1.29	5,320
1956-57	3,187	1.15	3,600
1957-58	3,581	0.74	2,656
1958-59	4,208	1.39	5,855
1959-60	4,926	1.10	5,403
1960-61	5,439	1.37	7,450
1961-62	5,958	1.13	6,728
1962-63	6,665	1.25	8,354
1963-64	6,667	1.34	8,930
1964-65(a)	7,162	1.41	10,080

(a) Subject to Revision.

TABLE NO. 2

SUPPLY AND DISPOSAL OF WHEAT: AUSTRALIAN WHEAT BOARD

1939-40 to 1964-65

Crop Year	Supplies			Disposals			
	Inward Carryover 1 Dec.	Receivals (gross weights)	Total	Local (a)	Export	Total	Outward Carryover 30 Nov.
	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons
1939-40	-	5,320	5,320	986	2,279	3,265	2,054
1940-41	2,054	1,733	3,787	1,280	1,375	2,655	1,132
1941-42	1,132	4,190	3,522	1,338	1,219	2,557	2,765
1942-43	2,765	3,864	6,629	1,449	1,019	2,468	4,161
1943-44	4,161	2,579	6,740	2,125	2,534	4,659	2,081
1944-45	2,081	1,059	3,138	2,316	516	2,832	306
1945-46	306	3,373	3,679	1,663	1,523	3,186	493
1946-47	493	2,693	3,186	1,547	1,270	2,817	369
1947-48	369	5,569	5,938	1,582	3,642	5,224	714
1948-49	714	4,764	5,478	1,643	3,335	4,978	500
1949-50	500	5,523	6,023	1,660	3,170	4,830	1,194
1950-51	1,194	2,630	5,824	1,810	3,501	5,311	512
1951-52	512	3,975	4,487	1,763	2,233	3,996	491
1952-53	491	4,897	5,385	1,647	2,766	4,413	972
1953-54	972	4,987	5,959	1,556	1,857	3,413	2,546
1954-55	2,546	4,158	6,704	1,564	2,645	4,209	2,495
1955-56	2,495	4,920	7,415	1,577	3,548	5,125	2,289
1956-57	2,289	3,270	5,559	1,729	2,703	4,432	1,127
1957-58	1,127	2,253(b)	3,380	1,540	1,396	2,936	445
1958-59	445	5,427	5,872	1,479	2,619	4,097	1,775
1959-60	1,775	4,881	6,656	1,639	3,369	5,008	1,649
1960-61	1,649	6,844	8,493	1,533	6,300	7,833	660
1961-62	660	6,105	6,765	1,444	4,843	6,287	478
1962-63	478	7,777	8,255	1,404	6,222	7,626	628
1963-64	628	8,379	9,007	1,560	6,895	8,455	552
1964-65(c)	552	9,420	9,972	1,960	7,192	9,152	820

(a) Local disposal is a residual item determined by deducting exports and outward carryover from total available supplies. Apart from actual local sales, therefore, it includes adjustments caused by differences in gross and net weights, handling losses etc. Excludes farm retentions.

(b) Includes imports (40,500 metric tons) from Canada.

(c) Estimated.

TABLE NO. 3

AUSTRALIA: WHEAT: COMMERCIAL DELIVERIES AND EXPORTS

1939-40 and 1948-49 to 1964-65

Crop Year (1 December to 30 November)	Commercial Deliveries (Net Weight)	Exports[b]	Exports as a Percentage of Deliveries
	'000 metric tons	'000 metric tons	%
1939-40	5,320	2,914	54.7
1948-49	4,742	3,140	66.2
1949-50	5,496	3,830	69.7
1950-51	4,611	2,781	60.3
1951-52	3,962	2,303	58.1
1952-53	4,875	3,247	66.6
1953-54	4,971	3,433	69.1
1954-55	4,142	2,585	62.4
1955-56	4,904	3,344	68.2
1956-57	3,259	1,549	47.5
1957-58	2,209	720	32.6
1958-59	5,415	3,939	72.7
1959-60	4,874	3,230	66.3
1960-61	6,834	5,323	77.9
1961-62	6,099	4,666	76.5
1962-63	7,770	6,364	81.9
1963-64	8,372	6,814	81.4
1964-65(a)	9,420	7,192	76.3

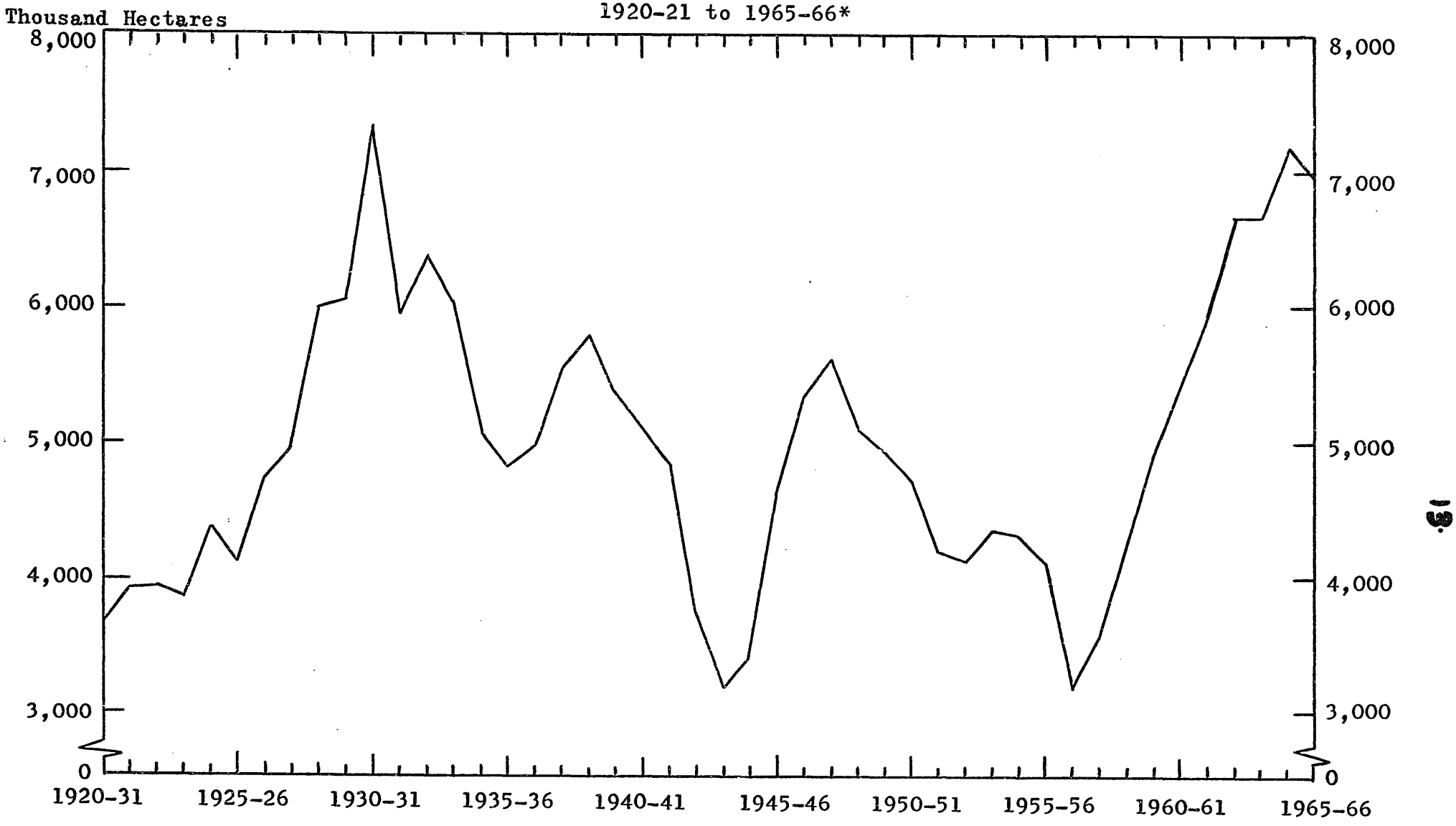
(a) Subject to revision.

(b) Data refer to quantity of individual crops exported. Actual shipment may have extended beyond the period of the crop year.

Graph No. 1

WHEAT AREA: AUSTRALIA

1920-21 to 1965-66*

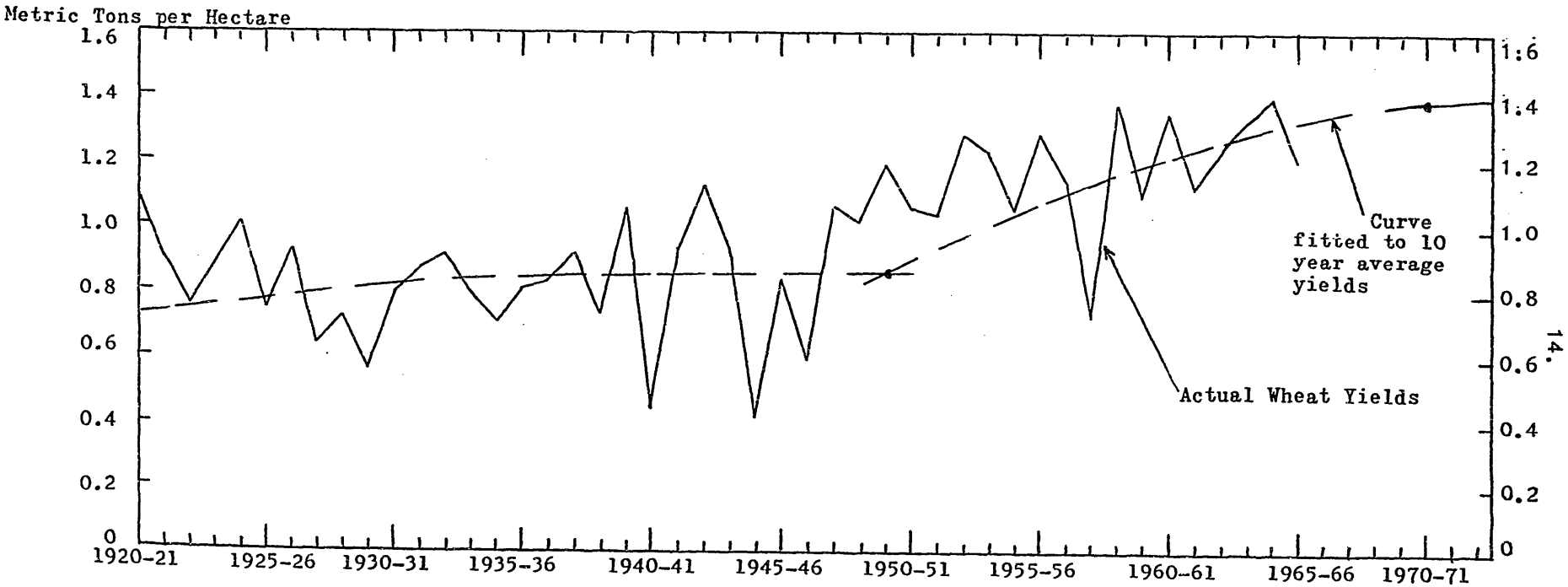


* Data for 1965-66 estimated.

Graph No. 2

AVERAGE WHEAT YIELD PER HECTARE: AUSTRALIA

1920-21 to 1965-66*

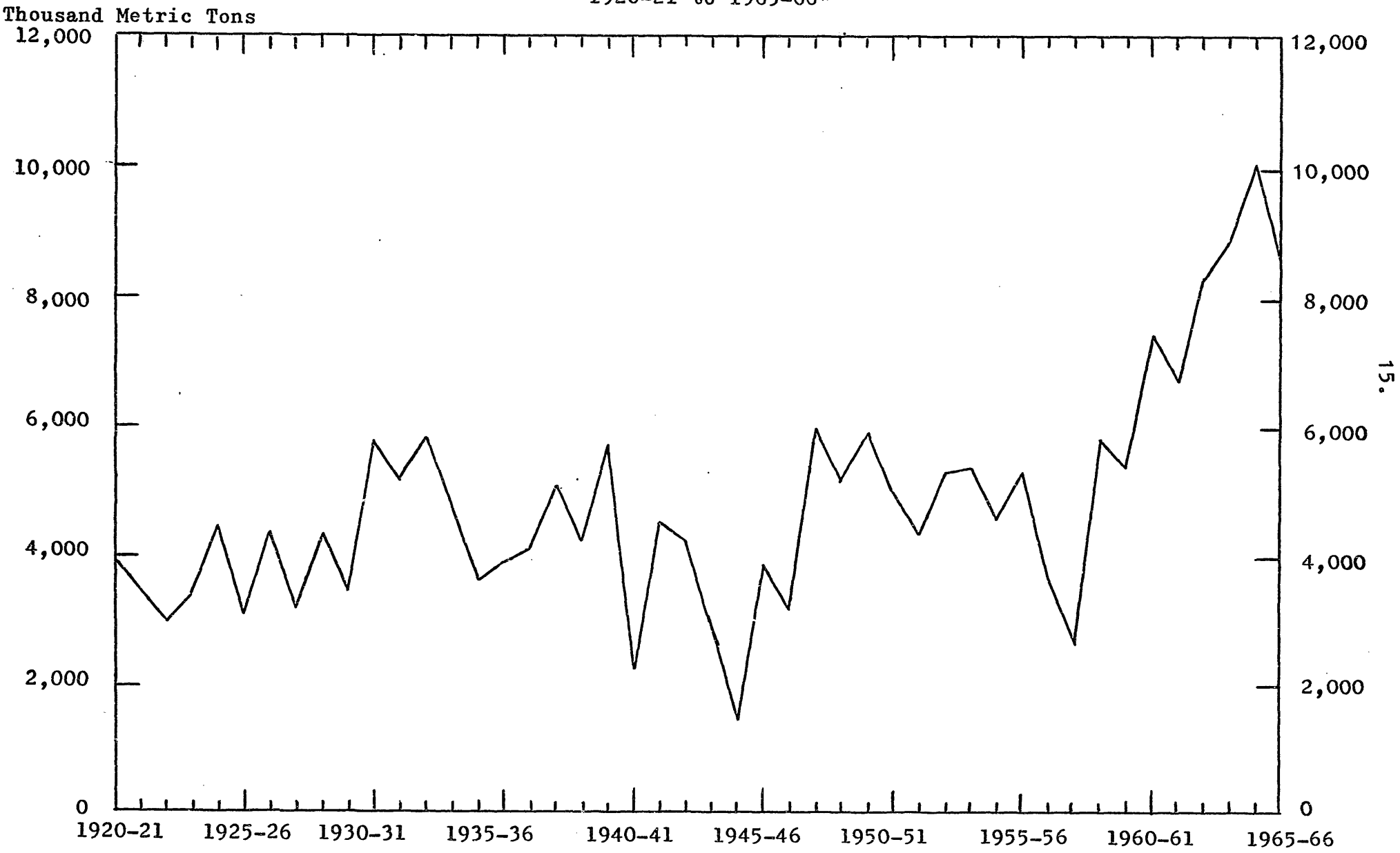


* data for 1965-66 estimated.

Graph No. 3

WHEAT PRODUCTION: AUSTRALIA

1920-21 to 1965-66*



* Data for 1965-66 estimated.

BARLEY

PART I - PAST TRENDS

PRODUCTION

1. The production of barley in Australia has been characterized by substantial year to year fluctuations due principally to variations in the average yield. In the post-war period, however, the area sown to barley has risen appreciably and has resulted in a general upward trend in production. Average yield per hectare has shown a slight tendency to increase over the longer term. Details of area, yield and production are given in Table No. 1.

A. Area of Barley

2. Since barley is dependent on somewhat the same soil and climatic requirements as wheat if follows that barley plantings in any year are affected by much the same factors as those influencing the wheat area. Moreover, to the extent that (on individual farms and nationally) there is a limited growing area, they are affected also by the size of the wheat area.

3. In the post-war years, the area sown to barley has recorded two distinct phases. The first comprising the period 1946-47 to 1960-61; the second, the period from 1960-61 to 1964-65. In the first period the barley area rose sharply from 303,000 hectares (748,000 acres) in 1946-47 to 1.1 m. hectares (2.8 m. acres) in 1960-61. This expansion, coincided with a general decline in the wheat area and, in many important barley producing areas represented merely a transfer of lands out of wheat and into barley. In the second period, the opposite appears to have occurred: the wheat area recorded a series of consecutive increases, and the area sown to barley declined. For the past three seasons the total barley area has been constant at about 0.8 m. hectares (2.0 m. acres).

4. A number of reasons can be advanced to explain these movements between barley and wheat but the main reason would appear to be the changes in profitability of two crops. During the 1939-45 war and in the immediate post-war years, prices received for barley rose relative to those for wheat, chiefly because of the effect of the Wheat Stabilization arrangements on the price of wheat. In addition, in these years average yields of barley were considerably above those for wheat. Although not causing any major shift out of wheat and into barley growing, these factors did have an important affect on sowings in the main barley growing regions.

5. From about mid-1950's, however, the relative profitability of barley in relation to wheat declined and the area sown to barley fell slightly, then stabilized at about 0.8 m. hectares (2.0 m. acres).

6. The settling of the area at this level in recent years can be explained by the greater suitability of barley for the wetter regions and in certain soils of the cereal areas. Premiums paid for high quality malting barley have also prevented further substitution out of barley growing.

B. Average Yield Per Hectare

7. The average yield per hectare has varied markedly in the past, both as between regions and between individual years. The actual yield for any year has been determined mainly by seasonal conditions, although the influence of research and improved farm practices is discernible over the longer term. Unlike wheat, however, the average yield for barley has not shown any significant trend in post-war years.

TABLE NO. 1

AUSTRALIA : BARLEY AREA, AVERAGE YIELD AND PRODUCTION

AVERAGE 1934-35 TO 1938-39 AND YEARS 1946-47 TO 1964-65

Year	Area	Average Yield	Production
	'000 hectares	metric ton per hectare	'000 metric tons
5 year Average 1934-35 to 1938-39	232	.95	219
1946-47	303	.87	263
1947-48	340	1.40	473
1948-49	410	.99	403
1949-50	421	1.05	443
1950-51	437	1.19	519
1951-52	452	1.10	497
1952-53	557	1.43	795
1953-54	730	1.28	936
1954-55	684	.98	667
1955-56	766	1.23	945
1956-57	847	1.32	1,118
1957-58	858	.81	691
1958-59	964	1.49	1,428
1959-60	963	.80	775
1960-61	1,145	1.34	1,542
1961-62	964	.98	941
1962-63	820	1.09	898
1963-64(a)	815	1.21	984
1964-65(b)	809	1.40	1,134

(a) Subject to revision.
(b) Estimated.

DISPOSALS

8. The sharp fluctuations that have occurred in the production of barley have been reflected directly in the level of barley exports. Domestic utilization of barley, on the other hand, has exhibited a steady upward trend in post-war years. Details of disposals by classes are given in Table No. 2.

(i) Domestic Utilization

9. The major domestic uses of barley in Australia are by factories and as stockfeed and seed. Usage by factories is directed principally towards the production of malt, which in turn is used predominately as a raw material in the production of beer. A steady rate of growth has been experienced in this sector, reflecting mainly increased beer consumption from population growth.

10. Usage of barley as stockfeed consists mainly of barley retained on farms. The quantity used in this way has fluctuated markedly from season to season but has recorded a definite upward trend. Pig producers are the main users of barley as stockfeed, although it is used throughout most fields of livestock production. Limited quantities are also used in commercially prepared feeds, chiefly for the poultry and dairying industries.

11. Seed usage has been related directly to the level of plantings and as such has shown a secular upward trend. Usage for this purpose however has stabilized during the past three years at about 62,000 metric tons (3.0 m. bushels) due to the levelling out of the upward trend in plantings.

(ii) Exports

12. Apart from meeting the requirements of the domestic market, barley production in Australia has developed in response to a relatively specialized export market. This market has existed in Western Europe and Japan where Australian barley has been used primarily for manufacturing purposes. The quantity available for export in each year, however, has fluctuated according to movements in the level of output. The great variation in the level of annual shipments can be seen from Table No. 2.

CARRYOVER STOCKS

13. End-of-season stocks of barley are not usually held in Australia. In some years limited stocks of about 20-50,000 metric tons have been held awaiting shipment to oversea markets. No details are available of carryover stocks.

TABLE NO. 2

DISPOSAL OF BARLEY : AUSTRALIA

AVERAGE 1934-35 TO 1938-39 AND YEARS 1946-47 TO 1964-65

Crop year (1 December to 30 November)	Production	Exports	Domestic Utilization(a)			
			In Factories	Stock Feed(b)	Seed	Total Domestic
	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons
5 year Average 1934-35 to 1938-39	219	74	n.a.	n.a.	n.a.	n.a.
1946-47	263	51	128	n.a.	25	n.a.
1947-48	473	232	140	55	31	226
1948-49	403	224	127	21	32	180
1949-50	443	252	130	37	33	200
1950-51	519	283	136	65	34	235
1951-52	497	279	149	40	41	230
1952-53	795	551	155	31	54	240
1953-54	936	640	167	80	52	299
1954-55	667	346	178	87	58	323
1955-56	945	641	183	60	59	302
1956-57	1,118	633	186	156	66	408
1957-58	691	299	197	165	63	425
1958-59	1,428	854	189	243	67	499
1959-60	775	457	199	119	81	399
1960-61	1,542	943	209	252	70	531
1961-62	941	419	237	206	63	506
1962-63	898	274	238	284	62	584
1963-64	984	392	241	212	62	515
1964-65(c)	1,134	454	255	363	62	680

n.a. Not available.
(a) Includes small quantities of imports; no allowance has been made for changes in stocks.
(b) Residual figure.
(c) Preliminary estimates.

PRODUCTION

14. Production of barley in Australia over the next five years is expected to show only a slight increase from current levels. Factors which have acted in recent years to depress the barley acreage are expected to continue and only minor increases in sowings, chiefly outside the main barley growing areas, are envisaged. It seems unlikely that the area sown in the major regions will decline further.

15. One factor which could result in a major recovery in the barley area would be a general reduction in wheat plantings. However, it has already been assumed in the projections for wheat that the acreage of wheat will remain relatively high, and that the relative profitability of barley to wheat will remain unchanged. Another factor likely to have a significant effect on the level of production is seasonal conditions. Year to year changes in seasonal conditions in the past have caused marked variations in production through their effect on average yields. Projection of production forward to 1970-71 has been based on the average yield obtained over the past five years.

16. A summary of the projected output to 1970-71, together with comparisons with actual production in recent years is given in the following schedule.

BARLEY OUTPUT : AUSTRALIA

1962-63 TO 1964-65 AND PROJECTIONS TO 1970-71

Component	Unit	1962-63	1963-64(a)	1964-65(b)	1970-71(c)
Area of Crop	m.hectares	0.82	0.82	0.81	0.97
Average yield per hectare	metric tons	1.09	1.21	1.40	1.18
Production	m. metric tons	0.90	0.98	1.13	1.13

(a) Subject to revision.
(b) Estimated.
(c) Projected on basis of assumptions and qualifications in the text.

DISPOSAL

17. The likely pattern of future disposals of Australian barley is evident from the trends exhibited in past years. Domestic usage can be expected to expand steadily, reflecting increased utilization of barley for malt production and for use as livestock feed. Seed requirements are expected to show only a very minor expansion. Exports will continue to represent a residual after meeting domestic requirements and will vary according to the level of output. Projected data for disposals in 1970-71 are given below. It has been assumed in these projections that carryover stocks will continue at negligible levels.

BARLEY : PROJECTED DISPOSALS 1970-71

Domestic Usage:	'000 metric tons
In Factories	302
Stockfeed	306
Seed	68
Total Domestic	676
Exports	458
Total Production	1,134

OATS

PART I - PAST TRENDS

PRODUCTION

1. Production of oats in Australia is associated closely with livestock enterprises and the bulk of output is devoted to livestock feeding purposes. A large proportion of the area is fed to livestock in the form of green fodder and hay, and of the grain harvested, about 60% is usually retained on farm for feed. The quantity of grain available for marketing in any year depends largely therefore on the availability of other livestock feed, including pastures.

2. Oats production in the post-war period has shown a relatively steep increase. Most of this rise can be attributed to increased sowing to oats for grain which rose from 0.7 m. hectares (1.7 m. acres) in 1946-47 to 1.37 m. hectares (3.4 m. acres) in 1963-64. The average yield increased slowly during this period, but over a much longer term has tended to decline. Details of area, the average yield and production are given in Table No. 1.

3. The principal factor leading to the increase in oats production has been the steadily rising requirements for livestock feed. Oats production is not directly competitive with other cereals but competes for land use indirectly as part of the livestock enterprise.

DISPOSAL

4. By far the larger part of the oats crop is used for livestock feed and for seed. In normal years, this usage accounts for about 70% of the harvest, while in years of reduced harvests almost the entire crop is used in this manner. Much of this grain is not marketed but is retained for use on farms. Of the marketed quantity, a significant proportion consists of milling grade oats which is directed principally to export markets.

5. Domestic usage of oats, apart from stockfeed and seed, accounts for a small and decling quantity. Most of this grain is used in the production of rolled oats which, as a result of increased competition from "ready to serve" cereals, has exhibited a slow long-term decline.

6. Exports of oats from Australia have fluctuated sharply in post-war years. An important part of these exports have consisted of a regular shipment of milling oats to Western Europe, particularly to countries of the E.E.C. The balance of exports have varied according to movements in the level of output. Details of disposals by classes are given in Table No. 2.

PRODUCTION

7. Future trends in the production of oats in Australia will depend mainly on feed requirements for livestock. On the basis of trends in the post-war period, and on an expected steady rise in livestock numbers, oats production should continue to rise in future years. By 1970-71 it is estimated that production could rise to about 1.49 m. metric tons (82 m. bushels).

8. The main factor expected to cause this future expansion is an increase in the area sown. The area sown for grain is projected to rise by 1970-71 to about 1.6 m. hectares (4.0 m. acres), compared with 1.4 m. hectares (3.4 m. acres) in 1963-64. The average yield per hectare is expected to remain close to that experienced in recent years.

9. Projections of area, average yield and production to 1970-71 are given in the following schedule, together with comparisons with actual production in recent years.

OATS OUTPUT : AUSTRALIA

1962-63 TO 1964-65 AND PROJECTIONS TO 1970-71

Component	Unit	1962-63	1963-64(a)	1964-65(b)	1970-71(c)
Area of crop	m. hectares	1.33	1.37	1.46	1.62
Average yield per hectare	metric tons	0.94	0.90	0.88	0.92
Production	m. metric tons	1.25	1.24	1.29	1.49

(a) Subject to revision.
(b) Estimated.
(c) Projected on basis of assumptions and qualifications in the text.

DISPOSAL

10. Usage of oats in future years can be expected to continue to be concentrated predominately for feeding purposes, with a large part of production being retained and used on farms where it is grown. Most of the increase in output is projected to be used for livestock feed. Seed requirements of oats for grain and oats for green fodder and hay are expected to account for the remainder of the increase. Usage by factories, mainly for human consumption, is expected to remain close to the present level.

11. Exports of oats will continue to represent a residual after domestic requirements and the level of actual shipments will vary with output. Total exports in 1970-71 are projected to be about 400,000 metric tons or slightly above exports in 1963-64. A summary of projected disposals in 1970-71 is given in the following schedule.

OATS : PROJECTED DISPOSALS 1970-71

Domestic Usage:	'000 metric tons
In factories	33
Stockfeed	846
Seed	208
Total Domestic	1,087
Exports	403
Total Production	1,490

TABLE NO. 1

AUSTRALIA : OATS AREA, AVERAGE YIELD AND PRODUCTION

AVERAGE 1934-35 TO 1938-39 AND YEARS 1946-47 TO 1964-65

Year	Area	Average Yield	Production
	'000 hectare	metric ton per hectare	'000 metric tons
5 year average 1934-35 to 1938-39	635	.49	309
1946-47	699	.40	282
1947-48	852	.87	738
1948-49	716	.60	428
1949-50	707	.70	497
1950-51	711	.64	456
1951-52	957	.65	626
1952-53	1,119	.71	792
1953-54	865	.69	598
1954-55	1,042	.57	596
1955-56	1,357	.75	1,025
1956-57	1,034	.62	642
1957-58	1,197	.48	570
1958-59	1,608	.98	1,577
1959-60	1,226	.70	850
1960-61	1,472	.94	1,383
1961-62	1,253	.80	1,000
1962-63	1,332	.94	1,249
1963-64(a)	1,373	.90	1,238
1964-65(b)	1,457	.88	1,288

(a) Subject to revision.
(b) Estimated.

TABLE NO. 2

DISPOSAL OF OATS : AUSTRALIA

AVERAGE 1934-35 TO 1938-39 AND YEARS 1946-47 TO 1964-65

Crop Year (1 December to 30 November)	Production	Exports	Domestic Utilization			
			In Factories	Stock Feed(a)	Seed	Total Domestic
	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons	'000 metric tons
5 year Average 1934-35 to 1938-39	309	5	n.a.	n.a.	n.a.	n.a.
1946-47	282	2	46	158	105	309
1947-48	738	256	64	300	97	461
1948-49	428	146	42	141	99	282
1949-50	497	157	46	197	97	340
1950-51	456	154	40	142	120	302
1951-52	626	245	36	215	130	381
1952-53	792	190	41	444	116	601
1953-54	598	43	37	385	133	555
1954-55	596	75	32	339	150	521
1955-56	1,025	208	31	663	123	817
1956-57	642	132	30	336	144	510
1957-58	570	54	29	311	176	516
1958-59	1,577	396	30	1,003	148	1,181
1959-60	850	228	31	426	165	622
1960-61	1,383	362	32	837	150	1,019
1961-62	1,000	284	32	522	162	716
1962-63	1,249	315	31	741	161	933
1963-64(b)	1,238	387	31	650	163	851
1964-65(c)	1,306	399	33	707	167	907

(a) Residual Figure.
(b) Subject to revision.
(c) Estimated.