Trends in Cropland Acreage and Fertilizer Use in Kentucky since 1980

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TRENDS IN CROPLAND ACREAGE AND FERTILIZER USE IN KENTUCKY
SINCE 1980

K.L. Wells

Cropland acreage and patterns of fertilizer use varied considerably during the period 1980-1991. Variation in cropland acreage is largely related to commodity prices, available markets, land ownership patterns, and government programs. Patterns of fertilizer use are affected by cropland acreage, the nature of the fertilizer supply industry in Kentucky, weather, and improved efficiency in use of time and labor by farmers. The situation in the early 1990's is different than it was in 1980, and the following discussion highlights changes that have taken place. Fertilizer use data are those reported by the University of Kentucky’s Division of Regulatory Services in the Kentucky Agricultural Statistics annual reports.

Changes In Cropland Acreage

For the purpose of this report, cropland is defined as the sum of acres planted to corn, soybeans, wheat, tobacco, and grain sorghum plus acres of all hay. Even though locally important, acreages of horticultural crops are not included for two reasons: (1) there are no reliable acreage reports, and (2) the total acreage for the state would be small. The cropland acreage discussed here also does not include pastureland, which is estimated to be somewhere between 5 and 8 million acres.

There are just over 25 million acres of land surface in Kentucky of which 11.4 million acres are considered usable for cropland and an additional 3.5 million acres which should be kept in permanent pasture. The proportion of this 11.4 million acres actually used for cropland varies, due largely to the factors mentioned above. It has varied from 48% in 1980 to a high of 53% in 1981 and 1982, and a low of 45% in 1987. Corn, wheat, soybeans, tobacco, and grain sorghum represented 35% of the cropland base in 1980 and 31% in 1990. They dropped to around 25% in 1987 and 1988, due largely to a reduced soybean acreage. These acreages are shown in Table 1 for the years 1980 to 1991. The most notable changes during this period were sizeable reductions in soybean acreage and a sizeable increase in hay production. On a percentage basis, for example, alfalfa acreage increased by 75% between 1980 and 1991.
Shift In Fertilizer Tonnage
While fertilizer tonnage largely reflects changes in cropland acreage, there has been a noticeable drop in fertilizer usage due to other factors. It is possible that this reflects increased soil fertility levels. Based on soil samples tested in UK's Soil Testing Lab, there was a major increase in percentage of samples testing high or very high in P and K from 1975 to 1985 for all major agronomic crops in Kentucky. Total annual tonnage dropped from over 1 million tons in the first half of the 1980's to under 0.9 million tons during the last half of the 1980's and early 1990's. In terms of average fertilizer use per cropland acre, it has dropped from around 380 pounds to around 300 pounds during the past few years. Figure 1 shows changes in the cropland acreage and fertilizer use for the period of 1981-1991.

Shifts In Sources Of Fertilizer N
During this period, there has also been a shift in sources of fertilizer nitrogen (N) used in Kentucky. As shown in Figure 2, urea has become the largest single source of fertilizer N, reflecting a drop in the use of ammonium nitrate and mixed fertilizers. The proportions of N from anhydrous ammonia and N-solutions has remained fairly constant, while the proportion of N from diammonium phosphate (DAP) has slowly increased.

Seasonal Use Of Fertilizer
Most of the fertilizer is used during the period March-June. During the period 1982-91, nearly 70% of the annual tonnage was used during these 4 months. About 20% is used during the fall season, July-December, with the remaining 10% during January-February. The variation which occurs in these percentages is largely due to effects of weather patterns.

Type Of Fertilizer Used
In 1980, about half the fertilizer used in Kentucky was mixtures and about half was materials. As shown in Figure 3, there was a slow change toward the use of more materials from 1980 to 1989, and a very rapid shift after 1989. This shift possibly is as much a reflection of increased custom blending as a dramatic shift to greater use of materials, since fertilizer components used in preparing custom blends are often reported as materials rather than mixtures.

Form Of Fertilizer Used
Solid fertilizers are by far the most commonly used form of fertilizer in Kentucky. As shown in Figure 4, they make up about 86% of the total fertilizer tonnage used. This has not changed during the timespan of this discussion (1980-91), and in fact, has changed very little since 1970. The shift towards greater use of bulk dry fertilizers as compared to bags continued during the 1980's, bagged use dropping from 35% of dry fertilizer in 1980 to 20% in 1991.
### Table 1.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Corn</strong></td>
<td>1,650.000</td>
<td>1,680.000</td>
<td>1,680.000</td>
<td>1,230.000</td>
<td>1,650.000</td>
<td>1,740.000</td>
<td>1,730.000</td>
<td>1,300.000</td>
<td>1,300.000</td>
<td>1,300.000</td>
<td>1,330.000</td>
<td>1,250.000</td>
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<tr>
<td><strong>Wheat</strong></td>
<td>450.000</td>
<td>810.000</td>
<td>810.000</td>
<td>740.000</td>
<td>670.000</td>
<td>430.000</td>
<td>440.000</td>
<td>500.000</td>
<td>550.000</td>
<td>630.000</td>
<td>700.000</td>
<td>640.000</td>
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<tr>
<td><strong>Tobacco, Burley</strong></td>
<td>185.000</td>
<td>218.000</td>
<td>220.000</td>
<td>216.000</td>
<td>210.000</td>
<td>170.000</td>
<td>140.000</td>
<td>140.000</td>
<td>150.000</td>
<td>172.000</td>
<td>185.000</td>
<td>213.000</td>
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<td><strong>Tobacco, Dark</strong></td>
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<td>19,100</td>
<td>17,300</td>
<td>17,500</td>
<td>16,300</td>
<td>13,300</td>
<td>8,300</td>
<td>8,000</td>
<td>10,200</td>
<td>9,150</td>
<td>10,200</td>
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<td><strong>Soybeans</strong></td>
<td>1,650.000</td>
<td>1,750.000</td>
<td>1,700.000</td>
<td>1,450.000</td>
<td>1,520.000</td>
<td>1,250.000</td>
<td>1,200.000</td>
<td>990.000</td>
<td>980.000</td>
<td>1,200.000</td>
<td>1,200.000</td>
<td>1,150.000</td>
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<td><strong>Sorghum</strong></td>
<td>NR</td>
<td>NR</td>
<td>48,000</td>
<td>48,000</td>
<td>130,000</td>
<td>150,000</td>
<td>60,000</td>
<td>30,000</td>
<td>15,000</td>
<td>13,000</td>
<td>35,000</td>
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<tr>
<td><strong>Alfalfa Hay</strong></td>
<td>200.000</td>
<td>206.000</td>
<td>204.000</td>
<td>225.000</td>
<td>230.000</td>
<td>250.000</td>
<td>255.000</td>
<td>265.000</td>
<td>320.000</td>
<td>370.000</td>
<td>320.000</td>
<td>350.000</td>
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<td><strong>Other Hay</strong></td>
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<td>1,360.000</td>
<td>1,380.000</td>
<td>1,330.000</td>
<td>1,450.000</td>
<td>1,600.000</td>
<td>1,540.000</td>
<td>1,950.000</td>
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<td>1,600.000</td>
<td>1,950.000</td>
<td>1,950.000</td>
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<tr>
<td><strong>Total Crops</strong></td>
<td>5,510.900</td>
<td>6,034.600</td>
<td>6,061.100</td>
<td>5,196.300</td>
<td>5,877.500</td>
<td>5,616.300</td>
<td>5,378.300</td>
<td>5,128.300</td>
<td>5,273.000</td>
<td>5,575.200</td>
<td>5,729.150</td>
<td>5,745.200</td>
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<td><strong>Tons Fert.</strong></td>
<td>1,037.300</td>
<td>1,149.314</td>
<td>1,112.054</td>
<td>1,115.131</td>
<td>1,088.298</td>
<td>907.219</td>
<td>884.538</td>
<td>841.925</td>
<td>837.889</td>
<td>824.872</td>
<td>871.295</td>
<td>864.664</td>
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<tr>
<td><strong>lbs Fert./Acre</strong></td>
<td>376</td>
<td>301</td>
<td>367</td>
<td>352</td>
<td>343</td>
<td>323</td>
<td>329</td>
<td>320</td>
<td>318</td>
<td>299</td>
<td>304</td>
<td>301</td>
</tr>
</tbody>
</table>

1/ Data from *Kentucky Agricultural Statistics*, annual reports.

2/ Calendar year basis.
Figure 1.

Kentucky Trends in Crop Acreage and Fertilizer Use (1980 = 100%)
Figure 2.

Nitrogen in Fertilizer Sources Used in Kentucky

- Ammonium Sulfate and Nitrate of Soda
- Mixed Fertilizers
- DAP
- Nitrogen Solutions
- Urea
- Ammonium Nitrate
- Anhydrous Ammonia

Year: 1981, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91