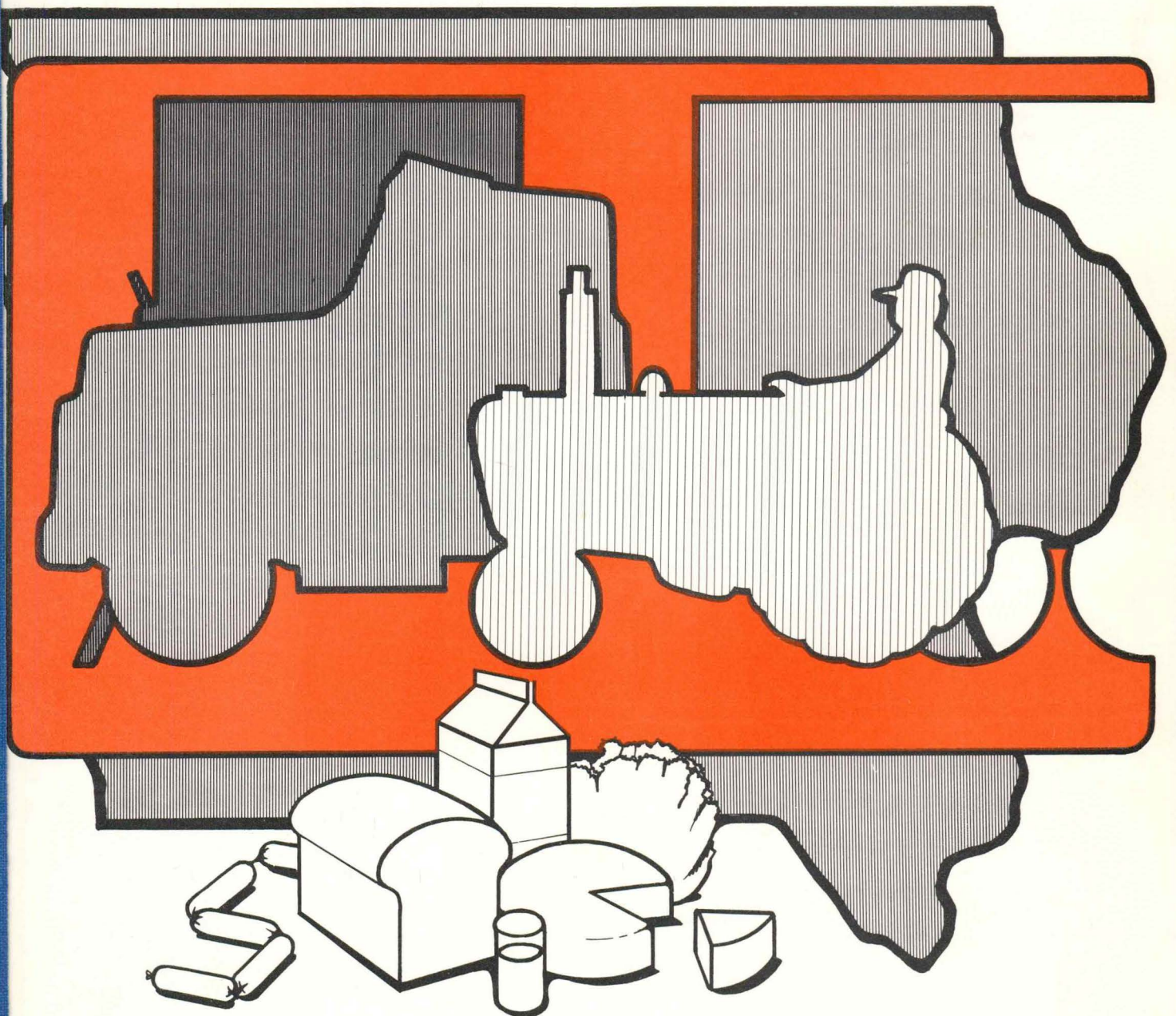


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## *farm fuel and equipment*



*Made available by:* IOWA DEPARTMENT OF AGRICULTURE  
IOWA ENERGY POLICY COUNCIL

1975

# IOWA FARM FUEL AND EQUIPMENT SURVEY

To The Reader:

The Iowa Energy Policy Council and the Iowa Department of Agriculture are proud to present the following statistics on energy and machinery used in 1975. These data are the results of a survey conducted by the Iowa Crop and Livestock Reporting Service. The purpose of the survey was to provide information on fuel useage and storage capabilities as well as the farm equipment situation. This information shows trends that have developed in recent years and will be useful in arriving at future needs and conservation measures.

We wish to thank all the farmers and ranchers who cooperated with us in this survey. They provided this information willingly as a public service.

Compiled by

IOWA CROP AND LIVESTOCK REPORTING SERVICE

Duane M. Skow, Agricultural Statistician in Charge

C. Ray Halley, Assistant State Statistician

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Frank McNiff, Iowa Energy Policy Council

Thatcher Johnson, Deputy Secretary of Agriculture

# State of Iowa



Dear Governor Ray:

As we celebrate this bicentennial year of 1976, one must be mindful of the importance of agriculture to Iowa and the Nation. In this role agriculture is a prime user of energy in production of food and fiber. This publication contains factual information available for the first time for many items that directly effect Iowa agriculture. The survey was made possible by the cooperative efforts of the Iowa Energy Policy Council and the Department of Agriculture.

The Nation's energy dilemma obviously has created concerns to Iowa. In the past, some assumptions have been made and good basic data provided by this bulletin will assist in making future decisions to insure that our State has a bright future and that Iowa's agriculture continues to grow.

Handwritten signature of Robert H. Lounsberry in cursive script.

Robert H. Lounsberry, Secretary  
Iowa Department of Agriculture

Handwritten signature of Rodson Riggs in cursive script.

Rodson Riggs, Director  
Iowa Energy Policy Council

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## ENERGY USEAGE ON IOWA FARMS

Survey results indicated that 99.8 percent of the estimated 136,000 Iowa farms used gasoline in 1975 with a total consumption of 374,532,000 gallons. The largest useage of gasoline was for crop production which accounted for 37 percent of the total (including 1 percent from custom services). Fuel useage for crop production is defined as, all energy consuming agricultural practices used to raise crops from plowing through transporting the crop to market. The next two largest categories of gasoline useage were general farm use at 26 percent and non-farm use at 23 percent. These areas of useage could be considered "catch-all" categories since they encompass any fuel use not directly related to a primary production process. Non-farm use would be further defined as personal use not directly related to the farming operation. Livestock production was the next largest useage of gasoline accounting for 12 percent. The survey indicated that 97 percent of the farmers had fuel storage facilities on farm with a total storage capacity for 50,826,000 gallons of gasoline.

Diesel fuel useage on Iowa farms during 1975, according to the survey results, amounted to 149,175,000 gallons. Crop production (including 3 percent for custom services) consumed the largest amount of diesel fuel with 89 percent of the total. Livestock production accounts for most of the remaining useage with 9 percent. The survey indicated that 63 percent of Iowa's farms used diesel fuel and had storage facilities on the farm with a total storage capacity for 32,843,000 gallons of diesel fuel.

Iowa farmers reported using 212,217,000 gallons of L.P.(liquefied petroleum) gas during 1975. Nearly half (47 percent) of the useage was for home heating, one-third was used for crop production, mostly grain drying, and 12 percent used for livestock production. Survey results showed 80 percent of the farmers used L.P. gas. Rated capacity of storage facilities on farms for L.P. gas totaled 85,967,000 gallons.

Fuel oil consumption on Iowa farms in 1975 amounted to 53,583,000 gallons. Forty-seven percent of the farmers reported using and having storage facilities for 17,810,000 gallons of fuel oil. Nearly all fuel oil (93 percent) was used for home heating.

Natural gas was reportedly used on only 4 percent of Iowa's farms with the major useage (87 percent) being for home heating. The total amount used in 1975 was 12,701,000,000 cubic feet.

Electric useage totaled 2,223 million kilowatt hours in 1975 on Iowa farms, according to survey results, with nearly 99 percent of farms reporting useage. Over half (52 percent) of the useage was for general farm use and nearly one-quarter (23 percent) for livestock production. Small percentages were used for crop production (8 percent), home heating (7 percent), and dairy production (6 percent).

TABLE 1: QUANTITY OF ENERGY USED BY IOWA FARMERS

AMOUNT OF ENERGY CONSUMED IN 1975 BY USEAGE  
AND TYPE OF ENERGY AND STORAGE CAPACITY ON FARMS

| ENERGY USEAGE                  | DIESEL        | GASOLINE      | L. P. GAS     | FUEL OIL      | NATURAL GAS        | ELECTRICITY            |
|--------------------------------|---------------|---------------|---------------|---------------|--------------------|------------------------|
|                                | (000)<br>Gal. | (000)<br>Gal. | (000)<br>Gal. | (000)<br>Gal. | Million<br>Cu. Ft. | (000)<br>Kilowatt Hrs. |
| Storage Capacity <sup>1/</sup> | 32,843        | 50,826        | 85,967        | 17,810        | ---                | ---                    |
| Total Energy Used              | 149,175       | 374,532       | 212,217       | 53,583        | 12,701             | 2,222,984              |
| Useage:                        |               |               |               |               |                    |                        |
| Crop Production                | 127,688       | 133,642       | 70,932        | 50            | 484                | 189,214                |
| Custom Services                | 4,016         | 5,507         | 1,632         | ---           | ---                | 2,035                  |
| Livestock Production           | 13,897        | 43,913        | 25,080        | 1,622         | 299                | 499,782                |
| Dairy Production               | 1,657         | 6,244         | 1,731         | 315           | 33                 | 122,035                |
| Poultry Production             | 6             | 688           | ---           | 16            | ---                | 41,164                 |
| Home Heating                   | ---           | 8             | 100,295       | 49,864        | 11,046             | 164,093                |
| General Farm Use               | 1,623         | 98,831        | 12,431        | 1,498         | 618                | 1,156,935              |
| Non-Farm Use                   | 288           | 85,697        | 112           | 218           | 221                | 47,726                 |

<sup>1/</sup> On Farm Storage

GASOLINE, DIESEL FUEL, AND L. P. GAS  
CONSUMPTION BY IOWA FARMERS  
1975

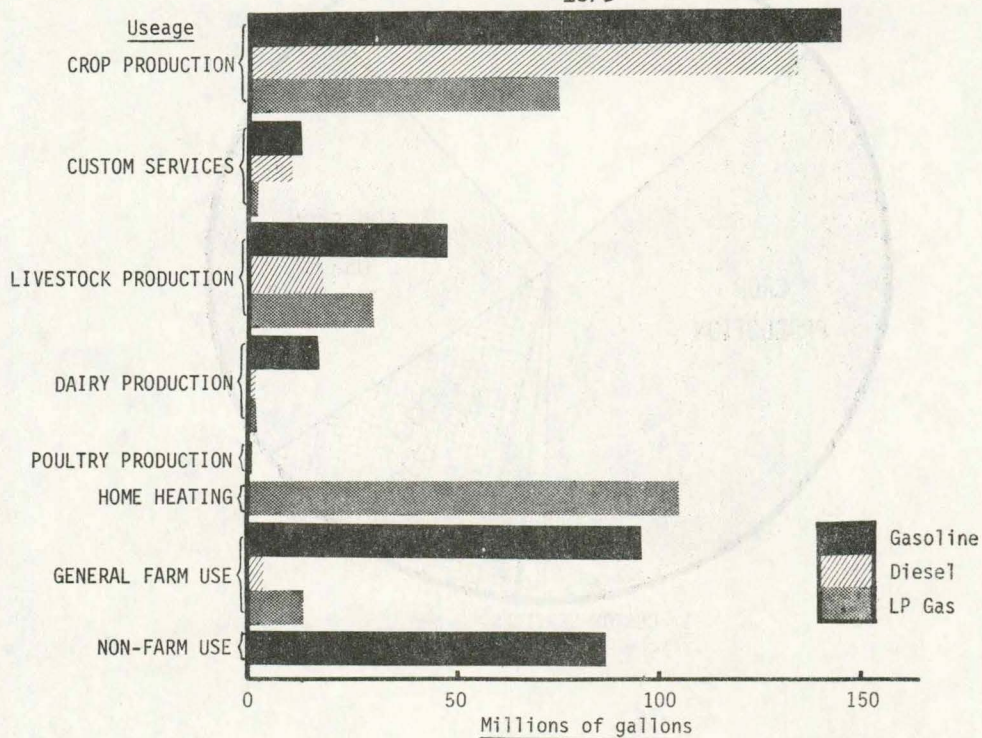


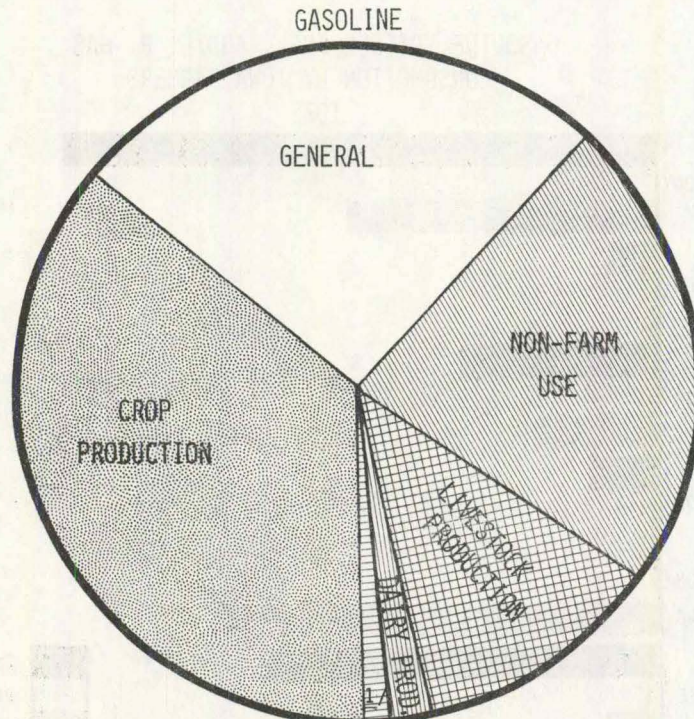
TABLE 2: QUANTITY OF GASOLINE USED BY IOWA FARMERS

AMOUNT OF GASOLINE CONSUMED IN 1975 BY TYPE OF USEAGE  
AND STORAGE CAPACITY ON FARMS BY CROP REPORTING DISTRICTS

| TYPE OF ENERGY<br>AND USEAGE               | CROP REPORTING DISTRICT |        |        |        |        |        |        |        |        | IOWA    |
|--|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|  | NW                      | NC     | NE     | WC     | C      | EC     | SW     | SC     | SE     |         |
| Thousand Gallons                           |                         |        |        |        |        |        |        |        |        |         |
| Gasoline<br>Storage Capacity <sup>1/</sup> | 7,324                   | 6,083  | 6,785  | 6,367  | 7,423  | 5,243  | 3,632  | 3,532  | 4,436  | 50,826  |
| Total Gasoline<br>Used                     | 53,324                  | 42,263 | 50,592 | 51,109 | 50,868 | 41,962 | 25,849 | 27,313 | 31,250 | 374,532 |
| <u>Useage:</u>                             |                         |        |        |        |        |        |        |        |        |         |
| Crop Production                            | 20,205                  | 16,731 | 17,269 | 18,215 | 19,491 | 14,739 | 10,443 | 8,108  | 8,441  | 133,642 |
| Custom Services                            | 1,011                   | 216    | 1,557  | 614    | 446    | 217    | 562    | 692    | 192    | 5,507   |
| Livestock Prod.                            | 7,546                   | 5,552  | 10,846 | 6,921  | 5,155  | 6,412  | 1,834  | 2,981  | 3,598  | 50,845  |
| General <sup>2/</sup>                      | 24,562                  | 19,764 | 20,920 | 25,359 | 25,776 | 20,594 | 13,010 | 15,532 | 19,019 | 184,536 |

<sup>1/</sup> On farm storage.

<sup>2/</sup> Includes home heating, general farm and non-farm use.



<sup>1/</sup> CUSTOM SERVICES.

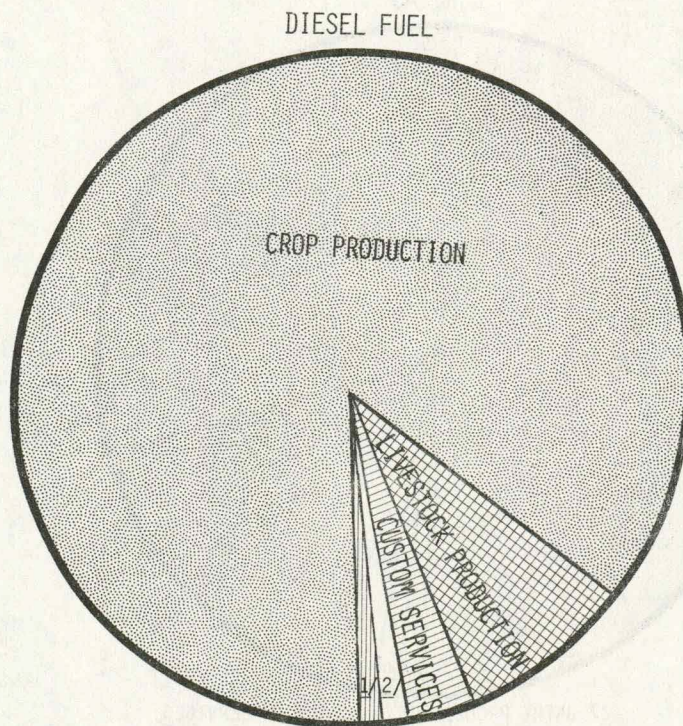
TABLE 3: QUANTITY OF DIESEL FUEL USED BY IOWA FARMERS

AMOUNT OF DIESEL FUEL CONSUMED IN 1975 BY TYPE OF USEAGE  
AND STORAGE CAPACITY ON FARMS BY CROP REPORTING DISTRICTS

| TYPE OF ENERGY<br>AND USEAGE                  | CROP REPORTING DISTRICT |        |        |        |        |        |        |       |        | IOWA    |
|---|-------------------------|--------|--------|--------|--------|--------|--------|-------|--------|---------|
|   | NW                      | NC     | NE     | WC     | C      | EC     | SW     | SC    | SE     |         |
| Thousand Gallons                              |                         |        |        |        |        |        |        |       |        |         |
| Diesel Fuel<br>Storage Capacity <sup>1/</sup> | 4,505                   | 6,128  | 3,521  | 3,939  | 4,354  | 2,851  | 2,633  | 2,021 | 2,890  | 32,843  |
| Total Diesel<br>Fuel Used                     | 20,535                  | 24,341 | 16,524 | 20,414 | 17,990 | 13,914 | 14,102 | 8,857 | 12,497 | 149,175 |
| <u>Useage:</u>                                |                         |        |        |        |        |        |        |       |        |         |
| Crop Production                               | 18,080                  | 22,102 | 13,029 | 16,694 | 15,979 | 11,376 | 12,780 | 7,157 | 10,491 | 127,688 |
| Custom Services                               | 402                     | 430    | 414    | 1,068  | 462    | 437    | 225    | 285   | 294    | 4,016   |
| Livestock Prod.                               | 1,905                   | 1,602  | 2,733  | 2,519  | 1,410  | 2,062  | 890    | 1,322 | 1,117  | 15,560  |
| General <sup>2/</sup>                         | 147                     | 207    | 349    | 133    | 139    | 39     | 207    | 94    | 596    | 1,911   |

<sup>1/</sup> On farm storage.

<sup>2/</sup> General farm and non-farm use.



<sup>1/</sup> DAIRY PRODUCTION. <sup>2/</sup> GENERAL.



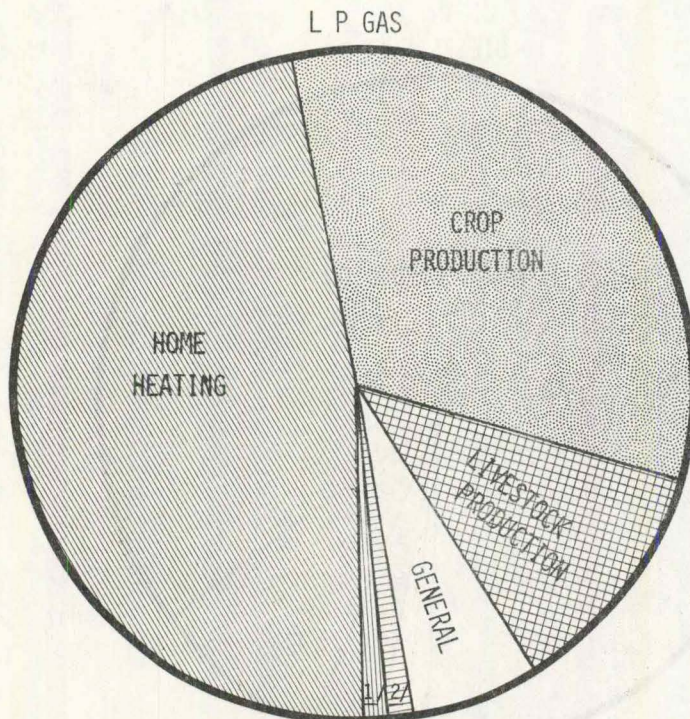
TABLE 4: QUANTITY OF L.P. GAS USED BY IOWA FARMERS

AMOUNT OF L.P. GAS CONSUMED IN 1975 BY TYPE OF USEAGE  
AND STORAGE CAPACITY ON FARMS BY CROP REPORTING DISTRICTS

| TYPE OF ENERGY<br>AND USEAGE                | CROP REPORTING DISTRICT |        |        |        |        |        |        |        |        | IOWA    |
|---|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|   | NW                      | NC     | NE     | WC     | C      | EC     | SW     | SC     | SE     |         |
| Thousand Gallons                            |                         |        |        |        |        |        |        |        |        |         |
| L. P. Gas<br>Storage Capacity <sup>1/</sup> | 8,404                   | 11,445 | 10,432 | 10,523 | 13,395 | 9,399  | 6,204  | 6,592  | 9,573  | 85,967  |
| Total L. P. Gas<br>Used                     | 20,921                  | 26,106 | 24,924 | 23,961 | 32,536 | 30,784 | 15,159 | 16,343 | 21,482 | 212,217 |
| <u>Useage:</u>                              |                         |        |        |        |        |        |        |        |        |         |
| Crop Production                             | 7,319                   | 9,968  | 7,454  | 6,264  | 12,561 | 11,964 | 4,434  | 4,470  | 6,498  | 70,932  |
| Custom Services                             | 403                     | ---    | 756    | 22     | 98     | 163    | ---    | 190    | ---    | 1,632   |
| Livestock Prod.                             | 3,165                   | 3,040  | 2,859  | 5,224  | 2,831  | 4,732  | 2,141  | 969    | 1,850  | 26,811  |
| General <sup>2/</sup>                       | 10,034                  | 13,099 | 13,855 | 12,450 | 17,046 | 13,924 | 8,584  | 10,713 | 13,134 | 112,838 |

<sup>1/</sup> On farm storage.

<sup>2/</sup> Includes home heating, general farm and non-farm use.



<sup>1/</sup> DAIRY PRODUCTION. <sup>2/</sup> CUSTOM SERVICES.

TABLE 5: QUANTITY OF FUEL OIL, NATURAL GAS, AND ELECTRICITY USED BY IOWA FARMERS

AMOUNT OF FUEL OIL, NATURAL GAS, AND ELECTRICITY  
CONSUMED IN 1975 BY CROP REPORTING DISTRICTS

| TYPE OF ENERGY                      | CROP REPORTING DISTRICT |         |         |         |         |         |         |         |         | IOWA      |
|-------------------------------------|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|
|                                     | NW                      | NC      | NE      | WC      | C       | EC      | SW      | SC      | SE      |           |
| Thousand Gallons                    |                         |         |         |         |         |         |         |         |         |           |
| Fuel Oil Storage Capacity <u>1/</u> | 3,536                   | 1,949   | 2,437   | 2,687   | 2,628   | 2,018   | 907     | 582     | 1,066   | 17,810    |
| Total Fuel Oil Used                 | 8,566                   | 6,831   | 9,366   | 8,499   | 7,961   | 5,836   | 2,352   | 1,714   | 2,457   | 53,583    |
| Million Cubic Feet                  |                         |         |         |         |         |         |         |         |         |           |
| Total Natural Gas Used              | 2,024                   | 2,698   | 1,378   | 1,738   | 1,278   | 1,209   | 675     | 1,067   | 634     | 12,701    |
| Thousand Kilowatt Hours             |                         |         |         |         |         |         |         |         |         |           |
| Total Electricity Used              | 270,924                 | 302,615 | 285,283 | 301,042 | 318,292 | 268,302 | 162,727 | 128,934 | 184,866 | 2,222,984 |

1/ On Farm Storage.

## INVENTORY OF ENERGY CONSUMING EQUIPMENT

Survey results indicate that there were 357,860 farm wheel tractors on Iowa farms as of January 1, 1976, with gasoline powered tractors accounting for 70 percent of the total and diesel 29 percent. Other tractors which include L.P. gas and all other types of minor fuel burning engines accounted for the other 1 percent. These tractors were operated an estimated 93,085,000 hours during 1975. When comparing hours of operation, diesel tractors accounted for 43 percent of the total hours in 1975; this was an average of 378 hours per tractor. Gasoline tractors accounted for 57 percent of the total hours and averaged 211 hours per tractor.

The trend toward diesel tractors is illustrated in Table 8 by comparing diesel versus gasoline for the periods shown. The percent of 1950 and earlier diesel tractors are less than 1 percent of all wheel tractors while gasoline tractors account for 21 percent during the same time period. During 1971-1976 diesel tractors increased to 12 percent of total wheel tractors on farms compared to only 3 percent for gasoline tractors for the same 5 year period.

There were a total of 250,617 gasoline wheel tractors according to survey results. Twenty-seven percent of the total were in the 5 to 34 P.T.O. horsepower group and accounted for 14 percent of the total hours operated by gas tractors. This is an average of 106 hours operated per tractor. Gas tractors with 35 to 64 P.T.O. horsepower accounted for 60 percent of the total and averaged 221 hours in operation during 1975. The next 2 horsepower size classes account for 12 and 1 percent and averaged 367 and 460 hours per tractor (See Table 6). Seventy-two percent of the gas tractors were manufactured prior to 1961 but they accounted for only 57 percent of the total hours operated. Tractors built from 1971-1976 amounted to only 5 percent of the total gas tractors.

Diesel wheel tractors totaled 105,155 and averaged 378 hours operated per tractor during 1975. Only 5 percent of the total had a P.T.O. horsepower rating of less than 50. Diesel tractors between 50 and 94 H.P. made up 41 percent of the total and averaged 353 hours operated per tractor; tractors between 95 and 124 H.P. accounted for 32 percent of the total and averaged 404 hours per tractor. Tractors 125 H.P. and over totaled 22 percent and averaged 423 hours. Table 7 further illustrates the trend toward a greater number of diesel tractors with increased horsepower. Diesel tractors prior to 1961 made up 12 percent of the total with 97 percent of those tractors less than 95 horsepower. However, tractors manufactured from 1971-1976 account for 41 percent of the total diesel tractors and 33 percent of those tractors are between 95 and 124 H.P. and 45 percent 125 H.P. or greater.

Combines on Iowa farms January 1, 1976, totaled 51,880 and were operated a total of 8,666,000 hours during 1975 for an average of 167 hours operated per combine. Gasoline powered combines numbered 40,031 or 77 percent of the total and averaged 158 hours of use while diesel combines accounted for the remaining 23 percent. Eighty-nine percent of the diesel combines reported were built since 1971. A majority of the gas combines (74 percent) were manufactured after 1965.

The total number of all self-propelled farm machinery (including wheel and crawler tractors, combines, forage harvesters, swathers, etc.) totaled 417,241 on Iowa farms January 1, 1976, and were operated a total of 103,262,000 hours during 1975. Of the total, 28 percent were powered by diesel fuel, 71 percent by gasoline, and 1 percent by other types of minor fuels (mainly L.P. gas and fuel oil).

The number of automobiles on Iowa farms, according to the survey results, totaled 147,038 on January 1, 1976, with an aggregate of 1,483,000,000 miles driven in 1975. Pickup trucks numbered 105,503 and averaged 6,815 farm miles and 1,829 non-farm for a total average of 8,644 miles. The total number of all motor vehicles was 281,132 averaging 8,907 miles per vehicle in 1975.

The survey indicated that 221,609 electric motors of 1 H.P. or more on Iowa farms were used a total of 50,844,000 hours in 1975. Seventy-three percent were less than 5 H.P. Combustion engines totaled 76,957 and were used 2,749,000 hours; sixty-nine percent of these were motors less than 10 H.P.

Grain dryers, according to the survey, numbered 55,018 and were operated a total of 8,485,000 hours. L.P. gas was the major source of energy totaling 82 percent, with electric dryers making up most of the remaining 18 percent. Other sources of energy utilizing dryers numbered less than 1 percent of the total.

TABLE 1. IOWA FARM MACHINERY AND VEHICLES OPERATED IN 1975 BY POWER SOURCE AND CLASS

| Machinery or Vehicle Class | Number  |         | Hours Operated |               | Miles Driven  |               |
|----------------------------|---------|---------|----------------|---------------|---------------|---------------|
|                            | 1976    | 1975    | 1975           | 1974          | 1975          | 1974          |
| Tractors                   | 100,000 | 95,000  | 20,000,000     | 18,000,000    | 1,000,000     | 900,000       |
| Combines                   | 150,000 | 145,000 | 30,000,000     | 28,000,000    | 1,500,000     | 1,400,000     |
| Forage Harvesters          | 50,000  | 48,000  | 10,000,000     | 9,000,000     | 500,000       | 450,000       |
| Swathers                   | 10,000  | 9,000   | 2,000,000      | 1,800,000     | 100,000       | 90,000        |
| Other Machinery            | 107,241 | 100,241 | 21,262,000     | 19,262,000    | 1,100,000     | 1,000,000     |
| Automobiles                | 147,038 | 145,000 | 1,483,000,000  | 1,450,000,000 | 1,483,000,000 | 1,450,000,000 |
| Pickup Trucks              | 105,503 | 103,000 | 6,815,000      | 6,500,000     | 6,815,000     | 6,500,000     |
| Other Vehicles             | 275,635 | 272,000 | 8,165,000      | 7,900,000     | 8,165,000     | 7,900,000     |
| Total                      | 417,241 | 407,241 | 103,262,000    | 98,262,000    | 103,262,000   | 98,262,000    |

TABLE 6: INVENTORY OF GASOLINE WHEEL TRACTORS ON IOWA FARMS, JANUARY 1, 1976

NUMBER AND HOURS OPERATED IN 1975 BY HORSEPOWER (PTO) SIZE CLASSES AND MODEL YEAR

| Horsepower<br>(PTO)<br>Size Class | MODEL YEAR AND HOURS OPERATED |                |         |                |         |                |         |                |         |                | Total   |                |
|-----------------------------------|-------------------------------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
|                                   | 1950 & Earlier                |                | 1951-60 |                | 1961-65 |                | 1966-70 |                | 1971-76 |                |         |                |
|                                   | Number                        | Hours<br>(000) | Number  | Hours<br>(000) | Number  | Hours<br>(000) | Number  | Hours<br>(000) | Number  | Hours<br>(000) | Number  | Hours<br>(000) |
| 5-34                              | 39,528                        | 3,458          | 23,281  | 2,816          | 1,080   | 171            | 1,208   | 130            | 3,517   | 725            | 68,614  | 7,302          |
| 35-64                             | 34,998                        | 5,353          | 78,646  | 16,732         | 18,297  | 5,646          | 12,480  | 3,769          | 4,947   | 1,489          | 149,368 | 32,989         |
| 65-94                             | 335                           | 106            | 3,766   | 1,149          | 10,076  | 3,553          | 13,586  | 5,388          | 2,603   | 945            | 30,366  | 11,142         |
| 95+                               | 61                            | 7              | 275     | 52             | 417     | 133            | 1,232   | 739            | 280     | 112            | 2,269   | 1,043          |
| Total                             | 74,926                        | 8,929          | 105,968 | 21,012         | 29,870  | 9,506          | 28,506  | 10,112         | 11,347  | 3,274          | 250,617 | 52,832         |

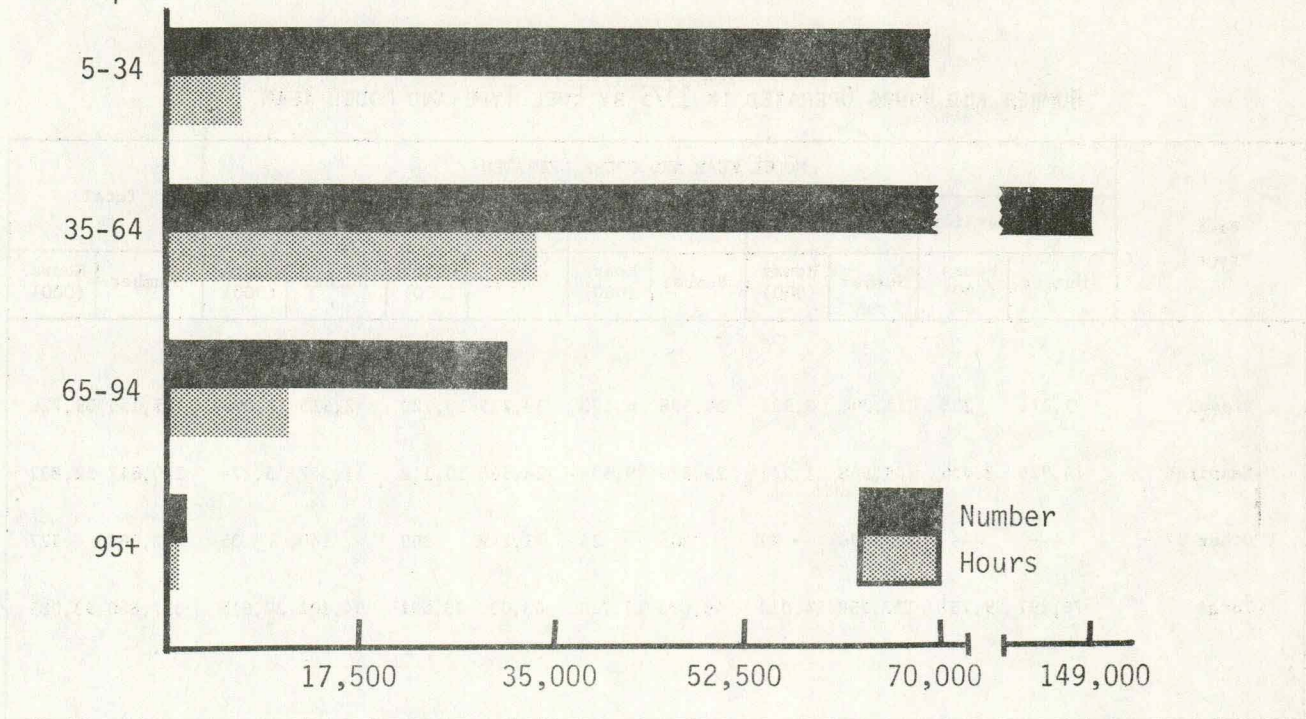
TABLE 7: INVENTORY OF DIESEL WHEEL TRACTORS ON IOWA FARMS, JANUARY 1, 1976

NUMBER AND HOURS OPERATED IN 1975 BY HORSEPOWER (PTO) SIZE CLASSES AND MODEL YEAR

| Horsepower<br>(PTO)<br>Size Class | MODEL YEAR AND HOURS OPERATED |                |         |                |         |                |         |                |         |                | Total   |                |
|-----------------------------------|-------------------------------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
|                                   | 1950 & Earlier                |                | 1951-60 |                | 1961-65 |                | 1966-70 |                | 1971-76 |                |         |                |
|                                   | Number                        | Hours<br>(000) | Number  | Hours<br>(000) | Number  | Hours<br>(000) | Number  | Hours<br>(000) | Number  | Hours<br>(000) | Number  | Hours<br>(000) |
| 5-49                              | 739                           | 102            | 3,416   | 544            | 569     | 135            | 130     | 24             | 729     | 200            | 5,583   | 1,005          |
| 50-94                             | 427                           | 74             | 7,675   | 2,241          | 11,415  | 4,310          | 14,829  | 5,522          | 8,976   | 3,133          | 43,322  | 15,281         |
| 95-124                            | 65                            | 26             | 205     | 117            | 4,064   | 1,512          | 14,889  | 6,023          | 13,923  | 5,721          | 33,146  | 13,400         |
| 125+                              | 140                           | 6              | ---     | ---            | 550     | 220            | 3,427   | 1,384          | 18,987  | 8,174          | 23,104  | 9,784          |
| Total                             | 1,371                         | 208            | 11,296  | 2,901          | 16,598  | 6,190          | 33,275  | 13,120         | 42,615  | 17,306         | 105,155 | 39,726         |

P.T.O.  
Horsepower

### GASOLINE WHEEL TRACTORS



P.T.O.  
Horsepower

### DIESEL WHEEL TRACTORS

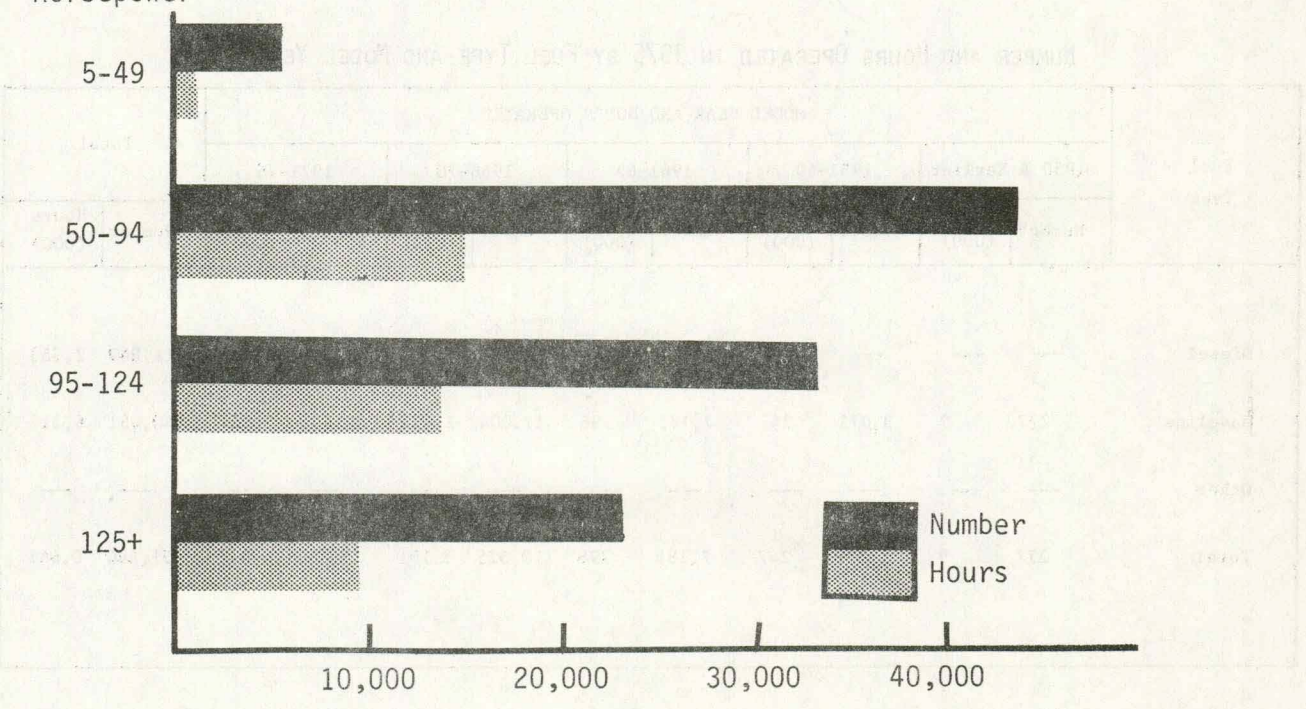


TABLE 8: INVENTORY OF ALL WHEEL TRACTORS ON IOWA FARMS, JANUARY 1, 1976

NUMBER AND HOURS OPERATED IN 1975 BY FUEL TYPE AND MODEL YEAR

| Fuel Type       | MODEL YEAR AND HOURS OPERATED |             |         |             |         |             |         |             |         |             | Total   |             |
|-----------------|-------------------------------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|-------------|
|                 | 1950 & Earlier                |             | 1951-60 |             | 1961-65 |             | 1966-70 |             | 1971-76 |             |         |             |
|                 | Number                        | Hours (000) | Number  | Hours (000) | Number  | Hours (000) | Number  | Hours (000) | Number  | Hours (000) | Number  | Hours (000) |
| Diesel          | 1,371                         | 208         | 11,296  | 2,901       | 16,598  | 6,190       | 33,275  | 13,120      | 42,615  | 17,306      | 105,155 | 39,726      |
| Gasoline        | 74,926                        | 8,929       | 105,968 | 21,012      | 29,870  | 9,506       | 28,506  | 10,112      | 11,347  | 3,274       | 250,617 | 52,832      |
| Other <u>1/</u> | ---                           | ---         | 494     | 99          | 205     | 24          | 1,249   | 369         | 140     | 35          | 2,088   | 527         |
| Total           | 76,297                        | 9,137       | 117,758 | 24,012      | 46,673  | 15,720      | 63,030  | 23,601      | 54,102  | 20,615      | 357,860 | 93,085      |

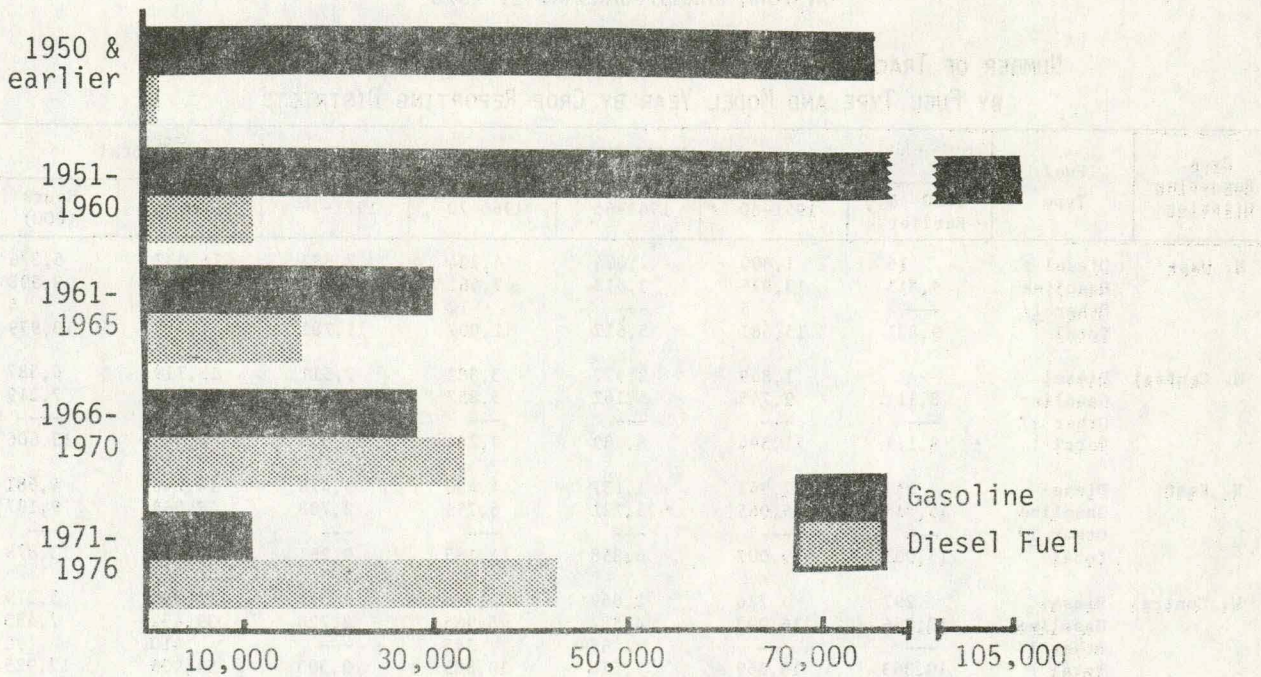
1/ Includes L.P. gas and all other minor fuel-using tractors.

TABLE 9: INVENTORY OF COMBINES ON IOWA FARMS, JANUARY 1, 1976

NUMBER AND HOURS OPERATED IN 1975 BY FUEL TYPE AND MODEL YEAR

| Fuel Type | MODEL YEAR AND HOURS OPERATED |             |         |             |         |             |         |             |         |             | Total  |             |
|-----------|-------------------------------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|-------------|--------|-------------|
|           | 1950 & Earlier                |             | 1951-60 |             | 1961-65 |             | 1966-70 |             | 1971-76 |             |        |             |
|           | Number                        | Hours (000) | Number  | Hours (000) | Number  | Hours (000) | Number  | Hours (000) | Number  | Hours (000) | Number | Hours (000) |
| Diesel    | ---                           | ---         | ---     | ---         | ---     | ---         | 1,321   | 250         | 10,528  | 2,103       | 11,849 | 2,353       |
| Gasoline  | 277                           | 9           | 3,071   | 247         | 7,181   | 796         | 17,004  | 2,931       | 12,498  | 2,329       | 40,031 | 6,313       |
| Other     | ---                           | ---         | ---     | ---         | ---     | ---         | ---     | ---         | ---     | ---         | ---    | ---         |
| Total     | 277                           | 9           | 3,071   | 247         | 7,181   | 796         | 18,325  | 3,181       | 23,026  | 4,432       | 51,880 | 8,666       |

# ALL WHEEL TRACTORS



# COMBINES

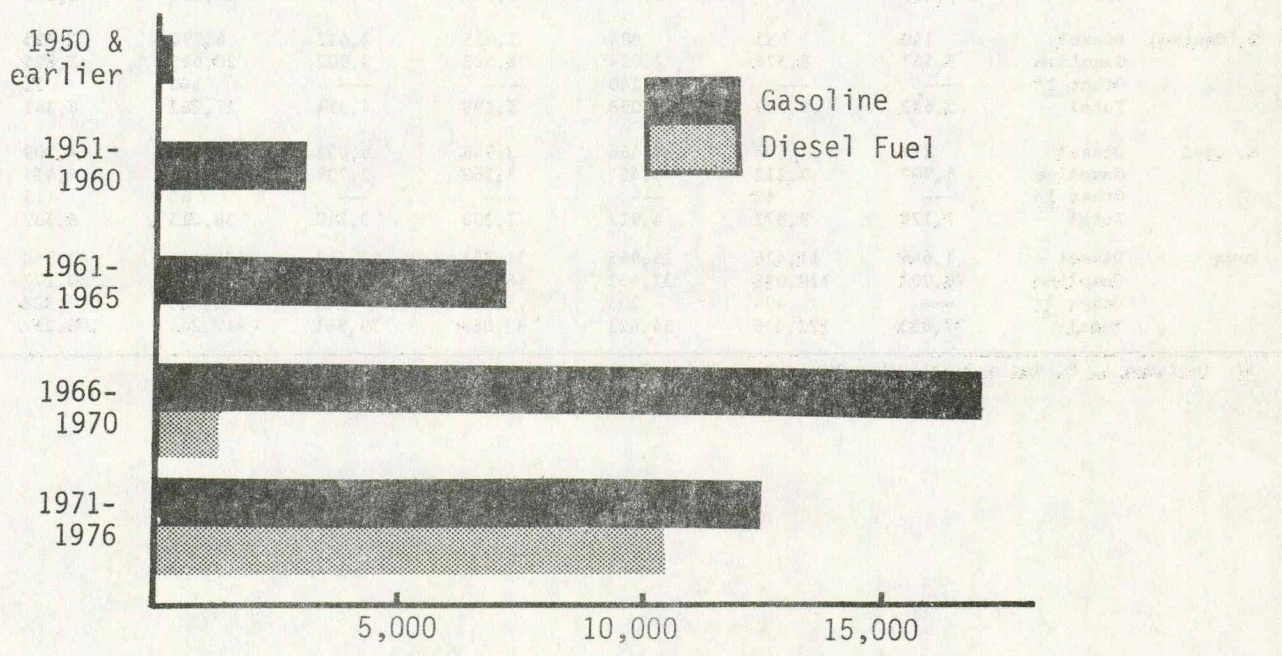




TABLE 10: INVENTORY OF ALL TRACTORS, COMBINES, AND OTHER SELF PROPELLED EQUIPMENT  
ON IOWA FARMS, JANUARY 1, 1976

NUMBER OF TRACTORS, COMBINES, AND OTHER SELF PROPELLED EQUIPMENT  
BY FUEL TYPE AND MODEL YEAR BY CROP REPORTING DISTRICTS

| Crop Reporting District | Fuel Type       | MODEL YEAR     |         |         |         |         | Total   |             |
|-------------------------|-----------------|----------------|---------|---------|---------|---------|---------|-------------|
|                         |                 | 1950 & Earlier | 1951-60 | 1961-65 | 1966-70 | 1971-76 | Number  | Hours (000) |
| N. West                 | Diesel          | 16             | 1,800   | 2,004   | 4,334   | 7,883   | 16,037  | 5,376       |
|                         | Gasoline        | 9,815          | 13,876  | 3,613   | 7,661   | 3,899   | 38,864  | 8,598       |
|                         | Other <u>1/</u> | ---            | 5       | ---     | 12      | ---     | 17      | 5           |
|                         | Total           | 9,831          | 15,681  | 5,617   | 12,007  | 11,782  | 54,918  | 13,979      |
| N. Central              | Diesel          | ---            | 1,849   | 2,977   | 3,382   | 7,511   | 15,719  | 6,387       |
|                         | Gasoline        | 8,111          | 9,745   | 5,162   | 5,852   | 4,324   | 33,194  | 7,219       |
|                         | Other <u>1/</u> | ---            | ---     | ---     | ---     | ---     | ---     | ---         |
|                         | Total           | 8,111          | 11,594  | 8,139   | 9,234   | 11,835  | 48,913  | 13,606      |
| N. East                 | Diesel          | 259            | 2,942   | 1,137   | 4,430   | 5,478   | 14,246  | 4,681       |
|                         | Gasoline        | 14,744         | 16,065  | 5,721   | 6,755   | 3,783   | 47,068  | 9,197       |
|                         | Other <u>1/</u> | ---            | ---     | ---     | ---     | ---     | ---     | ---         |
|                         | Total           | 15,003         | 19,007  | 6,858   | 11,185  | 9,261   | 61,314  | 13,878      |
| W. Central              | Diesel          | 297            | 776     | 2,869   | 4,575   | 6,577   | 15,094  | 5,379       |
|                         | Gasoline        | 10,066         | 16,093  | 4,582   | 5,965   | 2,726   | 39,432  | 7,455       |
|                         | Other <u>1/</u> | ---            | ---     | 65      | 345     | ---     | 410     | 90          |
|                         | Total           | 10,363         | 16,869  | 7,516   | 10,885  | 9,303   | 54,936  | 12,925      |
| Central                 | Diesel          | 507            | 1,099   | 2,054   | 4,509   | 7,942   | 16,111  | 5,147       |
|                         | Gasoline        | 9,393          | 15,474  | 5,786   | 7,300   | 3,946   | 41,899  | 7,719       |
|                         | Other <u>1/</u> | ---            | ---     | ---     | 140     | 140     | 280     | 38          |
|                         | Total           | 9,900          | 16,573  | 7,840   | 11,949  | 12,028  | 58,290  | 12,869      |
| E. Central              | Diesel          | 156            | 1,534   | 2,263   | 3,440   | 5,132   | 12,525  | 5,107       |
|                         | Gasoline        | 6,249          | 13,603  | 4,973   | 4,896   | 2,166   | 31,887  | 7,082       |
|                         | Other <u>1/</u> | ---            | 299     | ---     | 617     | ---     | 916     | 299         |
|                         | Total           | 6,405          | 15,436  | 7,236   | 8,953   | 7,298   | 45,328  | 12,488      |
| S. West                 | Diesel          | ---            | 291     | 1,301   | 3,630   | 4,577   | 9,799   | 3,776       |
|                         | Gasoline        | 5,180          | 7,456   | 2,139   | 2,584   | 743     | 18,102  | 4,666       |
|                         | Other <u>1/</u> | ---            | 130     | ---     | 135     | ---     | 265     | 60          |
|                         | Total           | 5,180          | 7,877   | 3,440   | 6,349   | 5,320   | 28,166  | 8,502       |
| S. Central              | Diesel          | 140            | 535     | 894     | 2,615   | 2,412   | 6,596   | 2,495       |
|                         | Gasoline        | 5,542          | 8,574   | 2,024   | 2,583   | 1,902   | 20,625  | 3,825       |
|                         | Other <u>1/</u> | ---            | ---     | 140     | ---     | ---     | 140     | 21          |
|                         | Total           | 5,682          | 9,109   | 3,058   | 5,198   | 4,314   | 27,361  | 6,341       |
| S. East                 | Diesel          | 271            | 600     | 1,466   | 3,946   | 6,031   | 12,314  | 4,209       |
|                         | Gasoline        | 6,907          | 9,212   | 3,451   | 3,362   | 2,709   | 25,641  | 4,415       |
|                         | Other <u>1/</u> | ---            | 60      | ---     | ---     | ---     | 60      | 15          |
|                         | Total           | 7,178          | 9,872   | 4,917   | 7,308   | 8,740   | 38,015  | 8,639       |
| Iowa                    | Diesel          | 1,646          | 11,426  | 16,965  | 34,861  | 53,543  | 118,441 | 42,558      |
|                         | Gasoline        | 76,007         | 110,098 | 37,451  | 46,958  | 26,198  | 296,712 | 60,177      |
|                         | Other <u>1/</u> | ---            | 494     | 205     | 1,249   | 140     | 2,088   | 528         |
|                         | Total           | 77,653         | 122,018 | 54,621  | 83,068  | 79,881  | 417,241 | 103,262     |

1/ Includes L. P. Gas and All Other Minor Fuel-Using Tractors.

TABLE 11: INVENTORY OF ELECTRIC MOTORS ON IOWA FARMS, JANUARY 1, 1976

Number and Total Hours Used by Iowa Farmers in 1975  
by Horsepower Size Class

| Horsepower Size | Number  | Hours Used |
|-----------------|---------|------------|
| 1-4.9           | 162,218 | 41,567,000 |
| 5 Plus          | 59,391  | 9,276,000  |
| Total           | 221,609 | 50,844,000 |

TABLE 12: INVENTORY OF COMBUSTION ENGINES ON IOWA FARMS, JANUARY 1, 1976

Number and Total Hours Used by Iowa Farmers in 1975  
by Horsepower Size Class

| Horsepower Size | Number | Hours Used |
|-----------------|--------|------------|
| Less Than 10    | 53,066 | 1,673,000  |
| 10 Plus         | 23,891 | 1,075,000  |
| Total           | 76,957 | 2,749,000  |

TABLE 13: INVENTORY OF GRAIN DRYERS ON IOWA FARMS, JANUARY 1, 1976

Number and Total Hours Used by Iowa Farmers  
in 1975 by Fuel Type

| Fuel Type   | Number | Hours Used |
|-------------|--------|------------|
| L.P. Gas    | 45,147 | 6,694,000  |
| Electricity | 9,806  | 1,774,000  |
| Other       | 65     | 16,000     |
| Total       | 55,018 | 8,485,000  |

TABLE 14: INVENTORY OF MOTOR VEHICLES ON IOWA FARMS, JANUARY 1, 1976

Number and Total Farm and Non-farm Miles Driven by Iowa Farmers  
in 1975 by Type of Vehicle

| Type of Vehicle                  | Number of Vehicles | Miles Driven in 1975 |               |
|----------------------------------|--------------------|----------------------|---------------|
|                                  |                    | Farm                 | Non-farm      |
| Pickups                          | 105,503            | 719,000,000          | 193,000,000   |
| Cars                             | 147,038            | 474,000,000          | 1,009,000,000 |
| Cars, Pickups,<br>and All Trucks | 281,132            | 1,293,000,000        | 1,211,000,000 |

## CROPPING OPERATIONS ON IOWA FARMS FOR SELECTED CROPS

Tables 15 through 17 indicate survey results of acres covered and fuel used for selected cropping practices performed on major crops by Iowa farmers in 1975. For each cropping operation the total acres covered by farm operator and hired custom operators are given as reported from the survey, along with the total gallons of each fuel consumed. The acres covered is the crop acres times the average number of times the operation was performed. The difference between total acres and the sum of acres covered using diesel and gasoline for any cropping operation is the number of acres covered by equipment utilizing other types of fuel. When analyzing each cropping operation for fuel economy, one can compare the average gallons burned per acre by diesel versus gasoline equipment. However, we must realize the survey averages are weighted averages and therefore, dependent on the number of acres covered by a variety of different horsepower and age tractors. The type of fuel and size of tractor generally used will vary considerably from one cropping practice to another.

### CORN CROPPING PRACTICES

About 84 percent of the 1975 corn acreage was moldboard plowed. Of these, 10.2 million acres plowed, diesel fuel was the energy source used on slightly over three-fourths of the acreage. Nearly all of the corn ground planted in 1975 was disked at least once. A total 23,505,000 acres were disked altogether amounting to nearly 2 times per acre. Almost three-fourths of the disking was done using diesel fuel. Farmers harrowed 48 percent of their corn at least once and gasoline was used to harrow over half the acreage covered. Pre-emergence herbicide and/or fertilizer was applied to 65 percent of the corn acreage with 27 percent of this application done by custom operation. Pre-plant anhydrous ammonia was applied to 41 percent of the corn acreage with 92 percent of those acres covered by equipment using diesel fuel. Custom operators applying anhydrous ammonia accounted for 32 percent of the total acres covered. Gasoline tractors were used as the energy source to plant over half the corn acreage. Nearly all of the corn was cultivated at least once. The total acres covered amounted to 26,175,000 acres which is an average of 2 times per acre. It took 5,400,000 hours to complete the corn cultivating operation. Seventy-one percent of the corn acreage harvested in 1975 was combined with gasoline being used on two-thirds of those acres. Custom operators accounted for 20 percent of the corn acres combined in 1975. Combining averaged 2.16 acres per hour and 1.89 gallons of diesel per hour compared to 2.47 gallons of gasoline per hour. Twenty-two percent of the corn was harvested by picking or picker-shellers in 1975 with 65 percent of the acreage using gasoline powered equipment. Picking and picker-shellers averaged 1.35 acres per hour and 2.77 gallons of diesel compared to 2.93 gallons of gasoline per acre. Corn silage was harvested from 880,000 acres, 20 percent of these acres by custom operators. Eighty-three percent of the acreage was harvested using diesel powered equipment. Silage harvesting averaged 1.32 acres per hour and 4.04 gallons of diesel compared to 5.75 gallons of gasoline per acre.

### SOYBEAN CROPPING PRACTICES

Farmers reported plowing nearly all of the 7,000,000 acres of soybeans planted in 1975. Moldboard plowing was done on 65 percent of the 1975 soybean acreage plowed of which 72 percent was done by diesel tractors. The other 35 percent

was chisel plowed with 92 percent of these acres done using diesel power. Nearly all of the soybean ground planted in 1975 was disked at least once and a total of 13,203,000 acres were disked. This is an average of nearly 2 times per acre. Almost three-fourths of the disking was done using diesel fuel. Farmers harrowed 43 percent of their soybeans at least once and a total of 3,588,000 acres were covered. Over half of these acres were covered using gasoline tractors. Pre-emergence herbicide and/or fertilizer was applied to 74 percent of the soybean acreage and 26 percent of this done by custom operators. About 57 percent of the soybean planting was completed using gasoline tractors. Nearly all of the soybean acreage was cultivated at least once, totaling 16,585,000 acres for an average of 2.37 times per acre. It took 3,446,000 hours to complete the cultivating. Seventy-one percent of the soybeans were harvested in 1975 using gasoline powered combines. Custom operators combined 22 percent of the acres harvested in 1975. Combining averaged 2.81 acres per hour and 1.55 gallons of diesel compared to 1.93 gallons of gasoline per hour.

#### OAT CROPPING PRACTICES

Farmers reported disking at least once nearly all of the total 1,830,000 acres of oats ground planted in 1975. The total of 3,023,000 acres disked amounts to an average of 1.7 times per acre of oats. Over half the disking was done using diesel fuel. Farmers harrowed 68 percent of their oats at least once for a total of 1,648,000 acres. About 65 percent of the harrowing was done by gasoline tractors. Oat planting was completed using gasoline tractors on nearly three-fourths the acreage. Slightly over 75 percent of the oat acreage harvested for grain in 1975 was combined using gasoline combines. Custom operators accounted for 39 percent of the oat acres combined in 1975. Combining averaged 2.06 acres per hour and 1.70 gallons of diesel compared to 2.04 gallons of gasoline per hour. The other 16 percent of the oats harvested was either cut for silage or baled as hay.

#### HAY CROPPING PRACTICES

Farmers reported raking, crimping, windrowing, etc., a total of 10,228,000 acres of hay in 1975, 73 percent of which was completed using gasoline powered equipment. It required an average of 3.04 acres per hour to complete and .90 gallons of diesel compared to .95 gallons of gasoline per acre. Hay was baled from a total of 4,694,000 acres in 1975 with slightly over half the acres being covered by diesel powered equipment. Custom operators accounted for a little more than one quarter of the acres baled in 1975. Baling averaged 2.37 acres per hour and 1.17 gallons of diesel compared to 1.56 gallons of gasoline per acre. Hay forage was cut from 956,000 acres in 1975 with diesel fuel being used to harvest 83 percent of those acres.

TABLE 15: CROP OPERATIONS PERFORMED BY IOWA FARMERS

ACRES COVERED, HOURS OF OPERATION, AND TOTAL GALLONS OF FUEL CONSUMED  
WITH FUEL CONSUMPTION RATES FOR MAJOR CROPS IN 1975

| CORN<br>Cropping Operations                                   | Fuel<br>Type | By Farm<br>Operator       |                | By Custom<br>Operator     |                | Iowa                      |                | Rates and Average Consumption |                           |          |          |
|---|--------------|---------------------------|----------------|---------------------------|----------------|---------------------------|----------------|-------------------------------|---------------------------|----------|----------|
|   |              | Acres<br>Covered<br>(000) | Hours<br>(000) | Acres<br>Covered<br>(000) | Hours<br>(000) | Acres<br>Covered<br>(000) | Hours<br>(000) | Ac./Hr.                       | Total<br>Gallons<br>(000) | Gal./Hr. | Gal./Ac. |
| Moldboard Plowing   | Diesel       | 6,338                     | 2,493          | 202                       | 66             | 6,540                     | 2,559          | 2.56                          | 14,421                    | 5.64     | 2.21     |
|   | Gas          | 1,953                     | 1,166          | 6                         | 2              | 1,959                     | 1,168          | 1.68                          | 5,070                     | 4.34     | 2.59     |
|   | Total        | 8,338                     | 3,683          | 208                       | 68             | 8,546                     | 3,751          | 2.28                          | ---                       | ---      | ---      |
| Chisel Plowing  | Diesel       | 1,406                     | 376            | 90                        | 18             | 1,496                     | 394            | 3.80                          | 2,362                     | 5.99     | 1.58     |
|   | Gas          | 118                       | 45             | 3                         | ---            | 121                       | 45             | 2.69                          | 217                       | 4.82     | 1.79     |
|   | Total        | 1,527                     | 421            | 93                        | 18             | 1,620                     | 439            | 3.69                          | ---                       | ---      | ---      |
| Disking   | Diesel       | 17,042                    | 2,698          | 213                       | 27             | 17,255                    | 2,725          | 6.33                          | 14,081                    | 5.17     | .82      |
|   | Gas          | 6,112                     | 1,406          | 12                        | 3              | 6,124                     | 1,409          | 4.35                          | 6,069                     | 4.31     | .99      |
|   | Total        | 23,279                    | 4,128          | 226                       | 30             | 23,505                    | 4,158          | 5.65                          | ---                       | ---      | ---      |
| Harrowing   | Diesel       | 3,674                     | 415            | 13                        | 1              | 3,687                     | 416            | 8.86                          | 1,891                     | 4.55     | .51      |
|   | Gas          | 4,169                     | 538            | 25                        | 2              | 4,194                     | 540            | 7.77                          | 1,870                     | 3.46     | .45      |
|   | Total        | 7,874                     | 955            | 37                        | 3              | 7,911                     | 958            | 8.26                          | ---                       | ---      | ---      |
| Pre-Emerg. Fert.<br>and/or Herbicide<br>Application <u>1/</u> | Diesel       | 4,233                     | 501            | 78                        | 12             | 4,311                     | 513            | 8.40                          | 2,554                     | 4.98     | .59      |
|   | Gas          | 1,995                     | 241            | 2,184                     | 263            | 4,179                     | 504            | 8.29                          | 1,958                     | 3.88     | .47      |
|   | Total        | 6,273                     | 744            | 2,262                     | 275            | 8,534                     | 1,019          | 8.37                          | ---                       | ---      | ---      |
| Pre-Plant<br>Anhydrous<br>Application                         | Diesel       | 3,220                     | 407            | 1,739                     | 161            | 4,959                     | 568            | 8.73                          | 3,414                     | 6.01     | .69      |
|   | Gas          | 416                       | 78             | ---                       | ---            | 416                       | 78             | 5.33                          | 369                       | 4.73     | .89      |
|   | Total        | 3,650                     | 520            | 1,739                     | 161            | 5,389                     | 681            | 7.91                          | ---                       | ---      | ---      |
| Planting  | Diesel       | 5,749                     | 1,155          | 211                       | 38             | 5,960                     | 1,193          | 5.00                          | 4,701                     | 3.94     | .79      |
|   | Gas          | 6,910                     | 1,825          | 135                       | 31             | 7,045                     | 1,856          | 3.80                          | 6,500                     | 3.50     | .92      |
|   | Total        | 12,754                    | 3,111          | 346                       | 69             | 13,100                    | 3,180          | 4.12                          | ---                       | ---      | ---      |
| Cultivating   | Diesel       | 13,574                    | 2,409          | 75                        | 16             | 13,649                    | 2,425          | 5.63                          | 9,145                     | 3.77     | .67      |
|   | Gas          | 12,251                    | 2,924          | 54                        | 15             | 12,305                    | 2,939          | 4.19                          | 9,859                     | 3.35     | .80      |
|   | Total        | 26,046                    | 5,369          | 129                       | 31             | 26,175                    | 5,400          | 4.85                          | ---                       | ---      | ---      |
| Combining   | Diesel       | 2,452                     | 1,013          | 526                       | 206            | 2,978                     | 1,219          | 2.44                          | 5,617                     | 4.61     | 1.89     |
|   | Gas          | 4,964                     | 2,559          | 1,362                     | 532            | 6,326                     | 3,091          | 2.05                          | 15,604                    | 5.05     | 2.47     |
|   | Total        | 7,416                     | 3,572          | 1,888                     | 738            | 9,304                     | 4,310          | 2.16                          | ---                       | ---      | ---      |
| Harvesting<br>(Picking,<br>Picker-Sheller)                    | Diesel       | 889                       | 599            | 89                        | 69             | 978                       | 668            | 1.46                          | 2,705                     | 4.05     | 2.77     |
|   | Gas          | 1,696                     | 1,292          | 132                       | 114            | 1,828                     | 1,406          | 1.30                          | 5,348                     | 3.80     | 2.93     |
|   | Total        | 2,592                     | 1,894          | 221                       | 183            | 2,814                     | 2,077          | 1.35                          | ---                       | ---      | ---      |
| Silage Harvesting   | Diesel       | 576                       | 403            | 151                       | 117            | 727                       | 520            | 1.40                          | 2,938                     | 5.65     | 4.04     |
|   | Gas          | 125                       | 121            | 28                        | 26             | 153                       | 147            | 1.04                          | 879                       | 5.98     | 5.75     |
|   | Total        | 701                       | 524            | 179                       | 143            | 880                       | 667            | 1.32                          | ---                       | ---      | ---      |

1/ No Incorporation

TABLE 16: CROP OPERATIONS PERFORMED BY IOWA FARMERS

ACRES COVERED, HOURS OF OPERATION, AND TOTAL GALLONS OF FUEL CONSUMED  
WITH FUEL CONSUMPTION RATES FOR MAJOR CROPS IN 1975

| SOYBEANS<br>Cropping Operations                                   | Fuel<br>Type | By Farm<br>Operator       |                | By Custom<br>Operator     |                | Iowa                      |                | Rates and Average Consumption |                           |           |           |
|---|--------------|---------------------------|----------------|---------------------------|----------------|---------------------------|----------------|-------------------------------|---------------------------|-----------|-----------|
|   |              | Acres<br>Covered<br>(000) | Hours<br>(000) | Acres<br>Covered<br>(000) | Hours<br>(000) | Acres<br>Covered<br>(000) | Hours<br>(000) | Ac. /Hr.                      | Total<br>Gallons<br>(000) | Gal. /Hr. | Gal. /Ac. |
| Moldboard Plowing   | Diesel       | 3,032                     | 1,164          | 56                        | 21             | 3,088                     | 1,185          | 2.61                          | 6,419                     | 5.42      | 2.08      |
|   | Gas          | 1,158                     | 696            | 22                        | 13             | 1,180                     | 709            | 1.66                          | 3,068                     | 4.33      | 2.60      |
|   | Total        | 4,222                     | 1,876          | 78                        | 35             | 4,300                     | 1,911          | 2.25                          | ---                       | ---       | ---       |
| Chisel Plowing  | Diesel       | 2,029                     | 465            | 149                       | 34             | 2,178                     | 499            | 4.36                          | 3,086                     | 6.18      | 1.42      |
|   | Gas          | 146                       | 59             | 11                        | 4              | 157                       | 63             | 2.49                          | 312                       | 4.95      | 1.99      |
|   | Total        | 2,197                     | 529            | 160                       | 38             | 2,357                     | 567            | 4.16                          | ---                       | ---       | ---       |
| Disking   | Diesel       | 9,183                     | 1,481          | 166                       | 32             | 9,349                     | 1,513          | 6.18                          | 7,921                     | 5.24      | .85       |
|   | Gas          | 3,727                     | 891            | 3                         | 1              | 3,730                     | 892            | 4.18                          | 3,702                     | 4.15      | .99       |
|   | Total        | 13,034                    | 2,390          | 169                       | 33             | 13,203                    | 2,423          | 5.45                          | ---                       | ---       | ---       |
| Harrowing   | Diesel       | 1,756                     | 206            | 7                         | 1              | 1,763                     | 207            | 8.52                          | 937                       | 4.53      | .53       |
|   | Gas          | 1,777                     | 247            | 14                        | 1              | 1,791                     | 248            | 7.22                          | 888                       | 3.58      | .50       |
|   | Total        | 3,567                     | 456            | 21                        | 2              | 3,588                     | 458            | 7.83                          | ---                       | ---       | ---       |
| Pre-Emerg. Fert.<br>and/or Herbicide<br>Application <sup>1/</sup> | Diesel       | 2,711                     | 346            | 978                       | 126            | 3,689                     | 472            | 7.82                          | 2,521                     | 5.34      | .68       |
|   | Gas          | 1,068                     | 134            | 385                       | 48             | 1,453                     | 182            | 7.98                          | 699                       | 3.84      | .48       |
|   | Total        | 3,811                     | 483            | 1,363                     | 174            | 5,174                     | 657            | 7.88                          | ---                       | ---       | ---       |
| Planting  | Diesel       | 2,913                     | 591            | 60                        | 12             | 2,973                     | 603            | 4.93                          | 2,368                     | 3.93      | .80       |
|   | Gas          | 3,829                     | 938            | 134                       | 33             | 3,963                     | 971            | 4.08                          | 3,265                     | 3.36      | .82       |
|   | Total        | 6,806                     | 1,538          | 194                       | 45             | 7,000                     | 1,583          | 4.42                          | ---                       | ---       | ---       |
| Cultivating   | Diesel       | 8,492                     | 1,591          | 52                        | 10             | 8,544                     | 1,601          | 5.34                          | 6,020                     | 3.76      | .70       |
|   | Gas          | 7,828                     | 1,800          | 64                        | 16             | 7,892                     | 1,816          | 4.35                          | 6,313                     | 3.48      | .80       |
|   | Total        | 16,469                    | 3,420          | 116                       | 26             | 16,585                    | 3,446          | 4.81                          | ---                       | ---       | ---       |
| Combining   | Diesel       | 1,488                     | 462            | 520                       | 114            | 2,008                     | 576            | 3.49                          | 3,113                     | 5.40      | 1.55      |
|   | Gas          | 3,928                     | 1,565          | 1,034                     | 342            | 4,962                     | 1,907          | 2.60                          | 9,564                     | 5.02      | 1.93      |
|   | Total        | 5,416                     | 2,027          | 1,554                     | 456            | 6,970                     | 2,483          | 2.81                          | ---                       | ---       | ---       |

<sup>1/</sup> No Incorporation

TABLE 17: CROP OPERATIONS PERFORMED BY IOWA FARMERS

ACRES COVERED, HOURS OF OPERATION, AND TOTAL GALLONS OF FUEL CONSUMED  
WITH FUEL CONSUMPTION RATES FOR MAJOR CROPS IN 1975

| OATS                               | Fuel Type | By Farm Operator    |             | By Custom Operator  |             | Iowa                |             | Rates and Average Consumption |                     |          |          |
|------------------------------------|-----------|---------------------|-------------|---------------------|-------------|---------------------|-------------|-------------------------------|---------------------|----------|----------|
|                                    |           | Acres Covered (000) | Hours (000) | Acres Covered (000) | Hours (000) | Acres Covered (000) | Hours (000) | Ac./Hr.                       | Total Gallons (000) | Gal./Hr. | Gal./Ac. |
| Disking                            | Diesel    | 1,731               | 327         | 3                   | 1           | 1,734               | 328         | 5.29                          | 1,503               | 4.58     | .87      |
|                                    | Gas       | 1,262               | 338         | 3                   | 1           | 1,265               | 339         | 3.73                          | 1,281               | 3.78     | 1.01     |
|                                    | Total     | 3,017               | 669         | 6                   | 2           | 3,023               | 671         | 4.51                          | ---                 | ---      | ---      |
| Harrowing                          | Diesel    | 577                 | 49          | 2                   | ---         | 579                 | 49          | 11.71                         | 185                 | 3.78     | .32      |
|                                    | Gas       | 1,061               | 147         | 3                   | ---         | 1,064               | 147         | 7.24                          | 485                 | 3.30     | .46      |
|                                    | Total     | 1,643               | 196         | 5                   | ---         | 1,648               | 196         | 8.41                          | ---                 | ---      | ---      |
| Planting                           | Diesel    | 479                 | 112         | 9                   | 2           | 488                 | 114         | 4.28                          | 357                 | 3.13     | .73      |
|                                    | Gas       | 1,300               | 286         | 22                  | 5           | 1,322               | 291         | 4.54                          | 867                 | 2.98     | .66      |
|                                    | Total     | 1,799               | 402         | 31                  | 7           | 1,830               | 409         | 4.47                          | ---                 | ---      | ---      |
| Combining                          | Diesel    | 229                 | 91          | 144                 | 57          | 373                 | 148         | 2.52                          | 633                 | 4.28     | 1.70     |
|                                    | Gas       | 718                 | 369         | 449                 | 231         | 1,167               | 600         | 1.95                          | 2,378               | 3.96     | 2.04     |
|                                    | Total     | 947                 | 460         | 593                 | 288         | 1,540               | 748         | 2.06                          | ---                 | ---      | ---      |
| Silage Harvesting and Baling       | Diesel    | 120                 | 64          | 69                  | 37          | 189                 | 101         | 1.87                          | 559                 | 5.53     | 2.96     |
|                                    | Gas       | 64                  | 32          | 37                  | 19          | 101                 | 51          | 1.98                          | 198                 | 3.88     | 1.96     |
|                                    | Total     | 184                 | 96          | 106                 | 56          | 290                 | 152         | 1.91                          | ---                 | ---      | ---      |
| <u>HAY</u>                         |           |                     |             |                     |             |                     |             |                               |                     |          |          |
| Raking, Crimping, Windrowing, Etc. | Diesel    | 2,576               | 774         | 110                 | 33          | 2,686               | 807         | 3.33                          | 2,418               | 3.00     | .90      |
|                                    | Gas       | 7,190               | 2,431       | 307                 | 104         | 7,497               | 2,535       | 2.96                          | 7,097               | 2.80     | .95      |
|                                    | Total     | 9,811               | 3,224       | 417                 | 137         | 10,228              | 3,361       | 3.04                          | ---                 | ---      | ---      |
| Baling Hay                         | Diesel    | 1,585               | 654         | 788                 | 195         | 2,373               | 849         | 2.80                          | 2,770               | 3.26     | 1.17     |
|                                    | Gas       | 1,874               | 946         | 416                 | 168         | 2,290               | 1,114       | 2.06                          | 3,582               | 3.22     | 1.56     |
|                                    | Total     | 3,471               | 1,606       | 1,223               | 374         | 4,694               | 1,980       | 2.37                          | ---                 | ---      | ---      |
| Hay/Forage Harvesting Operations   | Diesel    | 747                 | 334         | 51                  | 23          | 798                 | 357         | 2.24                          | 2,106               | 5.90     | 2.64     |
|                                    | Gas       | 148                 | 106         | 10                  | 7           | 158                 | 113         | 1.40                          | 582                 | 5.15     | 3.68     |
|                                    | Total     | 895                 | 440         | 61                  | 30          | 956                 | 470         | 2.03                          | ---                 | ---      | ---      |



## TILLAGE AND CROP ROTATION PRACTICES BY IOWA FARMERS

Iowa farmers when questioned about their tillage practices, indicated that they have in fact, changed methods since 1970. Survey results indicate that 90 percent of the farmers used moldboard plowing in 1975, however, 36 percent indicate they are doing less moldboard plowing now than in 1970. About one-half of those farmers said reduction of erosion was the main reason for reduction and another quarter answered that saving time was the main reason for change. Only 9 percent said that saving fuel was the major factor in reducing the amount of moldboard plowing.

Even though 65 percent of the Iowa farmers indicated that they do not chisel plow, 26 percent revealed that they were doing more than in 1970. The chief reasons given by those farmers using the chisel plow more was to reduce erosion and save time.

Most farmers indicated they were doing the same amount of disking as they did in 1970. About 19 percent reported they were doing more disking and 11 percent indicated they were doing less disking.

Field cultivating or cultivating prior to plant emergence was not used by 44 percent of the farmers reporting. Only 14 percent replied they are doing more field cultivating prior to emergence now than in 1970. The same amount of crop cultivating or cultivation following plant emergence as in 1970 was practiced by 57 percent of the farmers. Of those farmers doing less cultivation (36 percent of the total) the vast majority of them (81 percent) gave increased herbicide use as the reason for doing less cultivation.

For those farmers who responded that they have not changed their tillage practices since 1970, the reason most often given for not changing was the cost prohibitiveness of the required equipment. Plowing depths given by the farmers interviewed for moldboard plowing were: over half (58 percent) plow to a depth of 7 inches or less, 38 percent plow 8-9 inches, and 4 percent 10-11 inches. Of the 35 percent who chisel plow, 14 percent plow to a depth of 7 inches or less, 31 percent 8-9 inches, 42 percent 10-11 inches, and 13 percent 12 inches or greater.

When asked about their tillage practices on sloping land (greater than 4 percent slope), slightly over half responded as having grown crops on sloping land. Of those farming on sloping land, nearly 80 percent indicated they were using some soil conservation methods. Of those using conservation methods, 85 percent used strip farming, contours, or terraces.

Crop rotation practices were studied as they pertain to the four major crops in Iowa: corn, soybeans, oats, and hay. The percentage of 1975 crop land which followed 1974 corn, soybeans, or other crop acreages are given in Table 20. In general, crop rotation practices varied only slightly between Crop Reporting Districts for all crops except corn. For the State, 40 percent of the 1975 corn acreage was planted to corn in 1974. Corn followed soybeans in about 51 percent of the total corn acreage for the State. Only in the east central and southwest, did the percentage of other crop acres rotated to corn in 1975 exceed 10 percent.

About 92 percent of 1975 soybean acres were planted to corn in 1974. The percentage by district varied from 95 percent in the northwest, west central, central and east central districts to 85 and 86 percent respectively in the south central and southeast. Soybeans followed soybeans on 6 percent of the land across the State and ranged from 2 to 11 percent in the various districts. Soybeans followed other crops on only 2 percent of the acreage.

A majority (82 percent) of the 1975 oats were planted on 1974 corn ground. Oats following soybeans amounted to 14 percent of the acreage. The crop rotation practices for hay indicate the acreage to be from predominately other crops because most hay which is old enough to be classified as hay is usually second year hay, therefore, the previous years acreage would appear as hay or other crops. Rotation practices for first year hay could be best characterized by the rotation practices for oats which is commonly planted along with hay as a nurse crop.

TABLE 18: TILLAGE PRACTICE CHANGES SINCE 1970 BY IOWA FARMERS

Percent of Iowa Farmers by Direction of Change  
in Their Tillage Practices Since 1970

| Tillage Practice            | Changes Since 1970 |      |      |      |
|-----------------------------|--------------------|------|------|------|
|                             | Not Used           | Same | More | Less |
|                             | Percent            |      |      |      |
| Moldboard Plowing           | 10                 | 53   | 1    | 36   |
| Chisel Plowing              | 65                 | 8    | 26   | 1    |
| Disking                     | 6                  | 65   | 19   | 11   |
| Field Cultivating <u>1/</u> | 44                 | 38   | 14   | 4    |
| Crop Cultivating <u>2/</u>  | 6                  | 57   | 1    | 36   |

TABLE 19: REASONS GIVEN BY IOWA FARMERS FOR TILLAGE PRACTICE CHANGES

Percent of Iowa Farmers by Major Reason Given For  
Changes in Their Tillage Practices Since 1970

| Tillage Practice            | Change | Major Reason For Change |           |             |                |               |               |       |
|-----------------------------|--------|-------------------------|-----------|-------------|----------------|---------------|---------------|-------|
|                             |        | Save Time               | Save Fuel | Reduce Cost | Reduce Erosion | Improve Yield | Herbicide Use | Other |
|                             |        | Percent                 |           |             |                |               |               |       |
| Moldboard Plowing           | Less   | 24                      | 9         | 9           | 52             | 3             | 0             | 3     |
| Chisel Plowing              | More   | 15                      | 5         | 5           | 65             | 7             | 0             | 3     |
| Disking                     | More   | 32                      | 9         | 13          | 22             | 13            | 3             | 8     |
| Disking                     | Less   | 30                      | 11        | 12          | 21             | 12            | 6             | 7     |
| Field Cultivating <u>1/</u> | More   | 31                      | 6         | 10          | 24             | 17            | 1             | 11    |
| Crop Cultivating <u>2/</u>  | Less   | 7                       | 2         | 2           | 2              | 1             | 81            | 5     |

1/ Cultivation prior to plant emergence.

2/ Cultivation after plant emergence.

TABLE 20: CROP ROTATION PRACTICES BY IOWA FARMERS

PERCENT OF 1975 MAJOR CROPS WHICH FOLLOWED 1974 CORN, SOYBEANS,  
AND OTHER CROPS BY CROP REPORTING DISTRICTS

| 1975 CROP | 1974 CROP | CROP REPORTING DISTRICT |    |    |     |    |    |    |    |    | IOWA |
|-----------|-----------|-------------------------|----|----|-----|----|----|----|----|----|------|
|           |           | NW                      | NC | NE | WC  | C  | EC | SW | SC | SE |      |
| CORN      | Corn      | 32                      | 30 | 50 | 47  | 31 | 48 | 41 | 50 | 35 | 40   |
|           | Soybeans  | 63                      | 65 | 33 | 44  | 63 | 38 | 48 | 40 | 56 | 51   |
|           | Other     | 5                       | 5  | 17 | 9   | 6  | 14 | 11 | 10 | 9  | 9    |
| SOYBEANS  | Corn      | 95                      | 90 | 89 | 95  | 95 | 95 | 93 | 85 | 86 | 92   |
|           | Soybeans  | 4                       | 9  | 8  | 2   | 4  | 2  | 4  | 9  | 11 | 6    |
|           | Other     | 1                       | 1  | 3  | 3   | 1  | 3  | 3  | 6  | 3  | 2    |
| OATS      | Corn      | 92                      | 79 | 82 | 88  | 77 | 82 | 80 | 76 | 74 | 82   |
|           | Soybeans  | 5                       | 17 | 16 | 10  | 19 | 13 | 16 | 16 | 20 | 14   |
|           | Other     | 3                       | 4  | 2  | 2   | 4  | 5  | 4  | 8  | 6  | 4    |
| HAY       | Corn      | 0                       | 2  | 4  | 0   | 6  | 5  | 1  | 3  | 2  | 3    |
|           | Soybeans  | 0                       | 2  | 0  | 0   | 1  | 0  | 0  | 0  | 1  | 0    |
|           | Other     | 100                     | 96 | 96 | 100 | 93 | 95 | 99 | 97 | 97 | 97   |

## SURVEY DESIGN

The farm fuel and equipment survey was conducted to obtain an indication of the amount of energy used on Iowa farms during the calendar year 1975. This includes energy used for crop s, livestock, dairy and poultry production, custom services, home heating, general farm use and non-farm use. The survey was also designed to obtain estimates of the number of energy consuming self-propelled equipment and the hours operated. In addition, quantity of fuel used for the most common cultural practices and changes in tillage practices of Iowa farmers since 1970 is also available from the summaries.

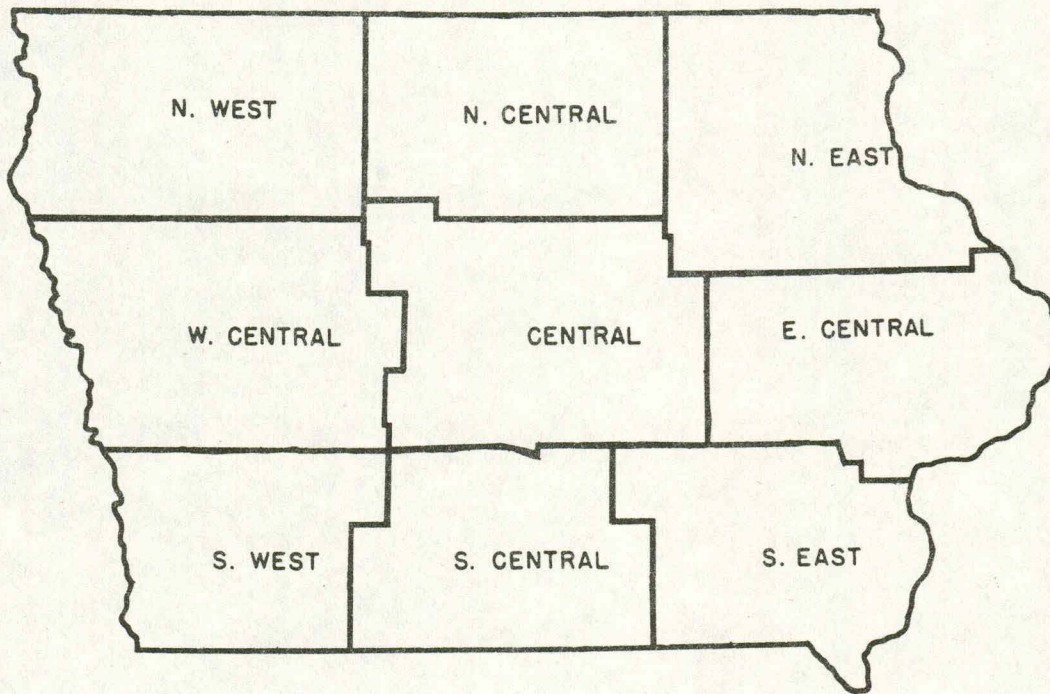
A systematic stratified probability sample of 1,083 was selected. Due to inaccessibility, retirement, or refusal to cooperate, 923 questionnaires were summarized. The sample was selected by size group and is shown below:

| <u>Strata</u> | <u>Land In Farm</u><br>(Acres) | <u>Universe</u> | <u>Sample</u> | <u>Sampling</u><br><u>Rate</u> |
|---------------|--------------------------------|-----------------|---------------|--------------------------------|
| 1             | 1- 79                          | 13,404          | 111           | 1/120                          |
| 2             | 80-179                         | 31,187          | 260           | 1/120                          |
| 3             | 180-299                        | 28,138          | 234           | 1/120                          |
| 4             | 300-499                        | 27,681          | 230           | 1/120                          |
| 5             | 500 +                          | 14,892          | 248           | 1/60                           |
|               |                                | 115,302         | 1,083         |                                |

The survey was conducted by personal interview during February and the first two weeks in March. Since each sample was selected with a known probability, the individual farm data, as reported by each respondent, was expanded to obtain estimates for crop reporting districts and the State.

This is the first survey of this type relating to energy utilization on Iowa farms and very little "check data" was available to compare the survey results against. A mail survey was conducted during the same approximate time period using an abbreviated version of the interview questionnaire to obtain comparable items but from an independent sample. The mail survey results for practically every item supported the level of the expanded data from the interview survey. Due to the smaller sample size and fewer number of items summarized, the results of the survey were not included in this publication but used only for comparison purposes.

# IOWA CROP REPORTING DISTRICTS



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