INDICATIVE PLANNING FOR THE POULTRY INDUSTRY IN NEW ZEALAND

by

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THE AGRICULTURAL ECONOMICS RESEARCH UNIT

The Unit was established in 1962 at Lincoln College with an annual grant from the Department of Scientific and Industrial Research. This general grant has been supplemented by grants from the Wool Research Organisation, the Nuffield Foundation and the New Zealand Forest Service for specific research projects.

The Unit has on hand a long-term programme of research in the fields of agricultural marketing and agricultural production, resource economics, and the relationship between agriculture and the general economy. The results of these research studies will be published as Unit reports from time to time as projects are completed. In addition, it is intended to produce other bulletins which may range from discussion papers outlining proposed studies to reprints of papers published or delivered elsewhere. All publications will be available to the public on request.

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PREFACE

From time to time the Agricultural Economics Research Unit proposes to publish discussion papers which, as their title suggests, aim at stimulating interest and discussion on specific topics in agricultural economics.

This, the first of these discussion papers, was given as an address to the Lincoln College Poultry Farmers' Refresher Course.

In the paper Dr. Ward presents some tentative projections for the poultry industry for 1973, and indicates what economic research is required to improve this type of forecasting which is essential to planning the orderly development of the industry.

Lincoln College  B. P. Philpott
28 May, 1964
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Introduction

Until a couple of years ago 'economic planning' was barely discussed in this country, although it has been adopted with striking success in Japan and several European countries including Britain under a Conservative government. Recently however the idea has caught on here and has been given impetus and status by its use in the Agricultural Development Conference. The concept of planning has changed in Western countries during the past decade; the old idea of detailed planning, involving physical controls (import licences, building licences and the like) has been replaced by a much broader and more flexible concept; 'Indicative Planning'.

The central planning agency postulates a desirable rate of economic growth (a percentage rise in the standard of living) and then analyses the implications of this rate for the various sectors of the economy. State organisations and private firms within these sectors then design their own investment and production
plans to take account of the overall design. Successful planning on these lines requires new economic techniques - sector accounting, process analysis, linear programming - which are being developed rapidly overseas aided materially by the electronic computer. This type of planning still leaves freedom for enterprise but ensures that enterprise is carried out within broad guiding lines. Coupled with sympathetic fiscal and monetary policies it has been an important factor in the striking growth rates of the Japanese and French economies over recent years. There are now indications that, at least within certain areas, there is a growing interest in indicative planning in New Zealand, and as we have seen it is the basis of the Agricultural Development Conference.

Expansion Targets

First let us consider the expansion targets which have been announced by the Agricultural Development Conference. What is their basis?

1) The Treasury has taken the Government Statistician's projection of population (assuming an immigration rate of 10,000 annually) over the next ten years. This gives a projected population of just over 3 million in 1973.
2) It has assumed a compound growth of G.N.P. of 4 per cent per annum over the decade. Assuming no deterioration in our terms of trade and allowing for population growth, this means a rise in real income per head or standard of living of 2% per annum. This is not startling in the light of the achievements of some other countries but it is better than we have managed over the last decade.

3) On the basis of these projections the Treasury has calculated that by 1972/73 our requirements for visible imports would reach £369 m. compared with £254 m. for 1962/63, valued at constant prices. This is a rise of £115 m. or 45% over the decade.

4) Our deficit on 'invisibles' in the balance of payments is also likely to rise rapidly over the decade, reaching £138 m. by 1972/73.

5) To meet these requirements for visible and invisible imports the value of exports will need to rise from £300 m. in 1962/63 to £467 m. by 1972/73, a compound rise of 4\frac{1}{2} per cent per annum.

The next stage in the plan is to estimate the level of production that will be necessary to meet this export target and to analyse ways and means of achieving this level of production.
A 'Development Plan' for the Poultry Industry

I understand that although the Poultry Board was represented on some of the Conference Committees, no programme has been drawn up for the poultry industry on the grounds that its production is overwhelmingly for the domestic market and that it is unlikely to enter overseas markets which are dominated by low cost producers in America and Europe. But surely the fact that you do not intend to export does not necessarily mean that this type of planning is not relevant to your industry; I thought therefore that the best contribution I could make to the Conference would be to explain what indicative planning is and then apply it broadly to the poultry industry. Since this is one man's effort over 45 minutes it will not cover the detail of 14 committees working over 12 months. I hope, however, at least to stimulate discussion in the line of approach.

The Consumption of Eggs in 1963

Calculations are on a per head per year basis and include eggs consumed in all forms. No authoritative figure is available but it is possible to make a broad estimate from several sources.
a) N.Z. Official Year Book for 1962 (p.734) gives a figure of 25 dozen for 1960. The basis of this figure is the number of eggs handled by licensed distributors to which is added estimates of production from other sources based on numbers of poultry recorded at the 5 yearly censuses. The Year Book suggests that consumption has been rising at around one dozen a year (4 per cent) in recent years but it seems that this trend may have been based on the rise in commercial production. A private communication from the Government Statistician suggests that the allowance made for 'backyard' production and 'over the fence' sales may have been too high in the light of the detailed 1961 Poultry Census figures which are now available.

b) A basically similar approach published in the N.Z. Poultry World (December 1963, p.617) gave an estimated consumption of 21 dozen.

c) An alternative approach in the same publication used the average consumption recorded in a small scale food survey to arrive at a figure of 27 dozen per head for the population as a whole.

I propose that we strike a broad average of these calculations and, allowing for some upward trend, settle for an average consumption of 25 dozen eggs
per head in 1963.

**Total Consumption in New Zealand**

On the basis of a total population of 2,512,000 in 1963 (N.Z.O.Y.B. 1962, p.47) this would give a total consumption of 63 million dozen eggs in that year.

**Sources of Eggs**

The N.Z. Poultry Board Report for 1963 records 25.8 million dozen shell eggs handled through licensed distributors. It also records a surplus of 5.4 million dozen eggs of which apparently two thirds or 3.6 million dozen were processed for sale in New Zealand. This gives a total consumption through Egg Marketing Authority channels of 29.4 million dozen, equivalent to 47 per cent of the estimated total consumption. In summary, the New Zealander consumes on average about 25 dozen eggs a year, of which he obtains nearly 12 dozen from licensed distributors, and rather more than 13 dozen from 'sideliners' or from the fowl houses or cages in his own or his neighbours' backgardens.

According to the 1961 Census there are over 100,000 households keeping less than one dozen fowls and almost 150,000 keeping less than two dozen. As there were only 644,000 households in New Zealand
in 1961 the total number of householders keeping poultry amounts to 1 in 4 over the country as a whole. We are clearly a nation of backyard poultry keepers.

**Projections for 1973**

Now we turn to projections for 1973.

The total demand or consumption for any commodity is largely determined by four major factors.

1) Total population
2) Income level
3) Price of the commodity
4) Taste

Taste is a subjective element which, for some goods (such as long pointed shoes) may be quite capricious. For most staple foodstuffs however it is not subject to marked changes except over long periods of time. Each of the other factors is capable of measurement and we find that for any demand study estimates or projections of total population and of income and price are vital components of the analysis. The concepts of income elasticity of demand and price elasticity of demand are important tools in the economist's research kit for a demand study of this type.
Estimated Consumption for 1973

With population growing at the present rate and assuming an immigration of 10,000 a year we shall just pass the 3 million mark in 1973. The Agricultural Development Conference also assumes that our real standard of living will rise by 2% per annum. What effect will these changes have upon the demand for eggs? We must make the analysis in two steps:

a) **Population**

Assuming no change in the present consumption rate, total consumption in 1973 will be

\[3.082 \text{ million} \times 25 \text{ dozen} = 77 \text{ million dozen.}\]

b) **Income Change**

To calculate this correctly we would need to know the income elasticity of demand for eggs i.e. the rate at which expenditure on eggs per head increased for a 1 per cent rise in real incomes. Work has been done on this in the U.K. and U.S.A. but we have no knowledge at all about it in New Zealand. A study made in the U.K. pre-war showed an income elasticity of demand of 1.3 (Stone). With the big rise in real income in Britain since then, income elasticity of demand for eggs is likely to have fallen. The rapid rise in consumption recorded in Britain over recent
years (4 per cent per annum) may be largely attributable to the effects of price changes and marked changes in supply and marketing. If we assumed an income elasticity of demand for eggs in New Zealand of 0.5 then a projected rise in real incomes of 2 per cent per annum would result in a rise in egg consumption of 1 per cent per annum. This would mean that on income grounds alone, for every dozen eggs consumed today 1.105 dozen would be consumed in 1973. Applying this factor to our previous estimate of 77 million dozen we have 77 (1.105) = 85 million dozen for the country as a whole, or almost 28 dozen per head.

A consumption of 330 eggs is very high by world standards but still short of the 30 dozen set by your "egg-a-day" slogan. A few years ago consumption in the U.S.A. was above this figure (around 360) but it has fallen back to about 310 at the present time. Consumption in Canada reached 300 a few years ago but has fallen slightly since then, while in Australia the increase in egg consumption is only keeping pace with the increase in population and is not rising per head of population. Reasons for this are not known but are probably mainly due to changes in diet, especially a move towards a 'continental breakfast' instead of an English breakfast. However, estimates of total consumption at three possible levels of
consumption per head are given in Table 1.

<table>
<thead>
<tr>
<th>Consumption per head</th>
<th>Total Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>doz/year</td>
<td>million dozen</td>
</tr>
<tr>
<td>25</td>
<td>77</td>
</tr>
<tr>
<td>27.5</td>
<td>85</td>
</tr>
<tr>
<td>30</td>
<td>92</td>
</tr>
</tbody>
</table>

Price Elasticity of Demand

So much for the probable effects of population and income on egg consumption - what now of price? We do not know the price elasticity of demand for eggs in New Zealand: that is the response of consumption to changes in price. Recent figures for the U.K. (Senior) suggests a price elasticity of -0.3 there. This means in round figures that a 10% fall in price would bring about only a 3% increase in consumption. It appears that in Britain the quality and presentation of eggs are more important factors than price in selling them.

(In passing we might note that if demand relationships in New Zealand are similar to those in Britain a 3% increase in supply above the level required to match increases in population and income levels would depress egg prices by 10%. The fall
in egg prices in New Zealand over the last year certainly indicates that rising production has had a significant effect upon price.)

In an interesting paper that Mr. Cowdrey gave to the Poultry Conference at Massey last year he discussed various methods of advertising for sales promotion but he had very little to say about the effect of price. I would like to suggest to you however that the price elasticity of demand for eggs, through licensed distributors, is probably significantly higher in this country than in the United Kingdom or the U.S.A. There are two reasons for this hypothesis:

1) Elasticity is always greater at higher prices than at lower prices, and the retail price of eggs in New Zealand is high by world standards especially at this time of the year i.e. late autumn/early winter. It is conceivable that a greater supply of eggs at this time of the year, though selling at slightly lower prices, could bring in greater receipts, and possibly greater profits, to the industry. It would undoubtedly be of major benefit to the consumer.

2) It seems probable that even if a fall in egg prices did not encourage New Zealanders to eat many more eggs it would probably encourage them to buy more regularly through the supermarkets and the grocers.
It would surely discourage them from keeping a few fowls at the bottom of the garden or from buying loose eggs from somebody else who keeps a few at the bottom of his garden. A change in this direction is clearly discernible in the marked fall in small flocks recorded in the Poultry Appendix to the 1961 Census (Table 2). This is the first time such a fall has been recorded. It is significant that it has occurred over a period when the retail price of eggs has fallen in relative terms.

The table shows a large fall in the number of backyard flocks. It is interesting to note that the greatest proportionate fall has been in the number of flocks with between 50 and 200 birds. Some of the people formerly running such flocks may well have found that keeping more birds than are necessary for their own households is not worthwhile at lower margins, others will have given up poultry altogether, while a few may have moved into the ranks of larger flocks.

I believe that this trend is likely to be accentuated over the next decade and that it will particularly affect the urban householder rather than the rural one who usually has a bit more space, easier access to cheap grain and less stringent local by-laws. The large number of backyard flocks in urban areas is shown in Table 3 extracted from the 1961 Census.
### TABLE 2
THE DISTRIBUTION OF FOWLS BY SIZE OF FLOCK

<table>
<thead>
<tr>
<th>Number of fowls in flock</th>
<th>Number of flocks 1956</th>
<th>Number of flocks 1961</th>
<th>Absolute change</th>
<th>Percentage change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 12</td>
<td>115783</td>
<td>102224</td>
<td>-13,559</td>
<td>-12%</td>
</tr>
<tr>
<td>13 - 24</td>
<td>58019</td>
<td>45894</td>
<td>-12,125</td>
<td>-21%</td>
</tr>
<tr>
<td>25 - 49</td>
<td>10270</td>
<td>7108</td>
<td>-3,162</td>
<td>-31%</td>
</tr>
<tr>
<td>50 - 199</td>
<td>3843</td>
<td>2602</td>
<td>-1,241</td>
<td>-32%</td>
</tr>
<tr>
<td>200 - 999</td>
<td>1067</td>
<td>883</td>
<td>-184</td>
<td>-17%</td>
</tr>
<tr>
<td>500 - 999</td>
<td>569</td>
<td>623</td>
<td>+54</td>
<td>+9%</td>
</tr>
<tr>
<td>1000 &amp; over</td>
<td>521</td>
<td>773</td>
<td>+252</td>
<td>+48%</td>
</tr>
<tr>
<td>Total</td>
<td>190072</td>
<td>160107</td>
<td>-29,965</td>
<td>-16%</td>
</tr>
</tbody>
</table>


### TABLE 3
BACKYARD FLOCKS IN URBAN AREAS 1961

<table>
<thead>
<tr>
<th>Size of flock</th>
<th>Number of flocks 1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 12</td>
<td>48,537</td>
</tr>
<tr>
<td>13 - 24</td>
<td>11,044</td>
</tr>
<tr>
<td>25 - 49</td>
<td>1,028</td>
</tr>
<tr>
<td>50 - 74</td>
<td>208</td>
</tr>
<tr>
<td>75 - 99</td>
<td>82</td>
</tr>
<tr>
<td>100 - 200</td>
<td>162</td>
</tr>
<tr>
<td>Total (below 200 birds)</td>
<td>61,061</td>
</tr>
</tbody>
</table>

The total number of flocks with less than 200 birds represents 99.4 per cent of the total flocks in urban areas.
Factors likely to accentuate the trend in the next decade are:

1) A more assured supply of good quality eggs available all the year round in the supermarkets and grocers at reasonable prices.

2) Better packing and grading of eggs sold retail (which your Board has already encouraged).

3) Rising living standards - with higher incomes people cannot be bothered to keep fowls especially if it interferes with the weekend at the bach.

4) Growing concentration of the population in the large towns with fewer facilities for and greater nuisance value of poultry.

5) The move toward smaller sections. A fowl house at the bottom of a 40 perch section is one thing - a fowl house together with a clothes drier, a double garage (and a boat port) on 24 perches is another.

6) Television. The spread of television and the expansion of programmes is likely to affect the small part time poultry keeper, as it has affected the home gardener in other countries.

(Of course there will always be some people who keep chooks for interest's sake or as pets for the children.)
I am one myself. After a day discussing economics with students I find it very relaxing to help my small boys feed a pen of Black Australorps. But if I could get good quality, decent sized eggs at 3/6 - 4/- per dozen all the year round I'd keep budgerigars or tropical fish instead.)

The decline in the number of 'backyard' and smaller 'sideline' flocks will be reflected in an increase in the proportion of eggs sold through the egg floors. It is not possible to predict the magnitude of this change without some quantitative knowledge of the price elasticity of demand and of the elasticity of supply of these small producers. I propose therefore to set up a number of possible 'proportionate sales' and show the levels of throughput that would result.

TABLE 4 THROUGHPUT OF EGG FLOORS IN 1973 UNDER VARYING ASSUMPTIONS

<table>
<thead>
<tr>
<th>Floor sales as % of total consumption</th>
<th>47%</th>
<th>61%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated consumption</td>
<td>Million</td>
<td>Million</td>
<td>Million</td>
</tr>
<tr>
<td></td>
<td>dozen</td>
<td>dozen</td>
<td>dozen</td>
</tr>
<tr>
<td>Million dozen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>36</td>
<td>47</td>
<td>58</td>
</tr>
<tr>
<td>85</td>
<td>40</td>
<td>52</td>
<td>64</td>
</tr>
<tr>
<td>92</td>
<td>43</td>
<td>56</td>
<td>69</td>
</tr>
</tbody>
</table>

These figures should be compared with a throughput of 31 million dozen in 1963.
Estimated consumption of eggs and throughput of egg floors

The range of values for estimated consumption and for floor sales as a proportion of total consumption are purely assumptions taken to illustrate the 'model'. A critical part of this type of forward planning is in determining what are the most realistic assumptions. In order to do this satisfactorily it is essential to make quantitative studies of the income elasticity of demand and the price elasticity of demand for eggs in New Zealand. The price elasticity of demand for eggs through licensed distributors will in turn be strongly influenced by the elasticity of supply of small producers. I would like to suggest that determining the values of these elasticities would be a vital piece of research for the industry.

In general terms, however, it appears highly probable that there will be a continued rise in total egg consumption and that an increasing proportion of the supply will be sold through licensed distributors. On the production side we shall probably witness a further decline in the number of 'backyarders' and small 'sideliners' and an increase in the number of modern, highly efficient, large scale producers. Indicative planning would go on from a calculation of egg consumption and sources of supply to calculate numbers of birds in the national flock, their
distribution by size of flock, breeding flocks, requirements for feed, capital and labour, transport, egg floors capacity, retail outlets and so on.

Table chicken

A second aspect of the poultry industry which I have not discussed at all is the production of table chicken. By this I mean broilers, although I know the trade dislikes the word, and not culled hens. With annual consumption of poultry in New Zealand at only 4 lbs per head there is surely an enormous potential for expansion in this class of white meat. I should not be so foolhardy as to suggest we could look forward to an export trade in this product against the commercial giants of America and Britain. But if we could induce people within New Zealand to eat more poultry we should not only enrich our national diet (and find more favour with the tourists) but we should also indirectly make available supplies of red meat which we could sell overseas. This section of the industry has only just started in New Zealand but it is already progressing more rapidly than was anticipated.

One large distributor, who only began to handle this class of poultry in 1957, is processing a quarter of a million birds this year. The expansion of this section of the industry could clearly far outweigh the expansion of egg production during the next decade.