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THE AGRICULTURAL SIGNIFICANCE OF AN AREA THAT MIGHT BE SERVED BY A DEEP-SEA PORT ON THE NORTH COAST OF NEW SOUTH WALES

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Commonwealth Bureau of Census and Statistics,

Grain Elevators Board of N.S.W.,

Maritime Services Board of N.S.W.,

N.S.W. Department of Agriculture—Meat Inspection Service, Homebush Bay,

N.S.W. Department of Railways.

Finally, the author is indebted to officers in the Division of Marketing and Agricultural Economics for useful comments on earlier drafts of this article.

1. INTRODUCTION

This article is the outcome of a request by the Department of Public Works to the Department of Agriculture to make a study of the agricultural significance of an area that might be served by a Deep-sea Port established on the Clarence River in Northern New South Wales.

In 1945-46, a Committee of Enquiry¹ investigated the problem, one of their findings being that "the whole project of port and railway construction will require to be regarded as of a major developmental character as it is unlikely that the revenues will meet working expenses until such time as both primary and secondary production of the area have been greatly expanded and markets established for its products."

A study of the agricultural importance of the area was made for the Committee by the Department of Agriculture and an article based on the study was published in 1945.²

A study at the present time was needed to see whether the situation had changed sufficiently for there to be more justification from an economic point of view for the development of the port. The main aim of this particular study was to estimate the total quantities of the major farm products from the area that might be available for export to overseas and interstate destinations now and in the "foreseeable" future. For convenience the word "farm" has been used throughout this study to embrace the agricultural, dairying, pastoral, pig, poultry and honey industries. It does not include the forestry or fishing industries.

Three basic points must be made concerning the assumptions on which the study rests and in the light of which the results must be read. Firstly, the calculations were made on the assumption that the establishment of a port would have no influence on the "exportable surplus" of farm products from the area. The establishment of a port would almost certainly encourage production in the area to the extent that it lowered freight costs of products for export and materials like fertilizer and fuel imported into the area. However, without detailed information concerning the supply functions for the major farm products in the area it is impossible to quantify this effect of the establishment of a port. An expected effect of such establishment would be the encouragement of secondary and tertiary industries and an increase in population of the area. An increase in population by providing a local market might further stimulate production but might on balance *reduce* the quantity of farm products available for export. The two main influences of the establishment of a port on the exportable surplus may thus be opposite in effect. Again no attempt has been made to quantify these effects.

Secondly, in arriving at figures for quantities of products available for overseas and interstate shipment it has been assumed that "requirements" for human consumption and for feed and seed purposes on farms in

¹ Parliament of New South Wales. *The Development of a Deep-sea Port on the North Coast of New South Wales with Railway and Road Connections*. Report of Committee, 5th February, 1946. Government Printer, Sydney.

² N. R. Wills and P. Vaidyanathan, "The North Coast Deep-sea Port", this *Review*, Vol. 13, No. 8 (August, 1945).

N.S.W. are fully met first. For some products there are institutional arrangements, e.g., marketing boards by which supplies are ensured for the local market in N.S.W. before demand from other sources is met. Though in other cases there are no such institutional controls it is probably a safe generalization to say that taking freight costs into consideration the price for most farm products in N.S.W. markets is, and will be in the future, such that demand in these markets will be satisfied before overseas and interstate demand is met. In any case, this is the assumption that is made and as will be seen later is an important assumption in view of the likely increasing demand for most products from an increasing N.S.W. population. In regard to what has just been said, a reservation has to be made. In making estimates of supply and demand, products are assumed to be homogeneous. Thus, for example, taking cheese, it is assumed that because N.S.W. consumption is currently about double N.S.W. production of cheese, there should be no exports from N.S.W. However, this ignores the fact that there are many varieties of cheese and there is a small export of N.S.W. cheese with a larger total import of other varieties of cheese, e.g., from Europe, leaving N.S.W. a net importer of cheese. Similarly with the various grades and qualities of meat and different varieties of apples, pears, etc. But as production and consumption statistics do not break down products generally into varieties and grades this assumption of homogeneity has had to be made.

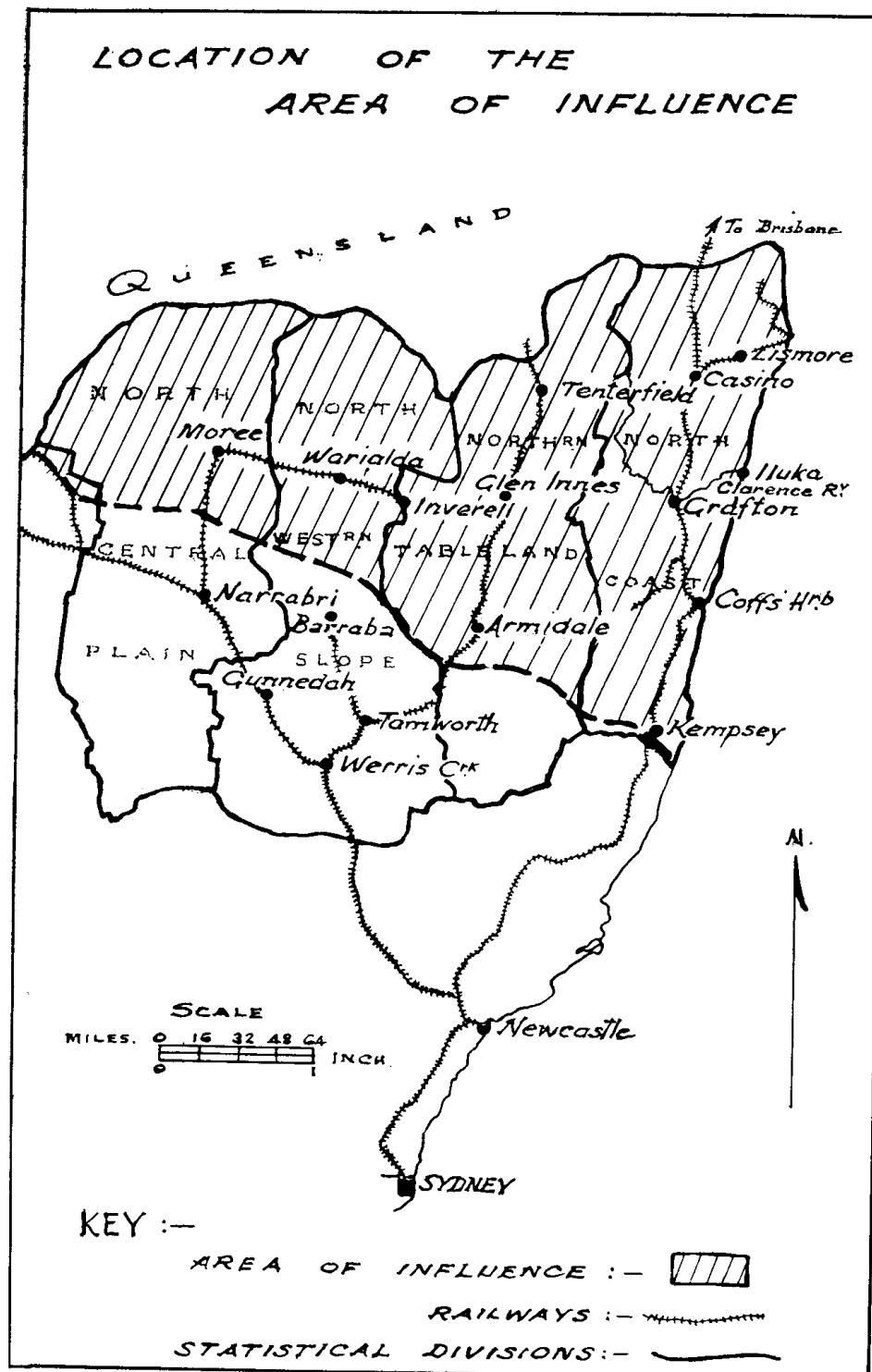
Thirdly, the area that might be served by the port has been assumed to be the same as that defined in the Committee of Enquiry's Report in 1946. The line demarcating the Area of Influence was drawn by the Department of Railways on the basis of railway freight rates then ruling, on relative distances to other ports, e.g., Sydney and Newcastle and on the assumption that a railway line would be built connecting the hinterland with the port. This railway is now most unlikely to be built so that if the port was established reliance would have to be made on road transport. Thus a new Area of Influence should be defined taking into account relative distances and freight costs by rail and road. With changing relative freight rates and developments having a bearing on convenience of handling, etc., in the future the Area of Influence is likely to change over time, and is thus a dynamic and not a static concept. This writer was, not, in the time available, able to assess the effects of these factors, but even if it were undertaken the definition of the Area is likely to be surrounded by a large fringe of uncertainty. It was in any case thought desirable to be able to compare current and future production, consumption, exportable surpluses, etc., with estimates of these entities made in 1946. To be comparable they would need to refer to the same area, and this was the procedure adopted.

Other assumptions made in the estimates of production, consumption, etc., will be explained in the various sections dealing with the particular calculations.

2. DESCRIPTION OF THE AREA

Types of Farming

The Area of Influence, hereafter referred to as the Area, comprises approximately the whole of the North Coast Statistical Division; all of the Northern Tablelands except for the Shire of Walcha; in the North-Western Slope, the Shires of Ashford, Bingara, Macintyre and Yallaroi,



and in the North-Central Plain, the Shires of Boolooroo and Boomi including the Municipality of Moree (see map).

It is not intended to give a description of the physical features of the Area as it has no direct bearing on the argument of this Study. Readers interested in these aspects will find a concise account of its climate, topography and soils in the article by Wills and Vaidyanathan.³ As regards the types of farming carried on in the Area, these can be broadly described as follows. Along the coast dairying with pigs predominates, with the growing of maize as a feed crop and with pockets of bananas, pineapples, sugar, potatoes and vegetables. Beef cattle are also to be increasingly found on dairy farms and also become more numerous as one moves up to the Tablelands. Here one finds them more in association with Merino sheep, with some farms cropping oats, maize, wheat and potatoes. Fruit farms, producing pome and stone fruits, are also important in this area. On the western slopes one moves into the wheat-sheep belt. Beef cattle are usually also to be found in association with the sheep, the latter producing fat lambs as well as wool. Oats, barley and sorghum are grown and tobacco is also to be found. Moving further westward on to the plains the pattern is similar except that less barley and sorghum are grown, tobacco disappears and Merino wool production becomes more important.

Trends in Settlement and Rural Employment

As far as settlement in the Area is concerned, it is possible only to view changes since 1955-56 as in this year the lists of holdings used in the collections of agricultural and pastoral statistics in New South Wales were reconciled with lists of rateable land of one acre or more recorded by country shires for rating purposes. This led to the addition of 4,784 holdings totalling 3,131,462 acres and 4,112 persons permanently engaged on rural holdings to the annual collection for New South Wales. In the Area as a whole the number of holdings has been fluctuating about the figure of 18,000 and the total acreage about 18,000,000. The total number of holdings in New South Wales in the same period has declined somewhat with the 1960-61 number being 76,871. Total New South Wales acreage has fluctuated about the figure of 173,000,000.

Within the Area there are, however, divergent trends apparent. In the North Coast Division the number of holdings has been declining, with acreage remaining substantially the same. In Coffs Harbour and Terania, however, there has been a slight increase in the number of holdings. The Northern Tableland as a whole has shown no significant change in number of holdings or total acreage. However, in that part of Macintyre included in the Tableland Division there has been a decrease in number of holdings and acreage, whilst the reverse is true of Dumaresq. Of those shires of the North Western Slope included in the Area, Ashford, Bingara and Yallaroï have shown an increase in the number of holdings with roughly the same acreage for the first two shires but a decreased acreage for the latter shire. That part of Macintyre included in the N.W. Slope has exhibited a steady increase in the number of holdings with an increase in acreage. In the N. Central Plain shires included in the Area, the number of holdings has been increasing, with a slight increase in acreage.

³ *Ibid.*

It is not possible to view changes in the size distribution of holdings in the Area in detail. However, the Commonwealth Statistician published the size distribution of holdings in New South Wales as at March, 1956, by Divisions and a study of this together with what has just been described about changes in number of holdings helps in understanding the changing pattern. The median size of holding in the North Coast occurs in the 100-200 acre group, that of the Northern Tableland and North Western Slope in the 1,000-2,000 acre group and that of the North Central Plain in the 2,000-5,000 acre group. This can be viewed against the tendency for the "average" size of farm (total acreage divided by number of holdings) to increase in the North Coast; to remain unchanged in the Tableland; to increase in those Shires of the N.W. Slope with a small average size and the reverse in the Shires with a larger average size; and to decrease in the N. Central plain Shires. Thus, though the "average" size of farm in the whole Area has remained unchanged, it is evident that the average size has been increasing in the area of preponderantly small farms (the North Coast) and decreasing in the area of preponderantly large farms (N. Central Plains). This is not inconsistent with the hypothesis that the proportion of small and large holdings is becoming smaller and the proportion of medium sized holdings becoming larger, which is the trend in New South Wales as a whole.⁴ However, to test this hypothesis conclusively one would need to have statistics of size distribution of holdings in the area over a number of years.

Though the number of holdings has remained virtually the same in the Area as a whole, the number of "owners, lessees, tenants and share-farmers" has decreased from 18,052 to 16,126. This decline has been general throughout the Area, even in places where the number of holdings has increased, with the exception of Ashford, Bingara, Yallaroi, Boomi and Boolooroo where numbers of owners, etc., have increased. But even in these Shires there has been a reversal, and a decline over the last year or two is evident. This declining trend is similar to that for New South Wales as a whole.

The number of permanent workers (employees, relations and managers) has also declined from 9,692 to 7,420 over the same period. This decline has been general throughout the Area except for Tomki and Woodburn on the North Coast, and Boomi and Boolooroo, where numbers have remained steady. Again, this trend is similar to that for the State as a whole.

Trends in Population

As far as total population in the Area is concerned, this has moved from 230,000 in 1947 to 248,000 in 1954 and 250,000 in 1961. Thus the population has been increasing but at a decreasing rate and this is in marked contrast to New South Wales as a whole where figures were 2,985,000, 3,424,000 and 3,917,000 respectively for the same years, exhibiting an almost constant rate of increase of slightly less than 2 per cent per annum. The general picture in the Area since 1954 seems to be an increase in the population of the Municipalities, with increases in the Shires up to 1954 but decreases since, with only a few exceptions.

⁴ G. R. Spinks and F. H. Gruen, "Post-war Trends in Farm Size in New South Wales, this *Review*, Vol. 26, No. 3 (September, 1958).

There appears no reason why the trend of decreasing numbers of rural people in the Area should not continue. This is a normal expectation in a growing economy. There is less certainty about the total population. In New South Wales as a whole, as we have seen above, population has been growing at a pretty constant rate since 1947. If this trend continues, New South Wales population in 1970 can be expected to be about 4,650,000 with fewer people than at present on farms and a greater concentration of people in the larger towns. In the Area this same tendency has been observed and can be expected to continue but it has not shared equally in the total increase of population. If the slackened growth rate evident since 1954 continues, the population of the Area in 1970 cannot be expected to be more than 253,000. A strongly executed policy of decentralization could, of course, be a factor in favouring a greater rate of growth of population in the future.

3. THE CURRENT IMPORTANCE OF FARM PRODUCTION IN THE AREA

Changes Since 1938-41

In this section figures for "current" production of the main farm commodities in the Area will be given and their importance in relation to the total production in the State. They will be compared with similar figures for 1938-41 so that changes in the production of each commodity and in its relative importance since that period will be apparent.

"Current" in this section and throughout the study is defined as the average for the three years 1958-59, 1959-60 and 1960-61. In the case of crop products and of wool, production figures are published by Shires in the Commonwealth Statistician's Statistical Register for New South Wales. However, for all other livestock products figures are not available on a Shire basis. Production of butter and cheese in the Area was estimated from figures for production by factories in the Area. However, for all other livestock products other methods of estimation had to be used. Briefly, an estimate of total milk production was based on the dairy cow population in the Area and an estimate of yield per cow from a recent economic survey in the Area. For details of this calculation see Appendix I. Estimates of the production of beef and veal, mutton, lamb and pigmeat were based on the relationship found in all cases between numbers of livestock on farms and livestock production in the State. These estimates were checked against slaughtering figures from establishments in the Area and movements by rail of live cattle, sheep and pigs to and from the Area. (See Appendices II, III and IV.)

An estimate of total egg production in the Area was based on the numbers of fowls in the Area, and the Commonwealth Statistician's estimate of total egg production in New South Wales (Appendix V). Honey production was estimated from a knowledge of the distribution of apiarists with different numbers of hives in New South Wales (Appendix VI).

The current production of the main farm products in the Area is shown in Table 1 together with the current production in the whole State, and similar figures for the position in 1938-39 to 1940-41. It will be noted that as regards total production of whole milk on farms, 35 per cent of the State's production is estimated to come from the Area. Compared to 1938-41, milk production in the Area has dropped whilst it has increased in the State as a whole. Only a small part of current production is needed for fluid consumption in the Area. Thus, a large proportion (about 80 per cent) of the production is made into butter in the nineteen factories and on farms in the Area, so that about half of the State's output of butter comes from the Area. This is the same proportion as twenty years ago, though production in the Area and in the State has declined. A very small part of the total production is made into cheese but this represents about 29 per cent of the State's output of this commodity. The remainder, 10 per cent of the total, is processed into "other milk products" which includes cream, condensed, concentrated and evaporated milk (full cream and skim); powdered milk (full cream and skim) and infants' and invalids' foods. Over 60 per cent of the State's output of these items taken as a group comes from the factories in the Area.

Production of beef and veal in the Area is estimated currently at 63,000 tons, representing about one-third of the State's production. It is necessary to point out that production in the Area and the State both relate to production of meat from slaughtering of animals *fattened in the Area and in New South Wales* respectively. It was thought desirable to separate these from slaughtering of animals that were fattened (and in most

TABLE 1

Average Annual Production of Farm Commodities in the Area and in N.S.W. for 1938-41 and 1958-61

Commodity	Unit	Average Production 1938-41			Average Production 1958-61		
		Area	State	Area/ State	Area	State	Area/ State
Whole milk	Gal.	132m	311·4m	42·5	116m	332·2m	35·0
Butter	Tons	28,200	52,200	55·0	20,800	39,100	53·0
Cheese	Tons	200	3,100	6·5	1,400	4,900	28·6
Other milk products	Gal.	n.a.	17·0m	n.a.	12·4m	20·2m	61·3
Milk for fluid consumption	Gal.	n.a.	n.a.	n.a.	7·1m	118·8m	6·0
Beef and veal	Tons	35,000*	153,600*	22·9	63,000	198,000	31·8
Mutton	Tons	21,100*	152,800*	13·8	12,000	102,000	11·8
Lamb	Tons				7,000	76,600	9·2
Total pig meat	Tons	9,000*	35,400*	25·4	12,400	27,500	45·0
Eggs	Doz.	0·2m	56·2m	0·4	2·0m	80·9m	2·5
Wool	Tons	26,630	226,000	11·7	29,000	282,000	10·3
Honey	Tons	370	1,480	25·0	1,380	6,630	20·8
Wheat	Tons	71,000	1,440,000	4·9	139,000	2,040,000	6·8
Barley	Tons	800	6,400	12·5	9,500	76,200	12·5
Oats	Tons	3,800	81,500	4·7	16,100	379,000	4·2
Maize	Tons	50,600	81,500	62·2	22,000	63,000	35·0
Sorghum	Tons	n.a.	n.a.	n.a.	9,400	26,800	35·0
Sugar (raw)	Tons	45,400	45,400	100·0	72,500	72,500	100·0
Potatoes	Tons	19,700	43,400	45·4	20,600	80,500	25·6
Bananas	Bu.	1,660,000	1,680,000	98·5	4,086,000	4,092,000	99·9
Pineapples	Bu.	17,000	20,900	81·0	71,000	71,500	99·2
Apples	Bu.	122,000	847,400	14·4	452,000	2,170,000	20·8
Pears	Bu.	24,200	326,500	7·4	60,000	573,000	10·5
Tobacco	Tons	200	280	71·0	700	910	77·0

* Average for 1941-42 to 1943-44.

cases bred and reared) outside the State. There is a considerable movement of cattle from Queensland into New South Wales not only of store cattle but also of fat cattle by rail, road and stock-route which are slaughtered mainly at abattoirs situated within the Area. The movements of these animals have been recorded by Department of Agriculture officials for the Bureau of Agricultural Economics.⁵ The production figures for the Area and the State are therefore net of the production of meat from the slaughtering of these Queensland fattened cattle. Compared to 1941-44, beef and veal production in the Area has nearly doubled.

Mutton production in the Area is estimated at 12,000 tons forming about 12 per cent of the State's production. Lamb production estimated at 7,000 tons is about 9 per cent of N.S.W. production. As the estimates in 1938-41 were undertaken only for mutton and lamb together, it is only possible to say that while total production of the two meats in N.S.W. increased to a certain extent over the period, production in the Area appears to have altered little. This conclusion however is a very tentative one since the estimation of meat production is fraught with difficulties.

For the same reason it would be incautious to conclude more than that production of pigmeat (pork, bacon and ham) in the Area appears to have increased somewhat since the previous estimate. Production in the State at that time was at a peak, which has never been reached before or since. The relative positions have thus not changed to the extent that the 25 per cent and 45 per cent in Table 1 would lead us to believe.

Current production of wool in the Area averages 29,000 tons and this is 10 per cent of the State's production. Production in the Area and the State has increased in the same proportion over the last 20 years. Compared to the make-up of the State's wool-clip, that from the Area would consist of more fine wool, as Merinos form a slightly greater proportion of the Areas sheep population than they do in the State as a whole.

Amongst crop products, wheat is the most important on a tonnage basis. Production has more than doubled since the beginning of the War, but still only forms a small fraction of total State production. Barley production in the Area also has expanded greatly since the War, maintaining the same proportion of the State's production that it did formerly, viz., one-eighth. Similar remarks would be made about oats, though the Area contributes only about 4 per cent of the State total.

Maize production has declined in the State over the same period but that of the Area has declined by even greater amounts. It now forms 35 per cent of the State's production as does the production of sorghum, a crop which was hardly known 20 years ago.

The State's source of sugar within N.S.W. still is exclusively the cane-fields in the Area. Production has increased by 60 per cent since 1938-41, this increase having taken place over the last 3-4 years. Current production averages 500,000 tons of crushed cane, equivalent to about 72,000 tons of raw sugar.

Whilst production of potatoes in the State has nearly doubled since the beginning of the War, production from the Area has not changed from the figure of about 20,000 tons.

⁵ *Cattle Movement Between Queensland and New South Wales 1955 to 1961*, Canberra: Bureau of Agricultural Economics, 1961. (Processed.)

Banana and pineapple production from the Area have expanded greatly since 20 years ago. The State's source of bananas in N.S.W. has always been confined to the plantations in the Area, only a minute fraction being produced outside the Area. But 20 years ago a significant proportion of the N.S.W. pineapple crop was grown along the Coast south of the Area. This has now almost ceased so that virtually all the crop originates within the Area.

The production of apples and pears has greatly increased in N.S.W. since the beginning of the War but production within the Area has increased at an even greater rate. The apple crop now accounts for 20 per cent of the State's output and pears for 10 per cent of the State's output.

Tobacco is still a minor crop in N.S.W. though production has expanded greatly. Most of the tobacco is grown in the Area.

Comparison with Estimates of "Potential" Production

Having discussed changes in production in the Area since the beginning of the War it is interesting to compare these changes with those envisaged by Wills and Vaidyanathan in their former Study of the Area. In assessing future changes in production no actual definition was given of the period over which these changes were expected to occur. However, presumably one would have expected most of the changes of production to have occurred in 15-20 years, i.e., by the present time. The authors of the former study emphasized that their future production estimates were really "potentialities", i.e., they were based on estimates of the *physical* limits to which each crop or livestock enterprise could expand in term of scale of operation and yield per unit. They were not therefore based on *economic* limits to production of the various commodities, given the then *current* situation of costs and returns in the Area. Still more were they not estimates of likely production based on expected *future* cost and price relationships, in the light of changing production and consumption patterns in world markets. This, let it be emphasized, is not to disparage the efforts of

TABLE 2

Comparison of Estimated Potential and Actual Current Production of Certain Farm Commodities in the Area

Commodity	Unit	Estimated Potential Production*	Actual Current Production
Butter	Tons ..	42,000	20,800
Beef and veal	Tons ..	42,000	63,000
Mutton and lamb	Tons ..	30,000	19,000
Pigmeat	Tons ..	20,000	12,400
Wool	Tons ..	26,800	29,000
Wheat	Tons ..	365,000	139,000
Maize	Tons ..	312,000	22,000
Potatoes	Tons ..	50,500	20,000
Bananas	Bu. ..	2,500,000	4,086,000

* Estimated by authors of the previous study.

the authors of the former study. Studies of future world market situations were virtually non-existent at that time whereas we now have bodies like F.A.O., O.E.E.C., P.P.E., the Bureaus of Agricultural Economics in the U.S.A. and Australia to mention a few, which regularly are investigating supply and demand trends and can give some guidance for making estimates of future situations. Moreover, the authors of the study would have recognized the limitation of an approach based on purely technical considerations. The comparison of their estimates and the actual figures for production is being done with the distinct advantage of possessing "hind-sight". It is just possible, though this writer believes not so likely, that had estimates been made with economic considerations in mind they would still have been as wide of the mark as those done without these considerations. Economists are not exactly infallible crystal-gazers. The comparison must be viewed in the light of these remarks.

The estimate of a potential production of 42,000 tons of butter was based on the assumption of an increase of 50 per cent in yield per cow in three generations of dairy cows, that is from a milk yield of about 300 gallons to 450 gallons per cow, in the Richmond-Tweed area, with no change in the numbers of cows. It also assumed an expansion of the dairying industry in the Tablelands. In fact current yield is estimated at about 330 gallons (see Appendix I for calculations) and over the last 10 years has been increasing at the average rate of about 3 gallons per annum. Furthermore, numbers of dairy cows have been declining at a greater rate than the increase in milk yield so that total production of butter has declined.

Though it is now, and was then, *technically* possible to increase numbers of dairy cows on each farm and especially to make vast improvement in milk yield per cow, the economic fortunes of the butter-fat industry have not been such as to favour these moves. In fact, they have been such as to favour moving *out* of dairying in the Area or switching over to other enterprises such as beef production. Thus the increase in beef production was underestimated probably because the possibility of farmers switching from dairying to beef in the North Coast was not foreseen.

The production of mutton and lamb has not come up to expectations for two main reasons. Firstly, the estimate was partly based on an assumption of a change from a sheep population of mostly Merino to one of mostly Cross-breds. This would have led to an increase in the average lambing percentage. This change has only occurred to a small extent, presumably due to the profitability of wool production, favouring Merinos, which could not have been foreseen by the authors of the report at that time. Thus the production of wool was not expected to change from the levels of 1938-41. Secondly, it appears that there may have been some over-estimation of the actual level of production in 1941-44, so potential production was also over-estimated by this amount. This conclusion is based on the fact that sheep numbers (and therefore presumably mutton and lamb production) have been increasing over the period, yet current production is estimated at still only 19,000 tons compared to the estimate in 1941-44 of 21,000 tons.

Potential pigmeat production was based on an assumption that on many mixed farms in the North Western Slope, between 10 to 30 sows would be carried as a sideline, producing porkers and baconers. Farmers producing wheat, wool and lamb have presumably considered these activities

as more profitable alternatives for their capital and labour than allocating some of these resources to pig production. The expected increase in pig numbers in the Area was therefore not forthcoming. Most of the increase in pig numbers that has taken place has been in the North Coast, where pig production was already a firmly established sideline to the dairying enterprise. Another reason for actual production being less than expected is the tendency for pigs to be slaughtered at lighter weights over the period. Thus even though the numbers of pigs produced increase, production of pigmeat may not be any greater. The authors of the report could hardly be expected to have foreseen a development of this character, however.

The potential production of wheat in the Area was estimated at 365,000 tons. This was five times the average production in 1938-41. Great expansion of wheat acreage was expected in the North Western Slope shires, at the expense of grazing. In fact, production has expanded to only twice the production in 1938-41 and most of the increase has come from a greatly expanded acreage in the Shires of the N. Central Plain. There is little doubt that part at least of the reason for wheat production not expanding as well as expected has been the relatively higher prices for wool as compared to wheat in the last decade, which could hardly have been forecast. But it is still doubtful whether production would have expanded five fold even had the relative profitability of wheat production remained as in 1938-41.

Maize production was estimated to have a potential of over six times the production of 1938-41. Most of the expansion was expected in the North Coast and the Northern Tableland, stimulated by the expected increase in pig numbers and higher levels of feeding to all livestock in the Area. In fact, the production of maize in the Area has declined to less than half of its level in 1938-41. This is in spite of a general increase in yield per acre. It is difficult, without a detailed study, to explain the reasons for this decline, other than to suggest that the higher per acre labour requirement of the crop has been making it a less attractive source of feed as labour costs rise.

Potential production of potatoes was estimated at 50,000 tons. It was envisaged that certain areas on the coast and on the highlands, at the time under pasture or timber, could be used for potato growing. This has not come about, current production being the same as in 1938-41 despite a tendency for increased yield per acre, especially in the North Coast. Part of the reason is presumably that though the Area is able to produce "new" potatoes, as does Queensland, this advantage is outweighed by the fact that it is competing for all months of the year except November, December and January with Victorian and Tasmanian areas where yields per acre are considerably higher.⁶

Bananas were one of the few commodities where future production was under-estimated. Acreage has been increasing almost continuously since 1938-41 and the last ten years has witnessed an upward trend in yield per acre, so that current production is about two and a half times what it was in the earlier period. Production was stimulated by the demand

⁶ See J. Van Der Meulen, "The Organization of the Sydney Potato Trade", this *Review*, Vol. 28, No. 4 (December, 1960).

from a growing Australian population, there being no export trade, and production has in fact been growing at a faster rate than population. It appears that the "limits" to banana acreage expansion were under-estimated, though it is not known on what basis these limits were estimated.

The burden of this section has been to illustrate how dangerous estimates may be when based entirely or almost entirely on technical considerations. It is a well known economic principle that optimum and maximum production are not synonymous and in fact they may be a long way apart. Decisions using only technical criteria tend to lead to results of the "all or none" variety, which can be described in an over-simplified way as follows: (a) "In this region, such and such a soil X is suitable for wheat-growing. Therefore all of it will be used for wheat-growing. Another soil Y is not suitable for wheat-growing. Therefore, none of it will be used for wheat-growing. (b) In this region, milk yield per cow is technically capable of being doubled. Therefore, over a period milk yield will be doubled". This approach ignores the fact that even under economic conditions that are assumed to remain static, production requires resources that are usually scarce and have alternative uses. Thus in (a) though the soil X is suitable for wheat-growing it does not mean that it is the *most* profitable use of the land. In (b) though technically milk yield can be doubled the additional cost of reaching this production may out-weigh the additional value of the production. Even if not, the additional resources required may give an even better return by being used elsewhere on the farm.

Considerations such as these help to explain why, for example, the production of wheat and butter would not have come up to expectations based on technical grounds. Economic conditions, however, do not have the habit of remaining static. The relative price for wheat may drop, so that even though such and such a soil X is suitable for wheat-growing it may become unprofitable or the least profitable use of the land on soil X. However, wheat prices may be such that it may be profitable to extend wheat production on to soil Y, even though this was considered unsuitable, e.g., gave lower yields than soil X.

4. CURRENT EXPORTABLE SURPLUSES OF FARM COMMODITIES

Current Position in New South Wales

The purpose of this section is to attempt to establish whether, for the list of farm products previously discussed, their current production is greater than, equal to or less than their current consumption. That is, whether, respectively, there is a current net export trade, no significant trade or a net import trade in the commodity. Trade here refers to both overseas and interstate movements of commodities by sea, rail and road. (Air transport is, and is likely to be in the near future, used to a minor extent for freight.) It is necessary to establish this because, as discussed in the Introduction, only if there is a significant net export trade in a commodity, is it assumed that any surplus production from the Area will be available for export outside the State.

Two approaches to this problem were used. Firstly, estimates were made of the consumption by humans and livestock in N.S.W. of the main farm products where this was possible. Thus the difference between

production and consumption should be a measure of the net export or net import trade in the commodity in N.S.W.

The second approach was to collate information on the actual imports and exports overseas and interstate of the main commodities for 1958-59 to 1960-61. Unfortunately, only figures for movements by sea are available (and then not always for every individual commodity). There is no readily accessible data on movements by rail and road between States, with minor exceptions discussed later. It was possible to get only qualitative statements by various people and bodies who had knowledge of such movements. Thus import and export figures from N.S.W. ports tell only part of the story in most cases. Consequently most reliance had to be placed on the first approach, which is now described in more detail.

The estimates of human consumption were based on the current population of N.S.W. and the per caput consumption figures published annually by the Commonwealth Statistician.⁷

It is thus to be noted that the figures refer to consumption per head in Australia rather than in N.S.W. Because of the lack of information on interstate trade, especially that by rail and road, no official estimates of consumption are made for the individual States. However, a survey of 427 households in the Sydney Metropolitan area was made in 1959, in which information was collected on the consumption of milk, butter, margarine, and cream.⁸ The per caput figures did not differ markedly (i.e., not much more than 10 per cent) from those for Australia as a whole, except for cream. This gives us a certain amount of confidence, at least as far as milk products are concerned, in using the Commonwealth figures as estimates of per caput consumption in N.S.W.

Figures on farmers' estimates of the quantities of milk, wheat, barley, oats, maize and sorghum fed to livestock were made available by the Commonwealth Statistician. The figures for cereals only include those fed "straight" and do not include amounts fed as compound feeding stuffs. They thus understate consumption by an unknown amount. However, in the case of wheat it was possible to get an estimate of the total amount fed to livestock and used for seed from the Australian Wheat Board. This is the figure used in the calculations. Estimates were made of the requirements of crops for seed purposes, based on agronomists' knowledge of the seed rates used in various areas of the State. These calculations appear in Appendix VII.

The total of the estimates of human consumption, livestock consumption and of seed requirements was deducted from the production figure for each commodity discussed in the previous section. The resultant figure is called "Surplus", being negative if total consumption exceeded production and it is intended to be a measure of the net trade position of each commodity in N.S.W. These figures appear in Table 3. Some caution should be used in accepting the figures for the "Surplus" at their face value. Most of the production figures can be accepted as being recorded with a high

⁷ *Report on Food Production and the Apparent Consumption of Foodstuffs and Nutrients in Australia*, Canberra: Commonwealth Bureau of Census and Statistics (Processed).

⁸ The main results of the survey were quoted in Chapter 3 of the book, *The Australian Dairy Industry*, edited by N. T. Drane and H. R. Edwards (Melbourne: F. W. Cheshire, 1961).

degree of accuracy, except eggs, of which there is a large proportion produced by domestic poultry-keepers and from areas uncontrolled by the N.S.W. Egg Marketing Board, neither of which are recorded. However, the consumption figures are estimates and as such have a certain degree of error attached to them. As the Surplus figure is a residual, the percentage error attached to it may be many times the percentage error of the production or consumption estimates, depending on the ratio of these two statistics. For example, in the case of butter a deficit of 7,400 tons is estimated. If, however, the Sydney survey figure, which is 11 per cent higher than the Australian one, is used the estimate of consumption is increased to 51,500 tons. The new deficit is 12,400 tons, a difference of 68 per cent in relation to the original estimate. Moreover, this type of error may be sufficient to change a surplus into a deficit or vice versa. It will be obvious that these reservations apply most forcibly when production and consumption are of close magnitude, i.e., close to a ratio of one and recede as the ratio becomes smaller (or larger) than one.

Bearing these remarks in mind, it is interesting to note that, taking milk and milk products as a whole, consumption exceeds production by a substantial margin. The consumption estimate would have to be reduced by 12.5 per cent for production and consumption to be in balance. The

TABLE 3

Current Production and Consumption of Farm Commodities in N.S.W.

Commodity	Unit	Production	Consumption		Surplus (Production minus Consumption)
			Human	Seeds and Livestock Feeding	
Whole Milk ..	Gal. ..	332.3m	376.0m	3.5m	— 47.3
Butter ..	Tons ..	39,100	46,500	....	— 7,400
Cheese ..	Tons ..	4,900	10,700	....	— 5,800
Other Milk Products ..	Gal. ..	20.2m	25.6m	....	— 5.4m
Milk for Fluid Consumption ..	Gal. ..	118.8m	111.0m	3.5m	+ 4.3m
Beef and Veal ..	Tons ..	198,000	200,000	....	— 2,000
Mutton ..	Tons ..	102,200	97,800	....	+ 4,400
Lamb ..	Tons ..	76,600	57,200	....	+ 19,400
Pigmeat ..	Tons ..	27,500	37,800	....	— 10,300
Eggs ..	Doz. ..	80.9m	68.6m	....	+ 12.3m
Wool ..	Tons ..	282,000	20,000	....	+ 262,000
Honey ..	Tons ..	6,600	n.a.	....	n.a.
Wheat ..	Tons ..	2,040,000	446,000	430,000	+ 1,164,000
Barley ..	Tons ..	76,200	60,000	14,000	+ 2,200
Oats ..	Tons ..	379,000	4,500	154,000	+ 220,500
Maize ..	Tons ..	63,000	n.a.	36,000	n.a.
Sorghum ..	Tons ..	26,800	....	8,800	+ 18,000
Sugar (raw) ..	Tons ..	72,500	205,000	....	— 132,500
Potatoes ..	Tons ..	80,500	202,000	9,000	— 130,500
Bananas ..	Bu. ..	4,092,000	n.a.	....	n.a.
Pineapples ..	Bu. ..	71,500	n.a.	....	n.a.
Apples ..	Bu. ..	2,170,000	n.a.	....	n.a.
Pears ..	Bu. ..	573,000	n.a.	....	n.a.
Tobacco ..	Tons ..	910	n.a.	....	n.a.

Sydney survey results would tend to suggest that consumption of all milk products has been *under* rather than over-estimated. There is a deficit for each of the constituent milk products except for milk for fluid consumption. As there is no known trade in fluid milk it follows that production must equal consumption, i.e. a surplus of zero. It would thus appear that consumption has been underestimated by 4,300,000 gallons but whether it is human or livestock consumption or both that have been underestimated it is hard to say.

Other products where there is little doubt that a deficit occurs are pigmeat, sugar and potatoes, the latter two products having substantial deficits in both absolute and relative terms. Beef and veal and mutton are shown to have a small deficit and surplus respectively but bearing in mind our previous discussion, no more should be said here than that production and consumption of these meats appear to be roughly in balance.

The only products that, using the first approach we can conclude, have a definite net trade surplus, are lamb, wool, and wheat, the latter two products having very large surpluses in relative terms and on a tonnage basis. Though there appears to be a large surplus production of eggs, in view of what has just been said about production estimates for eggs, it would not be safe to be too definite about the size of this surplus. As far as barley, oats, maize and sorghum are concerned we are uncertain of their net trade position *using the first approach* because of the unknown quantities of each fed to livestock as compound feeding stuffs. Some clues are forthcoming from our later discussion of rail and road movements in these commodities.

There are no official estimates of the consumption of honey, bananas, pineapples, apples, pears and tobacco, so it is not possible to estimate whether there are surpluses or deficits in these products.

Having used the approach of separately estimating production and consumption to arrive at conclusions about the magnitude and direction of trade of the main farm products in New South Wales, it is informative to compare them with the results of the other approach adopted. This is done in Table 4. Positive signs indicate exports and negative signs imports.

It is to be remembered that the only available trade figures are for movement by sea to overseas and interstate destinations. Allowing for the errors of estimating the net trade surplus, as previously discussed, the comparison does shed some light on the order of magnitude and direction of trade by rail and road between N.S.W. and other States of the Commonwealth.

Thus, for instance, there is a small export of butter, but as we established with little doubt that there is a net deficit of butter in N.S.W., it would appear that the product must be imported by rail or road, in the order of 8,000 tons. This estimate is corroborated by the Report of the Dairy Industry Committee of Enquiry,⁹ where it is shown that in 1958-59 the quantity moved into N.S.W. was 5,548 tons and for 1954-55 to 1958-59 averaged 7,594 tons. Similarly with cheese and other milk products. That

⁹ *Report of the Dairy Industry Committee of Enquiry* (Canberra: Commonwealth Government Printer, August, 1960).

there is a substantial movement of cheese and other milk products from Victoria to N.S.W. by rail is confirmed by the Division of Dairying in the N.S.W. Department of Agriculture.

In the case of beef and veal we have a firm estimate of the amounts of beef and veal sent from Queensland by rail and the numbers of fat bullocks and calves coming over the Queensland border for slaughter.¹⁰

TABLE 4

Comparison of Estimated Current Surplus Production and Recorded Trade of Farm Commodities in N.S.W.

Commodity	Unit	Estimated Surplus	Recorded Trade by Sea	
			Overseas	Interstate
Butter	Tons ..	— 7,400	+ 1,100	....
Cheese	Tons ..	— 5,800	+ 230	....
			— 500	
Other Milk Products	Gal. ..	— 5.4m	+ 5m	+ 0.25m
			approx.	
Milk for Fluid Consumption	Gal. ..	+ 4.3m	....	....
Beef and Veal	Tons ..	— 2,000	+ 35,000	— 42,400*
Mutton	Tons ..	+ 4,400	+ 5,200	Negligible
Lamb	Tons ..	+ 19,400	+ 3,300	"
Pigmeat	Tons ..	— 10,300	+ 110	"
Eggs	Doz. ..	+ 12.3m	+ 12.25m	n.a.
Wool	Tons ..	+ 262,000	+ 226,000	+ 600
Honey	Tons ..	n.a.	+ 925	n.a.
Wheat	Tons ..	+ 1,164,000	+ 1,100,000	+ 14,000
				— 9,000
Barley	Tons ..	+ 2,200	+ 800	— 2,300
Oats	Tons ..	+ 220,500	+ 3,800	n.a.
Maize	Tons ..	n.a.	....	n.a.
Sorghum	Tons ..	+ 18,000	....	n.a.
Sugar (raw)	Tons } ..	— 132,500	+ 6,200	— 56,000
Molasses	Tons }		— 88,000	— 16,000
Potatoes	Tons ..	— 130,500	+ 2,100	....
			— 500	— 19,600
Bananas	Tons ..	n.a.	....	n.a.
Pineapples	Tons ..	n.a.	+ 60	n.a.
Apples	Tons ..	n.a.	+ 1,750	n.a.
Pears	Tons ..	n.a.	+ 1,200	n.a.
Tobacco	Tons ..	n.a.	+ 200	+ 1,200
			— 9,500	

* (Rail & Road).

These currently are equivalent to 42,000 tons of carcase beef and veal. For convenience they are included in Table 4. It is known that there is a net movement of fat cattle from N.S.W. to Victoria by rail and road but

¹⁰ (1) A. G. Bennett and F. L. Adams, "The Sources of Supply of Beef to Sydney" *Quarterly Review of Agricultural Economics*, Vol. XIV, No. 1 (January, 1961).

(2) *Cattle Movements Between Queensland and New South Wales, 1955 to 1961*, *op cit.*

that it is small compared to the movement from Queensland to N.S.W. It would appear, then, that the conclusion that production and consumption of beef and veal in N.S.W. are currently in approximate balance is correct.

There is a small export trade of mutton overseas and as this is the size expected from our estimate of the net surplus one would expect there to be negligible movements by rail or road. In fact, there are quite significant movements between N.S.W. and Victoria in both directions of fat sheep, as well as store sheep, but it is not known whether these balance out. However, it would be true to say that N.S.W. would not be a large exporter of mutton.

There is a large difference between the estimated surplus and the recorded overseas trade in lamb. There is a considerable movement of fat lambs from Northern N.S.W. to Queensland and there are movements between N.S.W. and Victoria but it is doubtful whether these are sufficient to make up the difference between the two figures. It is very possible that consumption in N.S.W. is greater than the Australian average of 32.7 pounds per head used in this study. However, there is little doubt that N.S.W. is a net exporter of lamb.

There is a negligible trade by sea in pigmeat but the estimated deficit in N.S.W. suggests there is a sizable movement of pigmeat by rail and road into N.S.W. from other States. It is known, in fact, that there is a significant movement of bacon into N.S.W. from Queensland and Victoria and of pork from Western Australia. There is also a significant net movement of fat pigs from Queensland into Northern N.S.W. which are slaughtered there. However, these latter have already been included in the N.S.W. production figures. There is little doubt that our previous conclusion that N.S.W. is a net importer of pigmeat is correct.

It will be noted from Table 4 that the estimated surplus of eggs and the recorded overseas trade are almost identical. This may indicate that the suspected interstate trade in eggs is negligible but in view of the probable high degree of error in the production figure, not too much weight should be attached to this conclusion. For our purposes, the important conclusion is that N.S.W. is a significant net exporter of eggs.

There is no official estimate of honey consumption per head but taking a rough figure of 2.4 lb., New South Wales consumption would currently be 4,200 tons, leaving a surplus of about 2,400 tons. Recorded overseas trade is currently 925 tons, which would indicate that there is a certain amount of inter-state trade. New South Wales is almost certainly a net exporter of honey, but in relation to the size and monetary value of the exportable surpluses of other commodities that concern us, this trade is negligible.

Wool and wheat are two of the few products for which there is a large exportable surplus in New South Wales. The difference between the figures for estimated surplus and recorded trade by sea in the case of wool can be attributed to movement by rail and road from New South Wales to Victoria, and to a lesser extent Queensland and South Australia. It is known that for 1958-59 to 1960-61, 49,000 tons of New South Wales wool was sold outside the State, mostly in Melbourne and that 3,600 tons of wool produced outside the State was sold in wool auction centres in New

South Wales.¹¹ Thus the net interstate movement by sea, rail and road out of New South Wales of greasy wool was about 46,000 tons. This would be the main explanation of the difference between the two figures.

In the case of wheat, the overseas export figure refers to the average for the three years ended November 30, 1961, rather than June, 1961. These figures were taken from the Australian Wheat Board Annual Reports. It was thus possible to reconcile production, consumption and exports more closely, as stocks are an important item in the case of wheat and vary considerably between years.

Two reasons for the small discrepancy remaining between figures are a build-up of stocks over the three years of about 80,000 tons and a known total export of wheat to other States of 44,000 tons (30,000 tons of which, approximately, must have gone by rail).

As far as barley, oats, maize and sorghum are concerned, the quantities fed to livestock in the form of compound feedingstuffs are unknown. However, some indication of the magnitudes involved is given by the amounts used in the manufacture of compound feedingstuffs in New South Wales. For 1958-59 to 1960-61 these averaged 21,000 tons barley, 36,000 tons oats, 8,500 tons maize and 28,000 tons sorghum.¹² We cannot say that these are equal to the quantities consumed by livestock in New South Wales as there may have been overseas and interstate exports or imports of the feedingstuffs, but it would probably be not far from the truth to say that they were of roughly the same magnitude.

One could conclude, then, with little doubt that New South Wales is a net *importer* of barley. It is known that significant amounts of barley enter New South Wales by rail from Queensland, Victoria, and South Australia.

As regards oats, underestimates of quantities fed straight is certain to have taken place. There could quite possibly be an error of 100 per cent. However, it is known that significant quantities of oats move by rail from New South Wales to Victoria. It would appear then that New South Wales is probably a significant net exporter of oats, but the actual quantities cannot be determined with any degree of accuracy.

No attempt was made to estimate surplus production of maize, as there are no figures available for human consumption. It is known that maize enters New South Wales from Queensland by road but information about movements between New South Wales and other States is not available. It is difficult, then, to be at all categorical about the trade position of maize.

As regards sorghum, the grain enters New South Wales by rail and road from Queensland but nothing is known of other movements. With the quantities used in compound feedingstuffs, one could conclude that New South Wales is probably a net *importer* of sorghum.

¹¹ *Australian Wool*, Statistical Analysis Series Nos. 30, 33 and 36. Melbourne: Australian Wool Bureau, Wool Statistical Service, 1958-59, 1960-61 and 1961-62.

¹² Figures for 1958-59 taken from *Secondary Industries*, 1958-59 Bulletin No. 53, Canberra: Commonwealth Bureau of Census and Statistics, Figures for 1959-60 and 1960-61 supplied by Commonwealth Bureau of Census and Statistics.

There is no such uncertainty about sugar and potatoes. Though there is a small export of sugar from New South Wales, large quantities of sugar are shipped into New South Wales from Queensland and also large quantities of molasses are imported from overseas and interstate. Similarly, though there is a small export of potatoes, they are imported from interstate sources by sea, e.g., Tasmania and by rail and road, e.g., Victoria. As regards sugar and potatoes, New South Wales is a large net importer.

No official estimates have been published of the consumption per head of bananas. However, a rough estimate would suggest a figure of about twenty-five pounds. It is quite probable that consumption in New South Wales is higher than this but, taking this figure, consumption in New South Wales would currently average about 1,750,000 bushels. Thus about 2,300,000 bushels (57,000 tons) from the New South Wales crop would be available for export. There are no overseas exports from New South Wales (or from Queensland, where most of the rest of the Australian crop is produced), but large quantities are sent by rail to Victoria, South Australia and Western Australia.

The New South Wales pineapple crop is currently 71,500 bushels. No estimates of human consumption are available. It is known that considerable quantities of pineapples come from Queensland by rail to Sydney,¹³ and that from 1952-53 to 1958-59 the average quantity of pineapples sold on the Sydney market was about 250,000 cases or 375,000 bushels. As this is over five times the New South Wales crop it is clear that though there is a small overseas export of 3,000 bushels (about sixty tons), New South Wales is a large net importer of pineapples.

No official estimates are available, either, for the consumption of apples and pears. There is a small export trade overseas of both these fruits from New South Wales. However, there is a net movement of both these fruits into New South Wales from Victoria by rail and road and from Tasmania by sea. There is little doubt that New South Wales is a net importer of apples and pears.

There is a very small export overseas and interstate of tobacco. However, there is a large importation from overseas and N.S.W. is a large net importer of tobacco.

To summarize the conclusions of this section we can say that, of the main farm commodities that are produced within the Area, only mutton, lamb, eggs, wool, wheat, oats and bananas have been shown with little doubt to have a significant net surplus in N.S.W. and thus be available for export overseas or interstate. All the other commodities have a net surplus which is insignificant, zero or negative or the actual position is uncertain.

Current Exportable Surpluses from the Area

In this short section, current consumption of each main farm commodity in the Area is subtracted from production to arrive at a surplus figure. In the light of the findings from the previous section it is then concluded

¹³ J. Van der Meulen, "An Analysis of the Wholesale Demand for Pineapples in Sydney", this *Review*, Vol. 27, No. 3 (September, 1959).

how much of this surplus is required for consumption in the rest of the State and how much is available for export overseas or interstate.

Per caput consumption figures were the same as used in the previous section. They are all official estimates by the Commonwealth Statistician except those for bananas and honey, which were estimated on a rough basis. Total consumption (human, livestock and for seed purposes) was deducted from production to arrive at the estimated surplus figures which appear in Table 5. The same remarks about the underestimation of cereals consumed by livestock apply as in the previous section.

There are net surpluses for all commodities except fluid milk (for which production was estimated as being exactly equal to consumption), eggs and maize, which are in net deficit. When due allowance for possible error in the estimation of the production of eggs is made, one still concludes that the area is barely self-sufficient in eggs. It was not possible to estimate surplus figures for pineapples, apples, pears and tobacco. The size of these surpluses gives an indication of the magnitude and direction of movements of the commodities into and out of the Area.

TABLE 5

Current Production and Consumption of Farm Commodities in the Area

Commodity	Unit	Production	Consumption		Surplus (Production minus Consumption)
			Human	Seed and Livestock Feeding	
Whole Milk	Gal. ..	116.0m	24.0m	n.a.	92.0m
Butter	Tons ..	20,800	2,960	....	17,840
Cheese	Tons ..	1,400	680	....	720
Other Milk Products	Gal. ..	12.4m	1.6m	....	10.8m
Milk for Fluid Consumption ..	Gal. ..	7.1m	7.1m	n.a.	....
Beef and Veal ..	Tons ..	63,000	12,800	....	50,200
Mutton	Tons ..	12,000	6,240	....	5,760
Lamb	Tons ..	7,000	3,650	....	3,350
Pigmeat	Tons ..	12,400	2,400	....	10,000
Eggs	Doz. ..	2.0m	4.4m	....	— 2.4m
Wool	Tons ..	29,000	1,270	....	27,730
Honey	Tons ..	1,380	280	....	1,100
Wheat	Tons ..	139,000	28,500	12,500	98,000
Barley	Tons ..	9,500	3,850	3,500	2,150
Oats	Tons ..	16,100	300	6,000	9,800
Maize	Tons ..	22,000	n.a.	23,200	— 1,200
Sorghum	Tons ..	9,400	....	3,100	6,300
Sugar (Raw) ..	Tons ..	72,500	13,000	....	59,500
Potatoes	Tons ..	20,600	12,900	2,900	4,800
Bananas	Bu. ..	4,086,000	112,000	....	3,974,000
Pineapples ..	Bu. ..	71,000	n.a.	....	n.a.
Apples	Bu. ..	452,000	n.a.	....	n.a.
Pears	Bu. ..	60,000	n.a.	....	n.a.
Tobacco	Tons ..	700	n.a.	....	n.a.

Most of the sugar surplus is moved to Sydney by sea, from North Coast ports and small quantities of milk products are also shipped by sea, but the rest of the commodities in surplus are moved by rail and road.

It was possible in some cases to obtain information on the quantities moved into and out of the area by sea and rail and this served as a check on the estimates of surpluses. The size of these surpluses gives also a good picture of the contribution that the area makes towards the needs of the State and of the export overseas and to other States in Australia. From the previous section we conclude that all but six of the commodities are needed to meet demand in N.S.W. The six products which could enter into overseas and interstate trade are mutton, lamb, wool, wheat, oats and bananas. Taking into account the previous calculations of the size of the net export trade in these commodities, we can conclude that the following approximate quantities are currently available for export outside the State:

					Tons
Mutton	..	..	..	..	4,400
Lamb	..	..	..	..	3,350
Wool	..	..	..	..	27,730
Wheat	..	..	..	..	98,000 (maximum)
Oats	..	..	..	..	9,800 (maximum)
Bananas	..	..	..	..	57,000

5. FUTURE EXPORTABLE SURPLUSES OF FARM COMMODITIES

Future Position in New South Wales

We have arrived at estimates of the current quantities of the main farm commodities produced in the area that would be available for export overseas and interstate. We also need to make some estimates of the exportable surplus of each farm commodity that would be likely in the "foreseeable" future. As with estimating the current exportable surplus, we need first to ascertain the future trade position of each main farm commodity in N.S.W. This involves estimating future production and consumption in the State, which is the purpose of this section.

Forecasting for even a year ahead in economics is a risky undertaking. When the time period expands to a number of years the forecast becomes hazardous in the extreme. Very few official bodies are willing to commit themselves in their Outlook Statements to more than a few years ahead. While it is realized that a decision involving the expenditure of a large capital sum, such as the development of a deep-sea port entails, ideally needs estimates of future exportable quantities, etc., over a period of several decades, this is just not possible, unless the estimates degenerate into mere guesses based on "hunches". It has, therefore, not been attempted to forecast any further ahead than 1970.

We have previously criticized estimates of "potential" production because they were based on technical considerations without regard to the economic climate. However, we need to be aware of the equal error of thinking that

we know what the economic climate is going to be in the future. An event like the probability of Britain joining the European Common Market would substantially alter the prospects for the export trade in several commodities important to Australia. For this reason most of the estimates made in this section, especially those concerned with future production of the main commodities, must be treated as conjectural.

In estimating future production and consumption we are faced with the problem that supply of and demand for a commodity are not independent of each other. Price is an important factor in reconciling the two, and theoretically, at least, they need to be estimated simultaneously. However, demand for most food commodities in more wealthy countries like Australia tends to be price inelastic, i.e., prices can change substantially without much change in demand. Total demand will depend more on population changes and changes in income per head, both of which it is considered will increase significantly in Australia in the future. It is also considered that home demand will be the major factor in influencing N.S.W. production rather than the export trade, which offers less certain prospects of profitable outlets, at least in the near future.

The approach adopted has thus been to *first* determine future demand in N.S.W. based on (a) estimates of the growth of population and (b) changes in consumption per head expected with rising real incomes per head. Having done this, the likelihood of N.S.W. production reaching or exceeding the figure for future N.S.W. consumption is discussed in the light of export prospects and past trends in both scale and intensity of production. This is not a particularly esoteric approach but the time factor and lack of relevant data precluded the adoption of anything more sophisticated than the one presented here. Sometimes a naive model plus some judgment gives comparable results.

Population in 1970 is estimated to be 4.65 million on the basis of the trend since 1947 of an annual increase of slightly less than 2 per cent. The estimates for human consumption per head in 1970 are based on the evidence of relationships discussed in various publications¹⁴ and a consideration of past trends in consumption in Australia. To a certain extent also, account has been taken of the experience over the last decade of relative price movements; so that the effect of prices on demand has not been entirely discounted.

Estimates of future per capita and total consumption are shown in Table 6 for those main commodities for which information is available, together with similar figures for current consumption.

¹⁴ Drane and Edwards, *op. cit.*, Chapters 3 and 9.

G. W. Taylor, "Beef Consumption in Australia", *Quarterly Review of Agricultural Economics*, Vol. XIV, No. 3 (July, 1961).

A. Fletcher, "The Australian Market for Lamb", *Quarterly Review of Agricultural Economics*, Vol. XIII, No. 4 (October, 1960).

Wool Production and Utilisation, Statistical Bulletin No. 9, 1960-61, Canberra: Commonwealth Bureau of Census and Statistics.

Per Caput Fiber Consumption Levels, Commodity Bulletin Series. Rome: Food and Agriculture Organisation.

Report on Food Production and the Apparent Consumption of Foodstuffs and Nutrients in Australia, *op. cit.*

It is expected that per caput consumption of butter will decline, whilst that of fluid milk and cheese will increase slightly. The net result is that whole milk consumption is expected to decline.

Total meat consumption is likely to rise somewhat with a redistribution to a certain extent amongst the various meats, mutton and lamb consumption rising at the expense of beef and veal, mainly because of relative price movements. There will probably also be an increase in the consumption of poultry meat (especially of broilers, which at the moment is in the order of 4 lb. per head). This may be at the expense of the other meats, but its effects are difficult to quantify.

Egg consumption per head is expected to remain substantially the same. Wool consumption per head is expected to decline a little because of competition with synthetic fibres.

TABLE 6

Current and Future Human Consumption of Farm Commodities in N.S.W.

Commodity	Current Consumption		Consumption in 1970	
	Per Head	Total	Per Head	Total
Whole Milk	96.2 gal.	376.0m gal.	90.3 gal.	420.0m gal.
Butter.. ..	26.5 lb.	46,500 tons	23.0 lb.	47,800 tons
Cheese	6.0 lb.	10,700 tons	6.5 lb.	13,500 tons
Other Milk Products	6.5 gal.	25.6m gal.	6.5 gal.	30.2m gal.
Milk for Fluid Consumption	28.3 gal.	111.0m gal.	29.0 gal.	135.0m gal.
Beef and Veal	114.0 lb.	200,000 tons	110.0 lb.	228,000 tons
Mutton	56.0 lb.	97,800 tons	60.0 lb.	124,000 tons
Lamb	32.8 lb.	57,200 tons	37.0 lb.	77,000 tons
Pigmeat	21.5 lb.	37,800 tons	21.0 lb.	43,500 tons
Eggs	17.5 doz.	68.6m doz.	17.5 doz.	81.4m doz.
Wool	11.4 lb.	20,000 tons	100.0 lb.	20,800 tons
Wheat	256.0 lb.	446,000 tons	240.0 lb.	498,000 tons
Barley	34.4 lb.	60,000 tons	35.0 lb.	72,500 tons
Oats	2.7 lb.	4,500 tons	2.5 lb.	5,200 tons
Sugar	117.0 lb.	205,000 tons	112.0 lb.	232,000 tons
Potatoes	116.0 lb.	202,000 tons	110.0 lb.	228,000 tons

Wheat, oats, sugar and potatoes, being carbohydrates, are expected to be consumed less on a per capita basis in the future. Barley is mostly used in beer making and the consumption per head of beer is not likely to change very much. It is already at a very high level.

The effect, of the increased population expected in 1970, is to increase total consumption of all products substantially with the exception of butter and wool, where only a slight increase is expected. In no cases was a declining per capita consumption sufficient to outweigh the effects of an increasing population.

It now remains to consider the likelihood of the production of each commodity reaching or exceeding the expected level of consumption.

Some guidance as to world trade prospects for various commodities over the next few years was forthcoming from various issues of an F.A.O. publication.¹⁵

A study of the trend in milk yield per cow in New South Wales reveals an increase of about 3 gallons per annum. For reasons discussed in a previous section, it can not be expected that this trend value will increase. Thus milk yield per cow in 1959-70 is likely to be in the region of 400 gallons. With an expected consumption of 420,000,000 gallons (without any allowance for livestock consumption) this would require a herd of 1,050,000 cows for State production to equal consumption. The total number of dairy cows is currently about 900,000 and has been falling steadily since 1955-56, largely no doubt due to the relative unprofitability of producing for the butter market. The prospects for the export trade in most milk products are unlikely to improve in the future and are much more likely to deteriorate. The trend of declining cow numbers is likely to continue, with the result that New South Wales will still be a net *importer* of milk in 1970. As the State will have to be self-sufficient in fluid milk, the imports, which will still be from Victoria, will be in the form of butter, cheese or other milk products.

With beef and veal, it is much more difficult to estimate the likely change in production in the future. Beef and veal production comes from slaughtering of dairy cows and calves as well as from slaughtering of beef cattle. Whilst dairy cow numbers have been declining, beef cow numbers have shown a steady buildup since 1955. Several writers have commented on an observed cyclical pattern in beef cattle numbers in Australia¹⁶ which is thought to be related to changes in the relative price of beef. Whether beef cow numbers are likely to continue the upward trend or not would depend then largely on how future beef prices behave. However, assuming that the trend is continued, that there is no diminution in the flow of store cattle from Queensland and taking into account the observed trend of a changeover to younger turn-off¹⁷ of cattle for slaughter, it is estimated that production of beef and veal in 1970 would be in the region of 250,000 tons, compared to the current figure of 198,000 tons. This would give a net export of about 20,000 tons. In view of the likely declining export trade to the U.K. and Europe and the uncertain U.S. trade for manufacturing beef, it is more probable that production will not be stimulated to the extent that recent trends would indicate. Thus 20,000 tons for export is likely to be a maximum figure.

The numbers of ewes and wethers on farms in New South Wales have been increasing steadily over the last decade and concomitantly the production of mutton. If this trend continues it is estimated that mutton production in 1970 would be of the order of 140,000 tons, as against a current figure of 102,000 tons. This would give a net export figure

¹⁵ *Monthly Bulletin of Agricultural Economics and Statistics*. Rome: Food and Agriculture Organization.

¹⁶ G. O. Gutman, "The Cattle Cycle", *Quarterly Review of Agricultural Economics*, Vol. 2, No. 1 (January, 1950).

G. C. McFarlane, "Trends in the Production and Marketing of Beef and Veal", this *Review*, Vol. 23, No. 2 (June, 1955).

¹⁷ F. M. H. Collins and F. L. Adams, "The Changing Composition of Australian Beef Herds", *Quarterly Review of Agricultural Economics*. Vol. XIV, No. 4 (October, 1961).

of about 16,000 tons. Export prospects may be a little brighter than for beef and veal, as demand for the cheaper meats is expected to increase in such Asian countries as Japan.¹⁸ 16,000 tons is, therefore, a figure that may well be realised.

In line with the increasing ewe population the number of lambs in N.S.W. has also increased. This increase has been a proportionate one, as lambing percentages have hardly changed over the period. Production of lamb meat has also increased and if the trend in numbers of lambs continues, production in 1970 would be about 100,000 tons. This would leave a surplus for export of about 23,000 tons, which is virtually the same as the current figure. Again this is likely to be a maximum figure, when export prospects are taken into account.

There has been a slight tendency for the number of breeding sows on farms in N.S.W. and the number of pigs slaughtered to increase over the last decade. However, owing to the tendency towards lower slaughtering weights production of pigmeat has remained remarkably steady and, as has been previously noted, is no different from what it was in 1938-41. The pig enterprise, of course, is one which can be expanded quickly when the economic climate changes in its favour, but it would seem that this has not been the case in the past. Any stimulus to production is likely to come only from the home market and as consumption is expected to be 43,000 tons in 1970, production would have to expand by 60 per cent to meet this demand. Thus N.S.W. is likely to be still a net *importer* of pigmeat in the future.

There does not appear to have been any significant trend in egg production over the last ten years. By 1970 N.S.W. consumption is expected to be about 81 million dozen eggs which is identical to current production. In view of the gloomy export prospects in Europe for both shell and pulped eggs, it may well be that by 1970 production will almost entirely be disposed of on the home market.

Wool is one of the few agricultural products for which export prospects in the next decade are not completely gloomy. The declining use of wool per head of the population in Europe and the U.S.A., because of the substitution of synthetic fibres, has already been observed. However, even if it still declines, expanding population may still at least maintain total demand in these countries. Europe is not likely to be self-sufficient in wool for a long time to come and demand is growing in several Asian countries especially Japan. We have estimated that consumption in N.S.W. will be virtually static, so that any increase in production would be for export. Production has been increasing in line with the increasing sheep population, wool clip per head having hardly changed. If this trend continues, production can be expected to be about 340,000 tons in 1970, giving an export of about 320,000 tons.

Human consumption of wheat is expected to increase to about 500,000 tons and probably that used for livestock feeding will be of the same order. Wheat acreage and yield per acre have fluctuated greatly over a long period and there does not seem to be any decided trend upwards or downwards.

¹⁸ E. S. Hoffman, "Future Market Requirements at Home and Abroad", *Quarterly Review of Agricultural Economics*. Vol. XV, No. 2 (April, 1962).

Though it is difficult to assess future changes in production because of the uncertainty about future world markets, it is nevertheless possible to say that N.S.W. will still be a large exporter of wheat.

Though N.S.W. is at present a net importer of barley, the acreage has been expanding recently, though yield per acre shows no significant trend upwards. If acreage expands at the same rate in the future, production in 1970 could be about 100,000 tons. Human consumption is expected to be about 72,000 tons so that it might be expected that N.S.W. would be a net exporter of the product in 1970. However, if it is remembered that barley for livestock feeding is at the moment under-estimated and that its use in the future may also increase, one concludes that the surplus for export is likely to be small if not zero.

There is a slight tendency for oat acreage to increase, though yield per acre shows no sign of increasing. As with barley, the uncertain factor is the future requirement for livestock feeding. It is quite possible that most, if not all, of the oats grown in N.S.W. will be consumed there in the future.

The total use of maize and sorghum for livestock feeding and the consumption of maize by humans are unknown. Future use is thus also unknown. The acreage of maize has remained steady, though yield per acre has a tendency to increase, so that total production has been increasing slightly. The acreage of sorghum, on the other hand, has been increasing, as has yield per acre. As with oats, however, it is quite possible that most if not all of these two cereals will be consumed within the State.

As regards sugar, production has been increasing since 1955. However, even if the present trend continued there would still be a large gap between production and the consumption of 230,000 tons expected in 1970. Production is, in any case, likely to be limited by quotas under the Queensland-Commonwealth Sugar Agreement, which runs until 1969. N.S.W. will, therefore, still be a large net *importer* of sugar in the future.

Similar remarks apply to potatoes. Consumption is likely to increase in the future, with declining per capita consumption but increasing population. Production is little more than it was in 1949-50 though there have been large annual fluctuations in the intervening period. With comparative advantage lying with Tasmania and Victoria, N.S.W. is likely to remain a net *importer* in the future.

Per capita consumption of bananas is not known accurately nor is it known how consumption may change with rising incomes in the future. However, taking the previously calculated rough figure of 25 pounds per person and assuming this remains constant, future consumption in N.S.W. would be about 2.1 million bushels, as against the current figure of 1.75 million bushels. The acreage of bananas has been increasing with minor fluctuations since 1953-54 and yield per acre has been also increasing quite substantially. If this trend continues, production could be over 5 million bushels, so that there would be an exportable surplus of about 3 million bushels or 75,000 tons, as against the current figure of 57,000 tons. However, there is some doubt amongst local extension officers as to whether the trend in production will increase at the same rate as previously. 75,000 tons is likely to be, therefore, a maximum figure.

It has been previously shown that N.S.W. is a large net importer of pineapples. Acreage shows no tendency to increase but yield per acre has been increasing somewhat. However, there is no doubt that N.S.W. will still be a large net importer of the fruit in the future.

The production of apples and pears has been increasing, though with year to year fluctuations, over the last decade. If this trend continues production of apples could be about 2.8 million bushels and of pears about 750,000 bushels in 1970. However, as present N.S.W. consumption and the way in which per caput consumption may change in the future with rising incomes are unknown, it is impossible to estimate whether production might outstrip consumption by 1970. If it does, it is unlikely that the surplus will be a large one, however.

The acreage and production of tobacco has been increasing fairly rapidly but N.S.W. is a large net importer of the product at present and is likely to remain so for many years to come.

The estimates made in this section, it must be emphasized again, are very conjectural and likely to be the subject of large errors. The following general conclusions have, however, been reached about the likely export trade from N.S.W. in 1970. The only commodities of the Area which are expected with any degree of confidence to have a significant export surplus in N.S.W. are beef and veal, mutton, lamb, wool, wheat, and bananas. The estimated quantities are as follows:—

					<i>Tons</i>
Beef and Veal	..	..	..	..	20,000 (maximum)
Mutton	..	..	..	..	16,000
Lamb	..	..	..	..	23,000 (maximum)
Wool	..	..	..	..	320,000
Wheat	..	..	..	..	Large
Bananas	..	..	..	..	75,000 (maximum)

Future Exportable Surpluses from the Area

Having tentatively established what the relative trade position of certain farm commodities in N.S.W. is likely to be in 1970, it now remains to estimate the exportable surpluses available from the Area at that time. This need only be done for the six commodities beef and veal, mutton, lamb, wool, wheat and bananas, as we have shown that any available surpluses of all other commodities from the Area are likely to be consumed within N.S.W. Cotton is a commodity that may have production possibilities within the Area in the future, but any production would be required within N.S.W. for many years to come.

Adopting the approach of the previous section; we firstly estimate consumption and then estimate future production in the light of past trends, local knowledge of Departmental Officers and economic prospects. It must be borne in mind, of course, that as estimates for future exports of the six commodities, except wheat, were based on extrapolation of past trends, this assumes the continuation of past trends also in the Area. Thus if it is concluded that past trends will *not* be continued in the Area, this will alter the estimates of production and export for the State as a whole.

The estimates for human consumption of the six commodities appear in Table 7. They are based on the per capita figures previously calculated for N.S.W. There is expected to be an increase in the consumption of mutton, lamb, and a slight increase in bananas. Decreases are expected in beef, wool and wheat.

TABLE 7

Current and Future Human Consumption of Exportable Farm Commodities in the Area

Commodity	Current Consumption		Consumption in 1970	
	Per Head	Total	Per Head	Total
Beef and Veal ..	114.0 lb.	12,800 tons	110.0 lb.	12,400 tons
Mutton	56.0 lb.	6,240 tons	60.0 lb.	6,800 tons
Lamb	32.8 lb.	3,650 tons	37.0 lb.	4,200 tons
Wool	11.4 lb.	1,270 tons	10.0 lb.	1,100 tons
Wheat	256.0 lb.	28,500 tons	240.0 lb.	27,100 tons
Bananas	25.0 lb.	2,800 tons	25.0 lb.	2,820 tons

On the production side, the number of beef cows have been increasing since 1955. Dairy cows, which are an important source of beef, have however been declining. The numbers of beef calves have been increasing since 1958 but dairy calves and other beef cattle seem to have no tendency to increase. The build up of breeding herds may not have yet had time to be reflected in increasing numbers of the more mature cattle. Making similar assumptions to those used in calculating future production for N.S.W., production of beef and veal in the Area might be in the region of 72,000 tons, which would give a surplus of about 60,000 tons.

The number of ewes has been increasing steadily over the last ten years in the Northern Tableland and to a lesser extent in the North Western Slope and North Central Plain. There has been only a slight tendency for the number of wethers to increase, however. If the trend continues, production of mutton in 1970 would be about 15,000 tons. This would give a surplus of about 8,000 tons.

In line with the increasing ewe population, the number of lambs has also increased. If the trend continues, the production of lamb in 1970 would be about 10,000 tons, giving a surplus of about 6,000 tons.

Wool clip per head of sheep and lambs shorn has not exhibited any upward trend in the Area. With the expected increase in the sheep population, however, wool production in 1970 would be about 33,000 tons. This would leave a surplus of about 32,000 tons.

As far as wheat is concerned, acreage has been increasing in the North Western Slope and North Central Plain, while remaining steady on the Northern Tableland. Yield per acre has fluctuated between years but shows no significant tendency to increase. Increased production from the Area is likely in the future because it possesses a comparative advantage

compared to the rest of the State and also because it produces premium wheats. If the present trend continues, production in 1970 would be about 180,000 tons. However, because of the uncertainty of the export market, production may well fall short of this figure. With the projected acreage under wheat, seed requirements would be about 7,000 tons. Use of wheat for feed is very uncertain but a figure based on the current one (which we think may be underestimated in the order of 100 per cent), would be about 10,000 tons. Thus production less total consumption would be about 135,000 tons. This is to be viewed as a maximum figure.

We have already discussed the estimated trend in banana production in the State, and as production is virtually confined to the Area, there is no need to repeat those remarks.

In the light of the findings of the previous section concerning the magnitude of the export trade likely in 1970 in N.S.W., we can now conclude how much of the estimated surplus production from the Area would be available for export overseas or interstate. These figures appear below:—

					<i>Tons</i>
Beef and Veal	..	..	..	..	20,000 (maximum)
Mutton	..	..	..	..	8,000
Lamb	..	..	..	..	6,000
Wool	..	..	..	..	32,000
Wheat	..	..	..	..	135,000 (maximum)
Bananas	..	..	..	..	75,000 (maximum)

6. CONCLUSION

We have made estimates of the quantities of the major farm commodities of the Area that might be available for export overseas or interstate now and in the "foreseeable" future. For convenience they are brought together below.

Estimated Exportable Surpluses

Commodity					1958-61	1970
					<i>Tons</i>	<i>Tons</i>
Beef and Veal	..	..	..	..	..	20,000 (Maximum)
Mutton	..	..	..	..	4,400	8,000
Lamb	..	..	..	..	3,350	6,000
Wool	..	..	..	..	27,730	32,000
Wheat	..	..	..	..	98,000 (Maximum)	135,000 (Maximum)
Oats	..	..	..	..	9,800 (Maximum)	..
Bananas	..	..	..	..	57,000	75,000 (Maximum)

In having made these estimates the main aim of this study has been accomplished. Whether the commodities are likely to move to a port on the Clarence River or to other ports such as Sydney, Newcastle or Brisbane, whether they will be moved by rail or road, whether freight rates should be altered to influence the direction of flow of these commodities, etc.,

are all considerations which were outside the scope of this study. However, there are a few points which might be made even here. A basic assumption used in this study, a simplifying one but which it is considered is a reasonably valid one, is that available surpluses from the Area go towards satisfying New South Wales demand before being available for export overseas or interstate. No distinction was made between overseas and interstate trade. To estimate what quantities of each commodity are, and are likely to be in the future, moving into interstate trade would require a detailed analysis of current and future demand and supply in the other Australian States, freight rates by sea, rail, and air between States, etc. It might be found that a significant and in some cases an increasing proportion of exportable surpluses would be finding their way into interstate trade, as population and real incomes grow in other States. This is already so in the case of bananas. There are no exports overseas of bananas, being wholly consumed within Australia. Similarly, with maize. It is moreover significant that, though bananas were formerly moved by sea, the Banana Growers' Federation now prefers to send its produce by rail, even to Western Australia.

The second point is that, since it is unlikely that a railway connecting the hinterland with a port on the Clarence River will ever be built, much of the produce would have to move by road transport to the port. In the present state of knowledge of moving bulky commodities economically by road this would appear to be unthinkable in the case of wheat and oats at least.

The third point concerns wool. For wool to be available for export through a port on the Clarence, a wool auction centre would have to be established at the port or somewhere within the Area. This would be an addition to the wool centres in New South Wales which are at present situated at Sydney, Newcastle, Albury and Goulburn. Current production of wool in the Area is 29,000 tons and is expected to rise to about 33,000 tons by 1970. This, therefore, would be approximately the amount of wool sales that would be diverted from Sydney and Newcastle, which are the main centres for selling wool from the Area. Current volume of sales in Sydney and Newcastle are about 140,000 and 48,000 tons respectively. Those for Albury and Goulburn are about 16,000 and 14,000 tons respectively. In this connection the recent Wool Marketing Committee of Inquiry was of the opinion that "further decentralization of selling Centres is generally speaking not in the best interests of the industry".¹⁹

The significance of these three points that have been raised is obvious. Without wool, wheat, oats and bananas, the list of commodities available for export through a port on the Clarence River is reduced to:—

- (a) currently, mutton and lamb 7,750 tons
- (b) in the future, mutton and lamb 14,000 tons and beef and veal a maximum of 20,000 tons.

It is to be hoped that the results of this study will assist in building a factual basis on which final policy decisions regarding the port can be validly made.

¹⁹ *Report of the Wool Marketing Committee of Inquiry*, Canberra: Commonwealth Government Printer, 1962, pp. 99-100.

APPENDIX I

Estimation of Milk Yield per Cow in Area

(a) Total commercial butter production from factories in the North Coast divided by total number of cows, in milk and dry, in registered dairies in the North Coast was:—

1958-59	..	..	..	..	..	138 lb.
1959-60	..	..	..	..	..	150 lb.
1960-61	..	..	..	..	..	113 lb.

As this excludes milk used for any other purpose than butter it underestimates the yield per cow.

(b) A recent economic survey²⁰ in the North Coast showed an average milk yield for the sample of 172 lb. and 187 lb., commercial butter per cow for 1958-59 and 1959-60 respectively. These are greater than the above estimates for the same years in the ratio of 1.24. If it is assumed that the sample figure for 1960-61 would also exceed the estimate in (a) in the ratio 1.24 then the sample figure for 1960-61 would be 140 lb. c.b. For the three years 1958-59 to 1960-61 the average would be 166 lb. c.b. This is approximately equivalent to 330 gal. milk per cow, and is an estimate of the average milk yield in the North Coast. As 97 per cent of the dairy cows in the Area are situated in the North Coast, this figure has been taken as the average milk yield for the Area as a whole.

APPENDIX II

Estimation of Beef and Veal Production in Area

(a) An analysis of the relationship between the number of bullocks on farms in New South Wales at March 31 from 1955 to 1959 inclusive, and the numbers of bullocks slaughtered in New South Wales for the years ended June 30, 1956-57 to 1960-61 inclusive, gave the following regression equation:—

$$Y = 2.835 X - 1196 \quad (r = 0.79, \text{ significant at } 10\%)$$

where X = thousands of bullocks on farms

and Y = thousands of bullocks slaughtered

This was evidence of a reasonably close relationship in New South Wales and it was assumed that a similar relationship would hold for the Area. Extrapolation of the straight line gave nonsensical results for the Area, which was not surprising as the relevant values were considerably outside the range considered. Thus simple proportions were used and on the basis of the number of bullocks on farms in the Area, the number slaughtered was calculated. Similarly the ratio of cows slaughtered to total beef and dairy cows on farms, and the ratio of calves

²⁰ J. G. Bird, "The Dairy Industry on the Far North Coast of New South Wales", this *Review*, Vol. 30, No. 1 (March, 1962).

slaughtered to total beef and dairy calves on farms in New South Wales was calculated. These ratios were used to estimate the numbers of cows and calves slaughtered emanating from the Area. The estimates are:—

<i>Numbers slaughtered</i>				1958-59	1959-60	1960-61
Bullocks	..	..	..	175,000	158,500	122,700
Cows	..	..	..	222,000	151,000	119,000
Calves	..	..	..	232,000	206,000	186,000

Using dressed carcase weights of:—

Bullocks	..	..	..	..	515 lb.
Cows	..	..	..	..	380 lb.
Calves	..	..	..	..	80 lb.

the production of beef and veal was estimated.

1958-59	..	..	..	86,100 tons
1959-60	..	..	..	69,400 tons
1960-61	..	..	..	55,100 tons
Average	..	..	..	70,200 tons

Consumption in Area was estimated at 12,800 tons.

∴ Surplus Production = 57,400 tons

(b) Numbers of cattle slaughtered at abattoirs in the Area for the Sydney and export markets were:—

				<i>Bullocks and Cows</i>	<i>Calves</i>
1958-59	..	..	..	321,873	310,298
1959-60	..	..	..	190,405	258,110
1960-61	..	..	..	192,233	263,224
Average	.	..	..	235,000 approx.	277,000 approx.

Numbers of *live bullocks and cows* sent from Area by rail for slaughter in Sydney was approximately 40,000 in 1958-59 to 1960-61. Total numbers slaughtered in the Area and Sydney produced 65,000 tons beef and veal. However, Queensland fat cattle entering New South Wales for slaughter in 1958-59 to 1960-61 were equivalent to 23,200 tons. Approximately 87 per cent of these cattle were slaughtered within the Area. Thus 87 per cent x 23,200, i.e., 20,200 tons must be deducted from 65,000 tons, to give 45,000 tons approximately. This is an under-estimate of the surplus production from the Area because of the omission of—

(a) calves sent by rail to Sydney

(b) fat cattle sent by rail and road to destinations other than Sydney. The estimate can be compared with that in (a) of 57,400 tons. A figure of 50,000 tons for the surplus was finally taken, given a production figure of 63,000 tons.

APPENDIX III

Estimation of Mutton and Lamb Production in Area

(a) An analysis of the relationship between the number of ewes plus wethers on farms at March 31 in the years 1950 to 1961 and the number of sheep (excluding lambs) slaughtered in the years 1949-50 to 1960-61 in New South Wales gave the following regression equation:—

$$Y = 0.163 X - 3.53 \quad (r = 0.75, \text{ significant at } 1\%)$$

where X = millions of ewes plus wethers on farms

Y = millions of sheep slaughtered

Similarly, an analysis of the relationship between the number of lambs marked on farms in the years 1949-50 to 1960-61 and the number of lambs slaughtered in the years 1949-50 to 1960-61 in New South Wales gave the following equation:—

$$Y = 0.305 X - 0.982 \quad (r = 0.80, \text{ significant at } 1\%)$$

where X = millions of lambs marked

Y = millions of lambs slaughtered

As with the regression for beef cattle, extrapolation gave nonsensical results for the Area, so simple proportions were used. On the basis of the ewes plus wethers on farms at March 31, 1959 to 1961, and the lambs marked in 1958-59 to 1960-61 in the Area, the estimated numbers slaughtered emanating from the Area, were as follows:—

			<i>Ewes and Wethers</i>	<i>Lambs</i>
1958-59	..	..	560,000	437,000
1959-60	..	..	660,000	480,000
1960-61	..	..	780,000	520,000

Using dressed carcase weights of

Ewes and Wethers	..	..	42 lb.
Lambs	..	..	35 lb.

the production of meat was estimated:—

				<i>Mutton</i> <i>Tons</i>	<i>Lamb</i> <i>Tons</i>
1958-59	..	..	..	10,600	7,000
1959-60	..	..	..	12,500	7,700
1960-61	..	..	..	14,800	8,300
Average	..	..	..	12,600	7,700
Total production mutton and lamb	..		=		20,300 tons
Estimated consumption	..	..	=		9,900 tons
∴ Surplus production	..	..	=		10,400 tons

(b) Numbers slaughtered in abattoirs in Area for Sydney and export markets:—

			<i>Ewes plus Wethers</i>	<i>Lambs</i>
1958-59	..	..	2,859	—
1959-60	..	..	6,843	—
1960-61	..	..	88,970	3,025
Average	..	..	32,900	1,000

This is equivalent to 640 tons mutton and lamb.

Net movement of sheep (including lambs) by rail out of Area to rest of New South Wales was 458,000 in 1960-61.

Net movement of fat sheep crossing from New South Wales to Queensland for slaughter averages 90,000 approximately.

Thus total number of live sheep moving out of Area = 548,000.

This is equivalent to	..	..	..	9,640 tons
Add slaughterings in Area	..	..	..	640 tons
				<u>10,280 tons</u>

This is an over-estimate because a proportion of the sheep moving out of the Area by rail would be store sheep. It can be compared with the estimate in (a) of the surplus production of 10,400 tons. Production of mutton and lamb was finally taken as 12,000 and 7,000 tons respectively, giving a surplus production of mutton and lamb of 9,000 tons approximately.

APPENDIX IV

Estimation of Production of Pigmeat in the Area

(a) Analysis of the relationship between the number of baconers plus porkers on farms at March 31 in years 1951 to 1960 and the number of pigs slaughtered in years 1950-51 to 1959-60 gave the following equation:—

$$Y = 3.91 X - 107 \text{ (r = 0.83, significant at 1\%)}$$

where X = thousands of baconers and porkers on farms

Y = thousands of pigs slaughtered.

For similar reasons to those discussed in previous Appendices, simple ratios were used to estimate the numbers of pigs slaughtered emanating from the Area. They are as follows:—

1958-59	..	..	..	..	250,000
1959-60	..	..	..	..	248,000
1960-61	..	..	..	..	216,000

Using an average dressed carcase weight of 100 lb., production of pigmeat is:—

					<i>Tons</i>
1958-59	..	..	..	..	11,200
1959-60	..	..	..	..	11,100
1960-61	..	..	..	..	9,700
Average	..	..	..	..	10,700
Estimated consumption	..	..	..	..	= 2,400 tons
∴ Surplus production	..	..	..	..	= 8,300 tons

(b) Numbers slaughtered in abattoirs in Area for Sydney and export markets:—

1958-59	..	..	..	..	285,098
1959-60	..	..	..	..	261,030
1960-61	..	..	..	..	293,927
Average	..	..	..	..	280,000

Net movement of live pigs out of Area by rail to rest of New South Wales was 19,300 in 1960-61.

Net movement of fat pigs from Queensland for slaughter in New South Wales (mainly in Area) averages 40,000 approximately.

Thus total number slaughtered net of those from Queensland = 260,000 approximately. This is equivalent to 11,700 tons pigmeat. It will be an over-estimate because a proportion of the pigs sent by rail would be stores. The estimate can be compared with that in (a) of 8,300 tons. A figure of 10,000 tons for the surplus was finally taken, giving a production figure of 12,400 tons.

APPENDIX V

Estimation of Egg Production in the Area

Number of hens and pullets on farms with 150 or more laying stock within the area averaged 98,000 for 1958-59 to 1960-61.

This is 2.5 per cent of the total number of hens and pullets on farms with 150 or more laying stock in N.S.W. for the same three years.

Total production in N.S.W., including production from domestic poultry-keepers and from areas uncontrolled by the N.S.W. Egg Marketing Board, is estimated by the Commonwealth Statistician to be:—

					<i>Million doz.</i>
1958-59	..	..	..	..	69.8
1959-60	..	..	..	..	80.0
1960-61	..	..	..	..	93.0
Average	..	..	..	..	80.9

Assuming that the distribution of hens and pullets on farms with *less* than 150 laying stock is similar to that for hens and pullets on farms with 150 or more laying stock, then estimated total production in the area = 2.5 per cent x 80.9 million dozen.

= 2.0 million dozen.

APPENDIX VI

Estimation of Honey Production in Area

A recent survey of apiarists with more than 100 productive hives in N.S.W.²¹ gave the geographical distribution of these apiarists in various size groups. The numbers of apiarists in the area in the various size groups is shown below together with the total number of *all* apiarists (who must be registered) in N.S.W.

No. Hives	No. Apiarists in Area (a)	No. Apiarists in N.S.W. (b)	(a)/(b)
			per cent.
0-100	?	3,423	?
101-200	35	269	13.0
201-300	25	149	16.6
301-400	11	80	13.8
401-500	9	36	25.0
Over 501	18	44	41.0

A study of the size distribution shows that the Area has a preponderance of the larger apiarists compared to N.S.W. as a whole and suggests (but only suggests) that it will have a smaller proportion of the apiarists with less than 100 hives. Assuming this, and taking a figure of 10 per cent for the 0-100 group, the production in the various size groups in the Area can be estimated from a knowledge of the production in the various size groups in N.S.W. for the years 1958-59 to 1960-61. This is done below:—

No. Hives	Proportion (a)/(b)	State Production	Estimated Area Production
	per cent	lb.	lb.
0-100	10.0	2,208,700	221,000
101-200	13.0	2,523,800	328,000
201-300	16.6	3,097,500	513,000
301-400	13.8	2,232,800	308,000
401-500	25.0	1,569,800	392,000
Over 501	41.0	3,217,400	1,320,000
		14,850,000	3,082,000

Estimated production in Area is therefore 1,380 tons.

²¹ R. E. Cooke-Yarborough, Division of Marketing and Agricultural Economics, N.S.W. Department of Agriculture—unpublished material.

APPENDIX VII**Seed Rates Used in Estimation of Seed Requirements in N.S.W. and Area**

					<i>Per acre</i>
Wheat	..	..	..	..	50 lb. in N.S.W.
Wheat	..	..	..	..	40 lb. in Area
Barley	..	..	..	..	60lb.
Oats	..	..	..	..	50 lb. in N.S.W.
Oats	..	..	..	..	40 lb. in Area
Maize	..	..	..	..	12 lb
Sorghum	..	..	..	..	8 lb.
Potatoes	..	..	..	..	10 cwt.