OCCURRENCE OF FARMING PRACTICES IN IDAHO:

With Special Reference To Remote Sensing

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ABSTRACT

This survey of information was initiated and compiled because of the needs of remote sensing interpreters to identify crops throughout the year on various types of remote sensing imagery. A fairly comprehensive guide to what crops grow in a county and the specific seasonal cropping practices has been developed.

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The authors wish to acknowledge the fine cooperation of the personnel at the Agriculture Extension Office of the University of Idaho, the County Agriculture Extension Agents and the Soil Conservation Service Representatives.

Cover Photo: the cropland area around Lake Lowell (center) and the cities of Caldwell (top) and Nampa (right), Idaho. Photo taken by NASA U-2 aircraft.
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by

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Occurrence of Farming Practices in Idaho: with Special Reference to Remote Sensing

INTRODUCTION

This study of cropping practices developed from the needs of another major study in the state of Idaho. In mid-1975, investigators attempted to inventory irrigated lands in selected areas in southern Idaho using remote sensing imagery, including satellite imagery. The Department of Water Resources needed prompt information to fulfill statutory functions of: a) collecting information about water resources and needs; b) authorizing the sale of water rights; and c) approving the formation of irrigation districts.

One sub-study under that project undertook identification of crop types, one factor which would give investigators an indication of irrigation water demand. A significant amount of ground truth was required in the attempt to identify crop types using remote sensing imagery. Information was needed on many variables throughout the year, including cropping practices for each crop, row width, soil types, slope, aspect, field size, and types of irrigation used (Heller et al. 1976, Packard 1976). Project personnel soon realized that this kind of data was not readily available and that little information had been compiled on the occurrence of farming practices, especially on the rapidly expanding crop areas of southern Idaho.

This study, through the aid of a National Science Foundation Undergraduate Research Participant Grant, reports a compilation of occurrence of farming practices throughout the state of Idaho.

This information can be used to determine the best time or times of the year when crops can be discriminated on remote sensing imagery. Certain crops may have one date during the season when they can be singled out as mature, while the other crops are just being planted. Knowing when crops are at different stages will help determine the best combination of dates for discriminating all the crops in an area.

METHODS

We searched the literature for information on the occurrence of cropping practices and contacted personnel in the Agricultural Extension Office at the University of Idaho and the Soil Conservation Service for any available data. Although we had little success in finding the needed information, we learned that the best sources for such data were the County Extension Agents and the Soil Conservation Service representatives. These agents and representatives have collected and accumulated similar data for their counties or areas and in most cases are very aware of the present situation. We designed a survey questionnaire which was sent to all county Agricultural Extension agents and Soil Conservation Service (SCS) representatives in Idaho in July, 1976.

We asked them to indicate, for each of the 13 characteristics listed below, those crops occupying 10 percent or more of the total crop area in the county and to describe the characteristics, if appropriate. For items 1-5, we also asked for the dates of occurrence.

1. Plow
2. Plant
3. Fertilize
4. Irrigate
5. Harvest
6. Soil type (sandy loam, loam, silt, sandy, peat, clay, clay loam, silty loam)
7. Slope (0-5, up to 10, up to 20, up to 30 percent)
8. Dominant aspect if significant (all, level, or by direction, e.g., N, NNE, NE, etc.)
9. Row width (6-7, 6-12, 24-30, 30-36 inches)
10. Dryland or irrigated
11. Type of irrigation (flood, furrow, sprinkler, corrugate, rill, gravity dike, sub sprinkler, surface)
12. Average size of fields (1-20, 10-100, 100-160, 160-200, 200-600 acres)
13. If there are no-till fields

We compiled, analysed and summarized the data on maps (Figures 1-11) for ready reference.
We also asked for the following data, which are recorded in Appendix B.

1. Average annual rainfall in area
2. Average annual frost-free days
3. Crop rotation practices

After summarizing the data, we discovered a mimeographed pamphlet of limited distribution which included crop weather calendars for southern Idaho (Huxman and Faubion 1975). The pamphlet was apparently compiled by the Weather Bureau Agriculture Service Office in 1967 and then updated by the National Weather Service Office for Agriculture in 1975. This pamphlet includes crop practice occurrence similar to what we compiled for regions in southern Idaho.

RESULTS AND DISCUSSION

With a little coaxing we received 100 percent coverage for the state either through the county agents or the SCS personnel. Where there was duplicate coverage, we checked and verified the data before use.

Cropping characteristics, such as row width, size of fields, and slope often varied within a particular county. In these cases we generalized the data for the entire county.

The cropping practice data are presented in a series of Idaho county maps, each of which represents one or several crop types. An alphanumeric code on each map is used to designate the applicable data for each county.

When a cropping occurrence, such as plowing, took place in successive months, only the first month was entered in the map data. More specific data on the occurrence times of cropping practices are displayed in Appendix A, Table 1. This appendix includes the most specific information obtained in our survey with respect to times of plowing, planting, fertilization, irrigation, and harvest. In some cases, the actual commencement date (long-term average) of a farming practice is given; in others the months during which it occurs are listed.

Though these occurrences may vary from year to year, the data represent seasonal averages taken over a number of years and can serve as guidelines for prediction of future practices.

The crops represented are alfalfa, spring barley, winter barley, sugar beets, corn, fall grain, spring grain, lentils, beans, peas, potatoes, spring wheat and winter wheat. The alfalfa, sugar beets, corn, fall grain, spring grain, beans, and potatoes only occur in southern Idaho. The fall and spring grains are those other than wheat.

In addition to the crop occurrence maps, we have included other maps useful for determining crop types in an area using remote sensing imagery (Appendix C). A brief explanation follows:

- **Agricultural Use**: includes nonagriculture, grazing land, mountain valleys, dry land farming and irrigated farming.
- **Elevation**: shows elevation levels in feet between 600-1,500, 1,500-3,000, 3,000-6,000, 6,000-9,000, and 9,000-12,000.
- **Irrigated Areas**: distinguishes arable and irrigated land.
- **Land in Farms**: in categories of percentages below 20, 20-40, 41-60, 61-80, and over 80 by county.
- **Land Use**: includes barren, wilderness, forest, grazing, nonirrigated, and irrigated.
- **Annual Precipitation**: generalizes precipitation in inches for under 10, 10-20, 20-30, 30-40, 40-50, 50-60, and over 60.
- **Major Soils**: shows the Great Soils Groups.
- **Ground Water**: indicates where different rock types occur and appropriate depths of wells.

Sutter and Corey (1970) give other information that may be useful to the interpreter of remote sensing imagery, especially the grouping of crops by similarity of water usage, average annual consumptive use by crop, and consumptive irrigation requirements.

LITERATURE CITED


The code is an alphanumeric fraction with the symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations (1) involved and the month (2) of that operation. The denominator lists all other characteristics (3-9).

1. Operation
   1. Plow
   2. Plant
   3. Fertilize
   4. Irrigate
   5. Harvest

2. Month
   a. January
   b. February
   c. March
   d. April
   e. May
   f. June
   g. July
   h. August
   i. September
   j. October
   k. November
   l. December

3. Soil Types
   A. Sandy loam
   B. Loam
   C. Silt
   D. Sandy
   E. Peat
   F. Clay
   G. Clay loam
   H. Silty loam

4. Slope
   i. 0-5% slope
   j. up to 10% slope
   k. up to 20% slope
   l. up to 30% slope

5. Aspect
   M. All
   N. North
   O. West
   P. East
   Q. SE
   R. SSE
   S. SW
   T. NW

6. Soil Types
   U. H & S
   V. NNW
   W. SSW
   X. Level

7. Row Width (inches)
   a. 6-12 inches
   b. 6-12 inches
   c. 24-30 inches
   d. 30-36 inches

8. No-Till Fields
   e. Present
   f. Absent

9. Types of Irrigation
   g. Flooded
   h. Sprinkler
   i. Furrow

Field Size (acres)
   a. 1-20 acres
   b. 10-100 acres
   c. 100-160 acres
   d. 160-200 acres
   e. 200-600 acres

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphanumeric fraction with the symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations (1) involved and the month (2) of that operation. The denominator lists all other characteristics (3-9).

1. **Operation**
   - 1 Plow
   - 2 Plant
   - 3 Fertilize
   - 4 Irrigate
   - 5 Harvest

2. **Month**
   - a January
   - b February
   - c March
   - d April
   - e May
   - f June
   - g July
   - h August
   - i September
   - j October
   - k November
   - l December

3. **Soil Types**
   - A Sandy loam
   - B Loam
   - C Silt
   - D Sandy
   - E Peat
   - F Clay
   - G Clay loam
   - H Silty loam

4. **Slope**
   - I 0-5% slope
   - J up to 10% slope
   - K up to 20% slope
   - L up to 30% slope
   - M up to 35% slope

5. **Aspect**
   - M All specified
   - N South
   - O East
   - P West
   - Q SE
   - R SSE
   - S SW
   - T NW
   - U N & S
   - V N NW
   - W S SW
   - X Level

6. **Row Width**
   - a 6-7 inches
   - b 8-12 inches
   - c 12-15 inches
   - d 20-30 inches
   - e 30-36 inches
   - f 1-5 acres
   - g 10-100 acres
   - h 100-200 acres
   - i 200-600 acres

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphanumeric fraction with the symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics applicable to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations \(1\) involved and the month \(2\) of that operation. The denominator lists all other characteristics \(3-9\).

1. **Operation**
   - \(1\) Plow
   - \(2\) Plant
   - \(3\) Fertilize
   - \(4\) Irrigate
   - \(5\) Harvest

2. **Month**
   - \(a\) January
   - \(b\) February
   - \(c\) March
   - \(d\) April
   - \(e\) May
   - \(f\) June
   - \(g\) July
   - \(h\) August
   - \(i\) September
   - \(j\) October
   - \(k\) November
   - \(l\) December

3. **Soil Types**
   - \(A\) Sandy loam
   - \(B\) Loam
   - \(C\) Silt
   - \(D\) Sandy
   - \(E\) Peat
   - \(F\) Clay
   - \(G\) Clay loam
   - \(H\) Silty loam

4. **Slope**
   - \(I\) 0-5% slope
   - \(J\) up to 10% slope
   - \(K\) up to 20% slope
   - \(L\) up to 30% slope

5. **Aspect**
   - \(M\) All
   - \(N\) North
   - \(O\) South
   - \(P\) East
   - \(Q\) West
   - \(R\) SSE
   - \(S\) SE
   - \(T\) SW
   - \(U\) NW
   - \(V\) NE
   - \(W\) NW
   - \(X\) SW
   - \(Y\) SE
   - \(Z\) N

6. **Row Width**
   - \(a\) 6-12 inches
   - \(b\) 6-7 inches
   - \(c\) 24-30 inches
   - \(d\) 30-36 inches
   - \(e\) 1-20 acres
   - \(f\) 10-100 acres
   - \(g\) 100-200 acres
   - \(h\) 200-400 acres
   - \(i\) 400-600 acres

7. **Field Size**
   - \(a\) 5-10 acres
   - \(b\) 10-20 acres
   - \(c\) 20-50 acres
   - \(d\) 50-100 acres
   - \(e\) 100-200 acres
   - \(f\) 200-400 acres

8. **No-Till Fields**
   - \(g\) Present
   - \(h\) Absent

9. **Types of Irrigation**
   - \(l\) Flood
   - \(m\) Sprinkler
   - \(n\) Furrow
   - \(o\) Corrugate
   - \(p\) Reel
   - \(q\) Gravity dikes
   - \(r\) Sub-irrigation
   - \(s\) Surface
   - \(t\) Type not specified

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphanumeric fraction with the symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations (1) involved in that order; the month (2) of that operation. The denominator lists all other characteristics (3-9).

1. Operation
- 1. Plow
- 2. Plant
- 3. Fertilize
- 4. Irrigate
- 5. Harvest

2. Month
- a. January
- b. February
- c. March
- d. April
- e. May
- f. June
- g. July
- h. August
- i. September
- j. October
- k. November
- l. December

3. Soil Types
- A. Sandy loam
- B. Loam
- C. Silt
- D. Sandy
- E. Peat
- F. Clay
- G. Clay loam
- H. Silty loam

4. Slope
- I. 0-5% slope
- J. up to 10% slope
- K. up to 20% slope
- L. up to 30% slope

5. Aspect
- M. All
- N. South
- O. West
- P. East
- Q. SE
- R. SSE
- S. SW
- T. NW
- U. NS
- V. NW
- W. SSW
- X. Level

6. Row Width (inches)
- a. 6-7 inches
- b. 8-12 inches
- c. 24-30 inches
- d. 30-36 inches

7. Field Size (acres)
- e. 1-20 acres
- f. 20-100 acres
- g. 100-160 acres
- h. 160-200 acres
- i. 200-600 acres

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
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1. Operation
   1 Plow
   2 Plant
   3 Fertilize
   4 Irrigate
   5 Harvest

2. Month
   a January
   b February
   c March
   d April
   e May
   f June
   g July
   h August
   i September
   j October
   k November
   l December

3. Soil Types
   A Sandy loam
   B Loam
   C Silt
   D Sandy
   E Peat
   F Clay
   G Clay loam
   H Silty loam
   I Silt loam

4. Slope
   J 0-5% slope
   K up to 10% slope
   L up to 20% slope
   M up to 30% slope

5. Aspect
   N All
   O South
   P East
   Q SE
   R SSE
   S SW
   T NW
   U Northeast
   V Northwest
   W Northeast
   X Northeast

6. Row Width (inches)
   a 6-7 inches
   b 6-12 inches
   c 24-30 inches
   d 30-36 inches
   e 36-48 inches
   f 48-60 inches
   g 60-72 inches
   h 72-90 inches
   i 90-108 inches
   j 108-126 inches
   k 126-144 inches
   l 144-162 inches
   m 162-180 inches

7. Field Size (acres)
   a 1-5 acres
   b 6-20 acres
   c 21-60 acres
   d 61-200 acres
   e 201-600 acres
   f 601-1,000 acres
   g 1,001-2,000 acres
   h 2,001-4,000 acres
   i 4,001-6,000 acres
   j 6,001-10,000 acres
   k 10,001-20,000 acres
   l 20,001-60,000 acres
   m 60,001-1,000,000 acres
   n 1,000,001 acres or more

8. No-Till Fields
   i No-till fields
   k No-till fields

9. Types of Irrigation
   a Flood
   b Furrow
   c Sprinkler
   d Corrugate
   e Drip
   f Sub-sprinkler
   g Surface
   h Type not specified

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphanumeric fraction with the symbol for each characteristic (e.g., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations (1) involved and the month (2) of that operation. The denominator lists all other characteristics (3-9).

1. Operation
   1. Flow
   2. Plant
   3. Fertilize
   4. Irrigate
   5. Harvest

2. Month
   a. January
   b. February
   c. March
   d. April
   e. May
   f. June
   g. July
   h. August
   i. September
   j. October
   k. November
   l. December

3. Soil Types
   A. Sandy loam
   B. Loam
   C. Silt
   D. Sandy
   E. Peat
   F. Clay
   G. Clay loam
   H. Silty loam

4. Slope
   I. 0-5% slope
   J. up to 10% slope
   K. up to 20% slope
   L. up to 30% slope

5. Aspect
   M. All
   N. South
   O. West
   P. East
   Q. SE
   R. SSE
   S. SW
   T. NW
   U. N & S
   V. NNW
   W. SSW
   X. Level

6. Row Width (inches)
   a. 6-7 inches
   b. 6-12 inches
   c. 24-30 inches
   d. 30-56 inches

7. Field Size (acres)
   e. 1/20 acres
   f. 10-100 acres
   g. 100-160 acres
   h. 160-200 acres
   i. 200-600 acres

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphabetic fraction with a symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates the operation (1) involved and the month (2) of that operation. The denominator lists all other characteristics (3-9).

1. Operation
   - 1 Plow
   - 2 Plant
   - 3 Fertilize
   - 4 Irrigate
   - 5 Harvest

2. Month
   - a January
   - b February
   - c March
   - d April
   - e May
   - f June
   - g July
   - h August
   - i September
   - j October
   - k November
   - l December

3. Soil Types
   - A Sandy loam
   - B Loam
   - C Silt
   - D Sandy loam
   - E Peat
   - F Clay
   - G Clay loam
   - H Silty loam

4. Slope
   - I 0-5% slope
   - J 5-10% slope
   - K up to 20% slope
   - L up to 30% slope

5. Aspect
   - M All
   - N South
   - O West
   - P East
   - Q SE
   - R SSE
   - S SW
   - T NW
   - U N AS
   - V NNW
   - W GSW
   - X Level

6. Row width (inches)
   - a 6-12 inches
   - b 24-36 inches
   - c 30-36 inches

7. No-Till Fields
   - N No-till fields present
   - k No-till fields absent

8. Field Size (acres)
   - e 1-20 acres
   - f 10-100 acres
   - g 100-160 acres
   - h 160-200 acres
   - i 200-600 acres

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphanumeric fraction with the symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations [1] involved and the month [2] of that operation. The denominator lists all other characteristics [3-9].

1. Operation
   1. Plow
   2. Plant
   3. Fertilize
   4. Irrigate
   5. Harvest

2. Month
   a. January
   b. February
   c. March
   d. April
   e. May
   f. June
   g. July
   h. August
   i. September
   j. October
   k. November
   l. December

3. Soil Types
   A. Sandy loam
   B. Loam
   C. Silt
   D. Sandy
   E. Peat
   F. Clay
   G. Clay loam
   H. Silty loam

4. Slope
   I. 0-5% slope
   J. up to 10% slope
   K. up to 20% slope
   L. up to 30% slope

5. Aspect
   M. All
   N. South
   O. West
   P. East
   Q. SE
   R. SSE
   S. SW
   T. NW
   U. N & S
   V. NNW
   W. SSW
   X. Level

6. Row Width (inches)
   a. 6-7 inches
   b. 6-1/2 inches
   c. 24-30 inches
   d. 30-36 inches

7. Field Size (acres)
   a. 1-20 acres
   b. 20-60 acres
   c. 100-160 acres
   d. 160-200 acres
   e. 200-600 acres

8. No-Till Fields
   i. No-till fields present
   j. No-till fields absent

9. Types of Irrigation
   a. Flood
   b. Sprinkler
   c. Corrugate
   d. Rill
   e. Gravity dikes
   f. Sub sprinkler
   g. Surface
   h. Type not specified

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-1/2 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphanumeric fraction with the symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations [1] involved and the month [2] of that operation. The denominator lists all other characteristics [3-9].

1. **Operation**
   - 1. Plow
   - 2. Plant
   - 3. Fertilize
   - 4. Irrigate
   - 5. Harvest

2. **Month**
   - a. January
   - b. February
   - c. March
   - d. April
   - e. May
   - f. June
   - g. July
   - h. August
   - i. September
   - j. October
   - k. November
   - l. December

3. **Soil Types**
   - A. Sandy loam
   - B. Loam
   - C. Silty
   - D. Sandy
   - E. Peat
   - F. Clay
   - G. Clay loam
   - H. Silty loam

4. **Slope**
   - 1. 0-5% slope
   - 2. up to 10% slope
   - 3. up to 20% slope
   - 4. up to 30% slope

5. **Aspect**
   - M. All
   - N. South
   - O. West
   - P. East
   - Q. SE
   - R. SSE
   - S. SW
   - T. NW
   - U. N&S
   - V. NW
   - W. SSW
   - X. Level

6. **Row Width**
   - A. 6-7 inches
   - B. 6-12 inches
   - C. 24-30 inches
   - D. 30-36 inches

7. **Field Size**
   - A. 1-20 acres
   - B. 20-60 acres
   - C. 60-100 acres
   - D. 100-160 acres
   - E. 160-200 acres
   - F. 200-600 acres

8. **No-Till Fields**
   - i. No-till fields present
   - j. No-till fields absent

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphanumeric fraction with the symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations (1) involved and the month (2) of that operation. The denominator lists all other characteristics (3-9).

1. Operation
   1. Plow
   2. Plant
   3. Fertilize
   4. Irrigate
   5. Harvest

2. Month
   a. January
   b. February
   c. March
   d. April
   e. May
   f. June
   g. July
   h. August
   i. September
   j. October
   k. November
   l. December

3. Soil Types
   A. Sandy loam
   B. Loam
   C. Silt
   D. Sandy
   E. Peat
   F. Clay
   G. Clay loam
   H. Silty loam

4. Slope
   I. 0-5% slope
   J. up to 10% slope
   K. up to 20% slope
   L. up to 30% slope

5. Aspect
   M. All
   N. South
   O. West
   P. East
   Q. SE
   R. SSE
   S. SW
   T. NW
   U. N
   V. NNW
   W. NNE
   X. Level

6. Row Width (inches)
   a. 6-9 inches
   b. 10-12 inches
   c. 14-30 inches
   d. 30-36 inches

7. Types of Irrigation
   F. Flood
   G. Sprinkler
   H. Sub sprinkler
   I. Surface
   J. Orifice
   K. Type not specified

8. No-Till Fields
   l. No-till fields present
   m. No-till fields absent

9. Field Size (acres)
   a. 1-20 acres
   b. 20-60 acres
   c. 60-100 acres
   d. 100-160 acres
   e. 160-200 acres
   f. 200-600 acres
   g. 600-1000 acres

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 10-100 acres in size. No-till fields are absent.
The code is an alphanumeric fraction with the symbol for each characteristic (i.e., operation, time, soil type, etc.) listed in order of the characteristics given below. Only those symbols for characteristics appropriate to a particular crop are listed. If more than one month was indicated for a particular crop, only the first is listed. The numerator of the fraction indicates all the operations (1) involved and the month (2) of that operation. The denominator lists all other characteristics (3-9).

1. Operation
   a. Plow
   b. Plant
   c. Fertilize
   d. Irrigate
   e. Harvest

2. Month
   a. January
   b. February
   c. March
   d. April
   e. May
   f. June
   g. July
   h. August
   i. September
   j. October
   k. November
   l. December

3. Soil Types
   a. Sandy loam
   b. Loam
   c. Silt
   d. Sandy
   e. Peat
   f. Clay
   g. Clay loam
   h. Silty loam

4. Slope
   a. 0-5% slope
   b. up to 10% slope
   c. up to 20% slope
   d. up to 30% slope

5. Aspect
   a. North
   b. East
   c. West
   d. South

6. Row Width (inches)
   a. 6-12 inches
   b. 12-24 inches
   c. 24-30 inches
   d. 30-36 inches
   e. 36-48 inches
   f. 48-60 inches
   g. 60-72 inches
   h. 72-84 inches
   i. 84-96 inches
   j. 96-108 inches
   k. 108-120 inches

7. Field Size (acres)
   a. 1-5 acres
   b. 6-12 acres
   c. 13-20 acres
   d. 21-40 acres
   e. 41-100 acres
   f. 101-200 acres
   g. 201-300 acres
   h. 301-400 acres
   i. 401-500 acres
   j. 501-600 acres
   k. 601-700 acres
   l. 701-800 acres
   m. 801-900 acres
   n. 901-1000 acres
   o. 1001-1200 acres
   p. 1201-1500 acres
   q. 1501-2000 acres
   r. 2001-2500 acres
   s. 2501-3000 acres
   t. 3001-3500 acres
   u. 3501-4000 acres
   v. 4001-4500 acres
   w. 4501-5000 acres
   x. 5001-5500 acres
   y. 5501-6000 acres
   z. 6001-6500 acres

This example shows a crop for a county where the normal operations are to plow in April, plant in May, fertilize in June, and harvest in August. There is no irrigation. Soils are clay loam, on slopes up to 10% with all aspects. Row width is 6-12 inches in fields of 1-10 acres in size. No-till fields are absent.
APPENDIX A

Table 1. Specific dates for occurrences of farming practices for the major crops of each county. The data are from the survey questionnaire and are more complete than data included on the crop maps. Indicated in the table is the appropriate month or months of the year. Where a specific date was given, it is indicated by a slash with the date first; e.g., 1/7 is the 1st day of July.

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NA - not applicable; WN - when needed; F - Fall; S - Spring.
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NA - not applicable; WN - when needed; F - Fall; S - Spring.
## Appendix A - Table 1 continued

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NA - not applicable; WN - when needed; F - Fall; S - Spring.
<table>
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<td>Irrigate 6,7,8</td>
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<td>Harvest 9,10</td>
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<td>Fall Grain</td>
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<td>Grain</td>
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<td>Plow F 10</td>
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<td>Plant 4</td>
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NA - not applicable; WN - when needed; F - Fall; S - Spring.
# APPENDIX B

Table 1. Average annual rainfall and frost-free days, crop rotation practices and other comments.

<table>
<thead>
<tr>
<th>County</th>
<th>Average annual rainfall (inches)</th>
<th>Average annual frost-free days</th>
<th>Crop rotation practices</th>
<th>Other comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ada</td>
<td>11</td>
<td>130</td>
<td>alfalfa-corn-grain; alfalfa-row crop-grain</td>
<td></td>
</tr>
<tr>
<td>Adams</td>
<td>25</td>
<td>140</td>
<td></td>
<td>some June rains; dry July and August</td>
</tr>
<tr>
<td>Bannock</td>
<td>13</td>
<td>120</td>
<td>annual fallow-wheat; potatoes-grain</td>
<td></td>
</tr>
<tr>
<td>Bear Lake</td>
<td>13</td>
<td>75</td>
<td>2 barley-4-6 alfalfa; wheat-summer fallow-wheat; alfalfa-barley-oats &amp; seed alfalfa</td>
<td></td>
</tr>
<tr>
<td>Benewah</td>
<td>22</td>
<td>130</td>
<td>wheat-lentils</td>
<td>annual cropping</td>
</tr>
<tr>
<td>Blaine</td>
<td>14</td>
<td>95</td>
<td>5-8 alfalfa; 2-3 small grain; permanent pasture</td>
<td>seed potatoes and corn also grown, but make up less than 10% of crop area</td>
</tr>
<tr>
<td>Bingham</td>
<td>9</td>
<td>110</td>
<td>grain-potatoes; 3 alfalfa 1 potatoes-1 grain-1 potatoes-1 grain</td>
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</tr>
<tr>
<td>Bonner</td>
<td>31</td>
<td>121</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bonneville</td>
<td>9 (valley)</td>
<td>120</td>
<td>potatoes, potatoes-grain; 2 grain-potatoes; alfalfa-potatoes-grain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14 (drylands)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boundary</td>
<td>25</td>
<td>110</td>
<td>wheat-barley</td>
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<tr>
<td>Butte</td>
<td>9</td>
<td>97</td>
<td>IRRIGATED: 4 alfalfa-1 cereal crop-1 potatoes-1 cereal grain-1 alfalfa-4-7 alfalfa-3 cereal crops and seeded to alfalfa on 3rd year; DRYLAND: wheat-fallow</td>
<td></td>
</tr>
<tr>
<td>Camas</td>
<td>15</td>
<td>85</td>
<td>alfalfa and grain often not rotated for many years</td>
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<tr>
<td>Canyon</td>
<td>9</td>
<td>150</td>
<td>great variation in rotation practices alfalfa seeded in fall and spring; many other crops grown, but less than 10% of crop area</td>
<td></td>
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<tr>
<td>Caribou</td>
<td>14</td>
<td>70</td>
<td>wheat-wheat-spring grain; alfalfa-potatoes-grain</td>
<td>may freeze every month</td>
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<tr>
<td>Cassia</td>
<td>15</td>
<td>140</td>
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<tr>
<td>Clark</td>
<td>10</td>
<td>105</td>
<td>alfalfa-grain; alfalfa-potatoes</td>
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<tr>
<td>Clearwater</td>
<td>26</td>
<td>125</td>
<td>wheat-barley-peas</td>
<td>occasional fallow or lentils</td>
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### Appendix B – Table 1 Continued.

<table>
<thead>
<tr>
<th>County</th>
<th>Average annual rainfall (inches)</th>
<th>Average annual frost-free days</th>
<th>Crop rotation practices</th>
<th>Other comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custer</td>
<td>7</td>
<td>90</td>
<td>SEED GROWERS: potatoes-grain-alfalfa; COW-CALF: alfalfa-grain-alfalfa</td>
<td>most grain under sprinkler worked with offset disc and irrigated immediately after harvest; then late in fall volunteer grains disced again; in spring it is disced and ripped 16&quot; deep</td>
</tr>
<tr>
<td>Elmore</td>
<td>11</td>
<td>118</td>
<td>2 potatoes-1 grain; 1 potatoes-1 grain-1 beans; 1 sugar beets-grain-1 alfalfa; 1 sugar beets-grain-1 alfalfa; 4-6 alfalfa-2 grain; 1 potatoes-1 sugar beets-1 grain</td>
<td>potatoes planted on sandy soils starting in April; 3-4 year alfalfa rotations, except Mudlake area where hay left 8-10 years</td>
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<td>Franklin</td>
<td>16</td>
<td>119</td>
<td>potatoes-grain-hay; pasture continuous</td>
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<td>Fremont</td>
<td>18</td>
<td>110</td>
<td>potato-grain-hay; pasture continuous</td>
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<tr>
<td>Gem</td>
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<td>165</td>
<td>corn-grain-alfalfa; sugar beets-grain-alfalfa</td>
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<td>Gooding</td>
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<td>120</td>
<td>3 alfalfa-1 beans-1 grain-1 corn-1 grain; with pivot sprinklers for potatoes may be: potatoes-grain or potatoes-sweet corn</td>
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<tr>
<td>Idaho</td>
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<td>100 (Mudlake) 120 (Rigby)</td>
<td>alfalfa-grain-potatoes</td>
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<tr>
<td>Jerome</td>
<td>10</td>
<td>125</td>
<td>alfalfa-beans-beets; grain-(beans-beets); alfalfa with grain</td>
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<tr>
<td>Kootenai</td>
<td>23</td>
<td>140</td>
<td>winter wheat-spring barley; lentils or peas-wheat-spring barley; spring wheat-winter wheat-spring barley; bluegrass seed (6-8 years) worked into above systems</td>
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<tr>
<td>Latah</td>
<td>25</td>
<td>145</td>
<td>wheat-peas-fallow; peas-lentils-wheat</td>
<td>not much fallow</td>
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<td>Lemhi</td>
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<td>102</td>
<td>6 hay/pasture-1 grain</td>
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<tr>
<td>Lewis</td>
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<td>110</td>
<td>peas-wheat-barley; peas-wheat-barley-wheat-summer fallow</td>
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<tr>
<td>Lincoln</td>
<td>9</td>
<td>100</td>
<td>beans-grain-hay; grain-hay-corn</td>
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<tr>
<td>Madison</td>
<td>15</td>
<td>100</td>
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<td>Minidoka</td>
<td>9</td>
<td>130</td>
<td>3 hay-1 potatoes-1 grain-1 potatoes-1 grain</td>
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<tr>
<td>Nez Perce</td>
<td>15</td>
<td>180</td>
<td>wheat-peas; wheat-wheat</td>
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### Appendix B – Table 1 Continued.

<table>
<thead>
<tr>
<th>County</th>
<th>Average annual rainfall (inches)</th>
<th>Average annual frost-free days</th>
<th>Crop rotation practices</th>
<th>Other comments</th>
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<tbody>
<tr>
<td>Oneida</td>
<td>14</td>
<td>100</td>
<td>continuous grain; grain-fallow; continuous hay; hay-grain</td>
<td>other crops grown but do not comprise 10% of crop land area</td>
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<td>3-5 hay-2-3 row crops-1 grain-1 hay</td>
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<td>Payette</td>
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<td>beets-grain-alfalfa-corn; onion-corn-beets-grain; corn-beets-grain</td>
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<tr>
<td>Power</td>
<td>13</td>
<td>118</td>
<td>DRYLAND: wheat-fallow IRRIGATED: wheat-potatoes-sugar beets; wheat-potatoes</td>
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<tr>
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<td>11</td>
<td>75</td>
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<tr>
<td>Twin Falls</td>
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<td>134</td>
<td>wheat-2 alfalfa-sugar beets-beans; potatoes-2 grain-sugar beets; wheat-2 alfalfa-2 beans; and others</td>
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<tr>
<td>Valley</td>
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<td>pasture-grain-pasture; 2 grain-clover; potatoes-grain-clover</td>
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<td>Washington</td>
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<td>DRYLAND: wheat-fallow-wheat</td>
<td>some fertilizing and most plowing done in fall</td>
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<td>(Cambridge)</td>
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<td>(Weiser)</td>
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AGRICULTURAL USE

NON AGRICULTURAL USE

GRAZING LAND, FORESTEM IN NORTH & GRASSLAND IN SOUTH. CATTLE & SHEEP

MOUNTAIN VALLEYS. IRRIGATED & NON IRRIGATED. HAY, SEED, PASTURES & SMALL GRAINS

DRY LAND FARMING. WHEAT, GRAINS, & SOME PEAS & LENTILS

IRRIGATED FARMING. HAY, POTATOES, SUGAR BEETS & SPECIALIZED CROPS

Appendix C - Figure 4

LAND IN FARMS

OVER 80%
61-80%
41-60%
20-40%
BELOW 20%

AVERAGE 29.8%

Appendix C - Figure 5

LAND USE

BARREN & WASTE LANDS
LITTLE USE; MINOR RECREATION

WILDERNESS & PRIMITIVE AREA
MAJOR FOREST & RECREATION

FOREST: MAJOR RECREATION, FOREST
MINERAL; MINOR GRAZING

PASTURE & GRAZING
MAJOR LIVESTOCK; MINOR FOREST

NON IRRIGATED FARMLAND
MAJOR CROPLAND; MINOR PASTURE

IRRIGATED FARMLAND
MAJOR CROPLAND; MINOR PASTURE

Adapted from Caldwell, H.H. 1970.
Idaho Economic Atlas. Idaho Bureau of
Mines and Geology. 82 pp.
ANNUAL PRECIPITATION

MAJOR SOILS

VERY LIGHT-COLORED, SEMIARID SOILS WITH SALT DESERT SHRUB VEGETATION (GREY DESERT)

LIGHT-COLORED, SEMIARID SOILS WITH SAGEBRUSH-GRASS VEGETATION (SEROZEM)

SLIGHTLY DARK-COLORED, SEMIARID SOILS, SAGEBRUSH-GRASS VEGETATION (BROWN)

DARK-COLORED SEMIARID SOILS WITH SAGEBRUSH-GRASS VEGETATION (CHESTNUT)

VERY DARK-COLORED, SEMIARID, SAGEBRUSH-GRASS & GRASSLAND SOILS (CHERNozEM)

VERY DARK SUBHUMID GRASSLAND, SAGEBRUSH-GRASS GRASSLAND-FOREST SOILS (PRAIRIE- WESTERN BROWN FOREST, GREY WOODED)

DARK-TO-LIGHT-COLORED, SUBHUMID FOREST SOILS (WESTERN BROWN FOREST)

DARK TO LIGHT BROWN, SUBHUMID TO HUMID FOREST SOILS (BROWN PODZOLIC)

DARK-COLORED, HUMID, COLD ALPINE SOILS (ALPINE MEADOW, ALPINE TURF, ALPINE BOG)

SOILS CONSISTING OF NEARLY FRESH BASALTIC LAVA

Appendix C - Figure 8

GROUND WATER

WELL DEPTHS | ROCK TYPES
---|---
200 - 1500 | SEDIMENTARY & VOLCANIC AQUIFERS
100 - 1000 | OLDER BASALTS
50 - 500 | BASALTS
0 - 300' | SANDS & GRAVELS