Computer Programs for Range Management

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The interest in and use of computers in business management has increased rapidly over the past decade. The number and availability of computer programs or software is increasing daily, although only a few programs have been specifically developed for conservation and range management. Many of these computer programs are available to the individual businessman such as the rancher and to agency personnel. In a recent issue of *AgriComp*, a magazine on farm computing, there were advertisements for over 20 different software packages by 14 firms. AGPROS, a computer software company in Texas, lists 114 programs that could be used by ranchers (AGPROS 1982); few of these programs deal with range management.

The interest in developing programs for range livestock management is increasing. More individuals are pursuing applied software for the Western rancher. This article discusses the purpose and availability of some different computer programs that could be helpful to ranchers and range managers.

Classification of Programs

I have classified computer programs by two characteristics: (1) what type of machine (hardware) is required? and (2) what is the purpose of the programs?

The type of machine can be divided into two major classes, mainframe computers and microcomputers. **Mainframe computers** are the large computers found in government agencies, large businesses, and universities. These expensive machines require space and staff to keep them running. Range managers in agencies have access to mainframes through terminals. Ranchers are not going to buy them; however, there are several software packages for mainframe computers that ranchers can use. In many instances, the rancher provides information to another person (extension agent, consultant, banker, or agency employee) who knows how to use the program.

Microcomputers are relatively small, usually fitting a small desk or table, and are inexpensive compared to the large machines. Software for these machines is usually easy to use and oriented toward the individual, family, or small business.

I have adopted Kothmann's (1983) subject area classification of **software**. He classified software as dealing with information systems, business management, production decision aids, office operations, education, and recreation. Of the six areas, I will concentrate on the first three and include examples of computer software in each.

Information Systems

Information systems include software dealing with market and commodity reports, weather reports, news reports and other reporting services in information systems. Three exam-

ples of systems that are currently being used in agriculture in the West are AGNET, DIALCOM, and AGRIDATA.[1] All are on large mainframe computers and are accessed by telephone and computer terminal or microcomputer.

AGNET was developed by the University of Nebraska, Lincoln, in partnership with other states and supported by the Old West Regional Commission. It is currently being used by personnel in several states, primarily Nebraska, Colorado, Montana, North Dakota, South Dakota, Washington, and Wyoming. AGNET is an interactive system which contains over 100 programs. Included are programs containing market information with specialists' comments, Extension reports, news stories, and a list of hay for sale and pasture for rent. AGNET is supported by the Cooperative Extension Service, and you should contact your County Agent or State Agricultural Economics Specialist to discuss availability in your area.

The U.S. Department of Agriculture used a subsystem of DIALCOM, a commercial information system. The subsystem contains information programs containing USDA news releases, Crop Reporting Board reports, Foreign Agricultural Service reports, outlook and situation summaries, regional news releases, market reports, and even the morning news highlights. The Cooperative Extension Service uses this system, and can provide you with information concerning reports from the system. It is one source of information for Extension newsletters.

AGRIDATA is an example of a commercially available information system. Reports are available in the area of commodity markets, weather reports, news articles, and the futures market. Electronic mail and an education subsystem are also available.

Information systems also include other data bases that deal primarily with literature. DIALOG is commercially available and has literature databases on numerous topic areas. USDA Forest Service supports WESTFORNET, which contains natural resources literatures.

Business Management

There are numerous programs that are applicable to agribusiness management. Of the 114 programs listed by AGPROS (1982), over half are business management programs for the rancher or feeder of beef cattle or sheep. The AGNET system contains over 20 financial programs which include cash budgeting, comparative financial statements, analysis of alternative financing methods, cash flow analysis, purchasing analysis of equipment and land, and economic analysis of beef and crop production.

Numerous business management and economic analysis programs have been developed by universities and private

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software companies. The prices of the different packages vary tremendously, as well as the analysis capabilities. Programs are written with different operating systems. You should check to make sure programs are compatible with your computer system. Some also require other software systems or support systems to manage the information. These are called data management systems. A common type of data management system for business management is the spreadsheet. Some spreadsheets on the market are VisiCalc, VisiFile, Apple Business Graphics, Multi-Plan, Lotus 1-2-3, and Symphony.

The Cooperative Extension Service is developing business management systems for ranching, and Oregon State University has developed a budgeting system for microcomputers. Personnel from the University of California, Oklahoma State University, and Texas A & M University are currently developing the Microcomputer Budget Management System (MBMS). This program will allow ranchers to project costs and returns for different enterprises, whole ranch analysis of cash flow, net worth, and income statements.

Texas A & M University has a finance package which contains programs on agricultural loan analysis, evaluation of loan alternatives, and calculation of future and present values. More information can be obtained from the Extension Data Center Computer Services Unit, USDA Building (Rm 135), College Station, TX 77843.

The University of Idaho has programs available that can assist ranchers on machinery acquisition analysis, machinery cost analysis, cattle feeding analysis, breakeven feeder analysis, and enterprise budgeting. These microcomputer programs are available from Agricultural Communications Center, 111 Agricultural Sciences Building, University of Idaho, Moscow, ID 83843.

Production Decision Aids

Software packages that help ranchers make better decisions are difficult to separate from other types of software, as all should give the rancher more, and we hope, better information. I have included software that deals with herd records, herd and grazing management, and forage balance.

Several record-keeping programs are available on the AGNET system. In addition, Colorado State University has a program on beef performance which was adapted from a University of Idaho program. This program helps increase culling efficiency. Currently, ranchers submit information on data forms to Fort Collins, where it is processed on a mainframe computer. Reports are then returned to the rancher. While this system is only available to a limited number in Colorado, software has been adapted to microcomputers.

Numerous other herd record-keeping programs are available commercially such as bull record-keeping systems. Texas A & M University has a program that calculates adjusted 205-day weaning weights and provides information on performance evaluation.

A cow-calf management program and a stocker grazing management model have been developed at Kansas State University. Both are available from the Extension Service at Kansas State University.

Another range management program is Grazi Data. This program was developed to facilitate planning and record keeping in Texas. Animal and forage records are maintained, and animal requirements are balanced with forage availability. The program can be used to simulate alternative grazing management plans and to consider options before committing yourself to any grazing management program.

Individuals at Oregon State University have also developed a forage-animal requirement program. This should be of particular interest to public land users, as federal forage is an important aspect considered in the program.

COPLAN is a program that can be used for ranch planning. It is being used by the Soil Conservation Service in conjuction with ranchers. The program uses a mainframe computer and requires assistance in entering information and interpreting results.

This brief discussion has only described a few of the many software packages that are available. There are numerous references available that describe different packages. Most State Cooperative Extension Services publish a newsletter on computer programs. These newsletters describe different programs, provide evaluations and provide information on where to obtain programs. There are also magazines, newsletters, and software directories; a list of some of these sources is attached as an appendix. Also attached as an appendix is a list of some programs that are currently available and costs, if known.

Reference

AGPROS. 1982. AGPROS Source Book for Agricultural Applications. AGPROS Micro Systems, P.O. Box 64539, Lubbock, Texas.
Kothmann, M. M. 1983. The future of computers in the range livestock industry. *In:* Computer Programming for the Public Land Rancher, Public Land Council, Denver, CO.

Computer Programs Related to Range and Ranch Management[2]

I. Information Systems

A. Systems Name: AGNET   Available in Nebraska, Colorado, Montana, North Dakota, South Dakota, Washington, and Wyoming. Contact Extension Service in these states. In other states, contact can be made to AGNET, Rm. 7 Morrill Hall, NDSU, Box 5655, Fargo, ND 58105.

Initial subscription fee of $50 and first year's subscription fee of $25. In 1984, the average per hour expense for running programs wa $11 per user.

B. System Name: DIALCOM   Available to USDA personnel.

DIALACOM is an information system available to USDA personnel and other major subscribers. It contains situation and outlook reports, the USDA daily newsletter, daily market results, and the National Agricultural Library bibliographies as well as specialized data bases for extension personnel.

C. Systems Name: AGRIDATA   For more information AGRIDATA's address is 330 E. Kilboin Ave., Milwaukee, WI 53202 (800-5589044)

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[2]Many more programs are available in the private sector, but only a few have been listed. The use of trade names has been done only to help the reader. The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by the author is implied.

Start up fee of $75 plus $39/month. Discounted 7- and 12-month packages are $199 and $399, respectively. Connect time is $28.19/hr. for 300 baud and $39.24 for 1200 baud (includes use of toll-free number). Varying fees for each report access.

D. Systems Name: DIALOG For more information and a catalog, write to DIALOG Information Services, Inc., Marketing Dept., 3400 Hillview Ave., Palo Alto, CA 94304

DIALOG offers more than 175 databases which can be used for literature searches, business reports, and directories of career opportunities and foundations and grants. DIALOG is one commerical vendor of databases.

E. Systems Name: WESTFORNET Available at various WEST-FORNET Service Centers of USDA Forest Service.

WESTFORNET is an information system which does computer literature searching as well as other information support services for Forest Service employees, State Foresters, and more recently, Bureau of Land Management employees.

II. Business Management

A. Source: AGNET (See I.A.)

1. Program name: FINANCE
Purpose: Designed to help ranchers make financial projections and budgets. The program is a series of 15 sub-programs that cover subjects such as cash budgets, loan analysis and projections, cash flows, and depreciation.

2. Program name: PLANPAK
Purpose: To provide a computerized budgeting procedure for comparing physical and financial characteristics of a ranch organization with alternative organizations. Permits the user to estimate future profitability, debt servicing ability, and solvency characteristics of the ranch operation.

3. Program name: PLANTAX
Purpose: To consider tax consequences of changes in current year on possible federal income taxes.

4. Program name: COWCOST
Purpose: To estimate production and marketing costs associated with a beef cow-calf enterprise. Variable costs plus straight line depreciation on capital improvements are included.

5. Program name: CALFWINTER
Purpose: To estimate production and marketing costs of wintering calves.

6. Program name: GRASSFAT
Purpose: To estimate production and marketing costs of pasturing yearling calves during the summer.

7. Program name: FEEDMIX
Purpose: To formulate least-cost balanced rations. BEEF for feedlot operations and RANGE for beef cows and calves.

8. Program name: EWECOST
Purpose: To estimate production and marketing costs associated with a ewe-lamb enterprise.

9. Program name: BUYLAND
Purpose: To estimate the maximum price per acre to bid for a specific parcel of land. Predicts cash flow requirement if maximum bid is paid.

Microcomputer Programs

1. Program name: PASTEST
Purpose: To generate establishment budget for range and irrigated pasture.

Computer Requirements: Supercalc

Availability: On request, Mel George, Extension Range Specialist, Univ. of Calif. at Davis.

Cost: Nominal

2. Program name: RANGEIMP
Purpose: To evaluate range improvement alternatives using amortization.

Computer Requirement: CP/M and BASIC

Availability: On request, Mel George, Extension Range Specialist, Univ. of Calif. at Davis.

Cost Nominal

3. Program name: F.A.R.M. (Farm Accounting and Records Managements)
Purpose: A cash accounting program designed for farmers and ranchers without an accounting background.

Computer Requirement: Apple II Plus, IIe or IIc; 48k with 2 disk drives. Or, IBMPC and PC Jr. with 2 disk drives.

Availability: Shipped on receipt of order, Specialized State Systems, 160 S. 300 K., Kaysville UT 84037

Cost: $395.00

4. Program name: FINANCIAL ANALYSIS
Purpose: To detail annual financial analysis of farm or ranch business. It summarizes cash flow, calculates income and expenses, computes returns to investment and net worth, analyzes debt servicing capacity and present key financial ratios.

Computer requirement: IBM-PC and LOTUS 1-2-3.

Availability: On receipt of order, Karen Homan, Extension Computer Application Specialist, Colorado State University. (Original version developed at the University of Minnesota).

Price: $7.50 for CSU version.

5. Program name: FINANCING LAND SALE ANALYSIS
      FINANCING LAND PURCHASE ANALYSIS
Purpose: Two progams use after-tax cash flow and net present value to evaluate land purchase and sale financing alternatives.

Computer requirement: CP/M-80, CP/M-86, or MS-DOS, 64k, 1 disk drive; printer optional.

Availability: Extension Computer Technology Group, Texas A&M University.

Cost: $30 plus $25 disk set-up fee. ($20 for Texas residents).

6. Program name: BREA (Beef Ranch Economic Analysis)
Purpose: A computerized worksheet of ranch profitability and resource use. Calculates net ranch income, net return to family, labor management, net return to equity, and return to total investment.

Computer Requirements: IBM-PC, Supercalc III

Availability: March 1985, Extension Service, Department of Agricultural and Resource Economics, Oregon State University.

Cost: Unknown

7. Program name: K-FARM
Purpose: Financial and resource analysis.

Computer Requirement: CP/M or MS DOS

Availability: After field testing, Extension Agricultural

Economics, Kansas State University.

Cost: Unknown

8. Program name: FENCING COST CALCULATOR
Purpose: To estimate materials and investment requirements and annual costs of a fence. Allows analysis of different types of electric and non-electric fences.

Computer Requirement: CP/M-80; CP/M-86; or IBM-PC DOS version 2.0 only.

Availability: Extension Computer Technology Group, Texas A&M University.

Cost: $15 plus $25 disk set-up fee ($10 for Texas residents).

9. Program name: CATTLE FEEDING ANALYSIS
Purpose: To analyze costs and returns of cattle feeding and to determine breakeven price for placement of cattle in feedlots.

Computer Requirement: Apple II, II+, or IIe with DOS 3.3.

Availability: Agricultural Communications Center, University of Idaho.

Cost: $10.

10. Program name: BREAK-EVEN FEEDER ANALYSIS
Purpose: To evaluate opportunities in backgrounding calves by determining feed, nonfeed and break-even costs.

Computer requirement: Apple II, II=, or IIe with DOS 3.3.

Availability: Agricultural Communications Center, University of Idaho.

Cost: $10

11. Program name: ENTERPRISE BUDGET WORK-SHEET
Purpose: To estimate cost of production and profitability of an enterprise.

Computer requirement: Apple II, II+, or IIe with DOS 3.3.

Availability: Agricultural Communications Center, University of Idaho.

Cost: $10

Production Decision Aids
A. Source: AGNET (see I.A)
1. Program name: RANGECOND
Propose: To help calculate range condition and carrying capacity of native range. Based on Soil Conservation Service Range Site Guides.

2. Program name: BEEFGROWER
Purpose: To simulate beef cattle growth from an initial weight given environmental temperatures, feedlot conditions and ration specifications. Frame size, nutritional background, sex, and compensatory growth are considered.

3. Program name: COWGAME
Purpose: To simulate the selection process in beef herds. To teach how to utilize beef herd performance factors in selecting cattle.

4. Program name: BHPP/BHAP
Purpose: To generate, store and analyze individual rancher's beef herd data. Designed for commercial cow herds.

5. Program name: WEAN/YEARLING
Purpose: Beef herd performance programs for purebred herds.

6. Program name: RANGERATIONS
Purpose: To balance rations for beef cows, wintering calves, horses, and sheep.

7. Program name: CROSSBREED
Purpose: To help select breeding stock which will achieve desired changes in herd, and to plan crossbreeding programs. To forecast how 3 different crossbreeding systems will work within an individual's cow management regimen, using feed available on the ranch.

B. Microcomputer Programs
1. Program name: PASTURE INVENTORY
Purpose: To maintain pasture use records in terms of animal performance, capacity and residue at the end of use.

Computer requirements: CP/M and DBASEII

Availability: On request, Mel George, Extension Range Specialist, Univ. of Calif. at Davis.

Cost: Nominal

2. Program name: FORBAL
Purpose: Worksheet to balance forage availability against animal requirements in AUM's.

Computer requirements: CP/M and SuperCalc.

Availability: On request, Mel George, Extension Range Specialist, Univ. of Calif. at Davis

Cost: Nominal

3. Program name: SQUIRREL
Purpose: To examine ground squirrel control methods and population dynamics on alfalfa fields.

Computer requirements: CP/M and BASIC

Availability: On request, Mel George, Extension Range Specialist, Univ. of Calif. at Davis

Cost: Nominal

4. Program name: FEEDSTORIS
Purpose: To indentify alternatives of balancing feed resources and animal requirements and to determine impacts on net income.

Computer requirements: Apple and VisiCala

Availability: On request, Paul McCawley, Extension Range Specialist, Utah Stat Univ.

Cost: Approximately $5

5. Program name: Overstory-Understory Relations
Purpose: To predict understory production.

Computer Requirements: Apple soft

Availability: On request, Jack Nelson, Forestry and Range Management, Washington State Univ.

Cost: No charge

6. Program name: RANGEVEG
Purpose: To summarize and list vegetation data collected for monitoring range plant response to grazing and yearly environmental fluctuations.

Computer requirements: DBASE II, 256K.

Availability: Available by rancher request through Cooperative Extension, Univ. of Ariz.

Cost: To be determined.

7. Program name: GraziData
Purpose: To establish grazing data inventories by pasture

and grazing system, to calculate livestock numbers by kind and class of animal based on forage availability and the animal's forage requirements, to evaluate alternate grazing plans, and to maintain accurate, useable records of grazing by pasture and grazing system and by kind and class of animal.

Computer requirements: Apple II, II+, or IIe; 48k; 1 or 2 disk drives; 40 to 80 column screen; printer with parallel interface card.

Availability: Range Management Software, 1216 So. Ridefield, College Station, Texas 77840

Cost: $125

8.   Program name: COPLAN
Purpose: To determine animal requirement with range forages and supplements on the basis of dry matter and protein availability, and to determine economic feasibility of range improvements and animal alternatives.

Computer requirement: Written in Standard ASCII FORTRAN IV. Has been used on various mainframes.

Availability: Range Science Dept., Colo. State Univ.; other versions available at other locations. Available to SCS personnel through SCS.

9.   Program name: 205 DAY WEANING WEIGHT AND PERFORMANCE ANALYZER
Purpose: To calculate the adjusted 205-day weaning weights and weight ratios for a group of calves and to allow the user to sort the calves by size, sex, and dam.

Availability: Extension Computer Technology Group, Texas A&M University, College Station, TX

Cost $40 plus $25 disk set-up fee ($25 for Texas residents).

10.   Program name: BULL GAIN TEST ANALYSIS
Purpose: To assist cattle producers who are in the business of selling breeding bulls to maintain records of some performance measures related to yearling bulls.

Computer requirements: CP/M-80 version 2.2; 56k with microsoft BASIC 5.2.

Availability: Extension Computer Technology Group, Texas A&M University.

Cost: $15 plus $25 disk set-up fee ($10 for Texas residents).

The Grazing Land Simulator

John R. Lacey, Kris M. Havstad, and John R. Amend

Grazing lands have historically been held in low esteem by the general public. This philosophy has been responsible for the inconsistent political policies and inadequate fiscal support that has characterized grazing land management. Consistent policies and adequate funding will not be possible until urban youth, consumers, adult groups, and policy makers recognize the value of the food, fiber, water and recreation provided by grazing lands, and understand some of the basic principles of grazing land management.

It has been difficult to increase the public's understanding of grazing land. The urban population has become proportionately larger than their rural counterpart. Funding to train instructors and develop appropriate educational materials for the urban classroom has been inadequate. More excitement, challenge, and vividness is needed to stimulate the interest of the general public, and to encourage more instructors to teach grazing land management.

As a direct response to this need, a Grazing Lands and People project has been implemented at Montana State University. The key to this educational project has been the development of a Grazing Land Simulator. This effort was made possible by financial support from Cooperative State Research Service, National Cattleman's Association, Cooperative Extension Service, Bureau of Land Management, Bureau of Indian Affairs, US Forest Service, and the Soil Conservation Service.

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What Is the Grazing Land Simulator?

The simulator is a digital computer that models the ecology of rangeland. Although the present model is programmed with data from southeastern Montana and has a Northern Great Plains flavor, data form other locations can easily be incorporated into the program. Thus, the Grazing Land Simulator has wide applicability.

This simulator differs from standard digital computer simulations in that (1) it has a clock that records the the months and years during a run—each biological event is synchronized with the appropriate passing month (about 8 seconds per month); (2) it presents information on all of its variables simultaneously during the run; and (3) participants may interact with the model at any time by using simple controls to implement their grazing management decisions. It is not an answer-giving machine. It is a problem-causing machine. As the simulator operates, the challenges of managing range, wildlife, and livestock in an environmentally sound manner develop naturally. Participants are confronted with problems, make decisions, and are forced to live with the consequences of their actions.

The front panel of the Grazing Land Simulator depicts a ranch with three pastures—Arrowhead, Black Butte, and Cottonwood. Size and range site for each pasture is set at the beginning of the simulation. Wildlife populations, percent use, range trend, and vegetation rating are influenced by environmental factors and change as the simulator proceeds