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Trends in wheat area and production in W.A. since 1946

J. Reeves, Plant Breeder, Wheat and Sheep Division

Statistical examination of data associated with wheat grown in Western Australia during the 29-year period ending in 1974 shows that areas sown and total production increased substantially. Average yields and protein per hectare both increased significantly, while wheat protein percentage increased slightly, but not significantly.

Area, production and yields
The table below gives figures for wheat production in Western Australia from 1946 to 1974, with data for protein. Because wheat growing can fluctuate widely from year to year the data is presented as five year means. This helps to smooth out seasonal fluctuations and enables long term trends to be more easily seen.

During the period areas sown increased 2.2 times and production by 2.9 times. Areas sown, production and average yields are plotted in Figure 1. Average yields were calculated from yearly data and not from the data in the Table. The calculation indicated that average yields increased significantly over the 29 year period.

The yield increase averaged 50 kilograms per hectare every five years. The drop in average yield during the 1961/65 period was due to the 1963 rust epidemic and to adverse seasonal conditions in 1964. Average yield in the next five year period was lowered by the 1969 drought.

It is interesting to speculate why yields rose during the whole period. Until wheat quotas were introduced in 1969 most of the expansion in wheat growing was on light soils of low inherent fertility, and this tended to maintain yields at a low level.

<table>
<thead>
<tr>
<th>Period</th>
<th>Area ('000 hectares)</th>
<th>Production ('000 tonnes)</th>
<th>Average Yield (tonnes/hectare)</th>
<th>Wheat Protein (percentage)</th>
<th>Protein/hectare (kilograms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946/50</td>
<td>1 144</td>
<td>996</td>
<td>0.86</td>
<td>9.4</td>
<td>80.8</td>
</tr>
<tr>
<td>1951/55</td>
<td>1 202</td>
<td>1 104</td>
<td>0.92</td>
<td>9.3</td>
<td>85.6</td>
</tr>
<tr>
<td>1956/60</td>
<td>1 356</td>
<td>1 336</td>
<td>0.97</td>
<td>9.6</td>
<td>93.1</td>
</tr>
<tr>
<td>1961/65</td>
<td>2 033</td>
<td>1 937</td>
<td>0.94</td>
<td>9.1</td>
<td>85.5</td>
</tr>
<tr>
<td>1966/70</td>
<td>2 664</td>
<td>2 711</td>
<td>1.02</td>
<td>9.9</td>
<td>101.0</td>
</tr>
<tr>
<td>1971/74*</td>
<td>2 567</td>
<td>2 914</td>
<td>1.13</td>
<td>9.6</td>
<td>108.5</td>
</tr>
</tbody>
</table>

* Average of four years, other periods are five year averages.
The effects of pasture legumes and the increased use of bagged fertilisers, including nitrogen, would have been important in increasing yields. Also rapid changes in varieties took place, the newer ones being more suitable for growing on leguminous pastures.

At the beginning of the period the midseason-maturing wheats Bencubbin and Gluclub were the two most important varieties. Increased sowings of pasture legumes meant elimination of fallowing and hence later planting with cereals; this led to a demand for quicker maturing varieties. As a result the early maturing Bungulla became the leading variety in 1949. It was replaced in 1956 by the stronger strawed and better quality Gabo, which in turn was replaced by the higher yielding Gamenya in 1965. Gamenya is still the leading variety.

Wheat protein
Grain protein percentage and protein per hectare are shown in Figure 2. Protein percentage increased slightly but not significantly. However, protein per hectare increased very significantly. The calculated increase was 5.3 kg per hectare every five years. Most of the increase in protein per hectare was due to increased average yields.

Wheat protein and average yields in yearly intervals are shown in Figure 3. In a dry year such as 1969 average yield is low and protein content is high. Conversely in a more favourable year, such as 1973, yield is high and protein low. There are exceptions to this and 1963 is an example. Because it was a wet year, protein was low, but yield was also low due to a rust epidemic.