ASSISTING TEXAS RANCHERS IN INTEGRATED MANAGEMENT INFORMATION SYSTEM DEVELOPMENT AND USE

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ABSTRACT

The management requirements for business oriented, Texas ranchers to make a living is helped by their Integrated Management Information System (IMIS) and ability to utilize information in decision making. The IMIS provides production, financial, and marketing information that facilitates the evaluation and monitoring of alternatives using the integrated systems approach.

This paper describes ranching in Texas, the IMIS, and approaches used by Extension management economists to assist Texas ranchers in developing and using their IMIS.

Ranching in Texas

Ranching is large in Texas as this activity accounts for 71% of the agriculture land use in the state (44.9 million of the 63.5 million hectares). This land provides the feeder cattle for the large feedlot industry (Texas feedlots finish 6 million cattle annually). Texas also has the nations largest sheep, goat, and the white tail deer herds. Hunting and wildlife is an important land resource use and compliments the primary income source, breeding cows, and growing young (stocker) cattle. Historically, much of the oil and natural gas wealth was controlled by land owners. In recent years, oil and gas production has sharply declined. Much of this income is widely shared among non-ranch heirs. Ranching, in early history, was land and cattle and then evolved to land and oil. Now in many respects it has returned back to land and cattle.

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Ranching in Texas is important from the standpoint of it's place in history, culture, resource use, and economic impact. The Texas ranching and cowboy culture provides a great motivation for participation in ranching and explains the large lifestyle or recreation participation in the cow-calf sector. The ranching culture focuses on cattle and horses. It is not a business culture. Many ranchers have poor financial management and marketing skills.

Lifestyle herds of less than 100 cows accounts for 91% of the herds and 49% of the 5.7 million beef cows (see Table 1). These small, part-time ranchers tend to be less responsive to price or technology change. Most are not interested in business management. The opportunity for profitable use of IMIS is with the business management oriented producers that make their living ($30-40,000 annual income) in ranching. This group represents less than 5% of the 133,000 operations or about 6,650 cow-calf producers.

Table 1. Beef Cows in Texas

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Size of Herd (head)	Operations (000)	Percent of Producers	Percent of Inventory	Head of Beef Cow (000)
1-49	104	78.3	30	1.83
50-99	17.5	13.1	19	1.09
100-499	10.5	7.7	33	1.91
500+	1.0	0.9	18	0.87

➔91.4% of the operations have less than 100 cows but they account for 49% of the inventory.

➔Of the 133,000 beef cow operations, 1,000 herds of 500 or more represent 0.75% of the operations but 16% of the inventory.

➔The 121,500 herds of less than 100 head produce about 1.9 million feeder calves.

Data Source: USDA, National Agricultural Statistics Service

Texas cow-calf producers that attempt to make a living in ranching face a difficult competitive situation. Ranchers must compete with non-business motivated producers, low returns and decreasing product demand. The sector is characterized by rate of returns 2.5% or less in years of high prices in this very cyclical industry (McGrann, et. al., February 1996). Land resource is over valued in terms of current earnings because of the consumption or recreation demand for rangeland. Land appreciation plus the current earnings are the lowest of agricultural sector often in the 1-5% range. The beef cattle sector is faced with intense price competition from poultry and has lost market shares. In the past 20 years, per capita beef consumption is down 23% and poultry is up 91% (see Table 2). Per capita expenditure for beef is up 6% and poultry is up 139% (see Table 3).

Table 2. Per Capital Consumption

(kilograms)

	Beef	Poultry	Pork
1975	40.1	22.4	19.55
1985	35.9	32.1	23.5
1995	31.1	42.8	24.5

Beef down 23%

Poultry up 91%

Data Source: NCBA - National Cattlemen: Directions, July 1996

Table 3. Per Capita Expenditures

	Beef	Pork	Chicken	Total
1985	$180.31	$83.75	$43.69	$307.75
1994	$191.50	$105.36	$104.24	$401.10

Beef is up 6%

Chicken is up 139%

Total up is 30%

Data Source: NCBA - National Cattlemen: Directions, July 1996

INTEGRATED MANAGEMENT INFORMATION SYSTEM

The purpose of an IMIS is to provide accurate information which enables decision makers to more effectively manage agricultural resources in order to achieve objectives and meet consumers' product demands. To manage for performance, performance must be measured. Integrated analysis deals with measuring the results of past decisions, but also sets the stage for identifying ways to change production and management systems. Measuring performance through integrated analysis is more important in ranching today, because the; (1) economics of size and corresponding growth in the ranches size means more complete information systems are required to manage these large businesses, (2) increased national and international competition means that there will be continued agricultural price-cost squeeze which will place a greater emphasis on effective business management, (3) ability to be responsive to consumer food quality and safety demands to be competitive requires more complete information on production and marketing options, and (4) greater emphasis on business management for farm and ranch operations are necessary for economic survival. A rising concern about the environment adds significant dimensions to food production and resource management decisions.

Integrated analysis and quantification of production costs certainly aid in the profitable use of price risk management opportunities such as the futures market and forward contracting. Modern information technologies greatly facilitate integrated analysis in data collection, data processing, and performance calculations. Training decision makers analytical skills to effectively utilize the information is also a growing challenge.

Integrated analysis must begin by defining the ownership and management goals for the ranch business, its resources, the products produced, and the enterprises to be analyzed, as illustrated in Figure 1. An integrated analysis does not have to encompass all resources (land, environment, management, labor, capital, information, and knowledge) nor does it have to encompass all of the ranch enterprises in order to be useful. The more complete the analysis, however, the less chance for error in decision making due to an incomplete view of the system. An integrated analysis

captures the enterprise's production, resource use, and financial results of the decisions made during a specified time period. The usefulness of the analysis is a product of the data that is collected, its accuracy, and the methodology used to process the data. Data and information behind an integrated analysis centers around ranch accounting and inventory data. However, off-ranch sources for weather, price, and other data are also used. The integrated analysis is only as comprehensive as the data and the methodologies employed. The knowledge, experience, time, and efforts of the decision makers determine the effectiveness of any integrated analysis in helping manage the ranch.

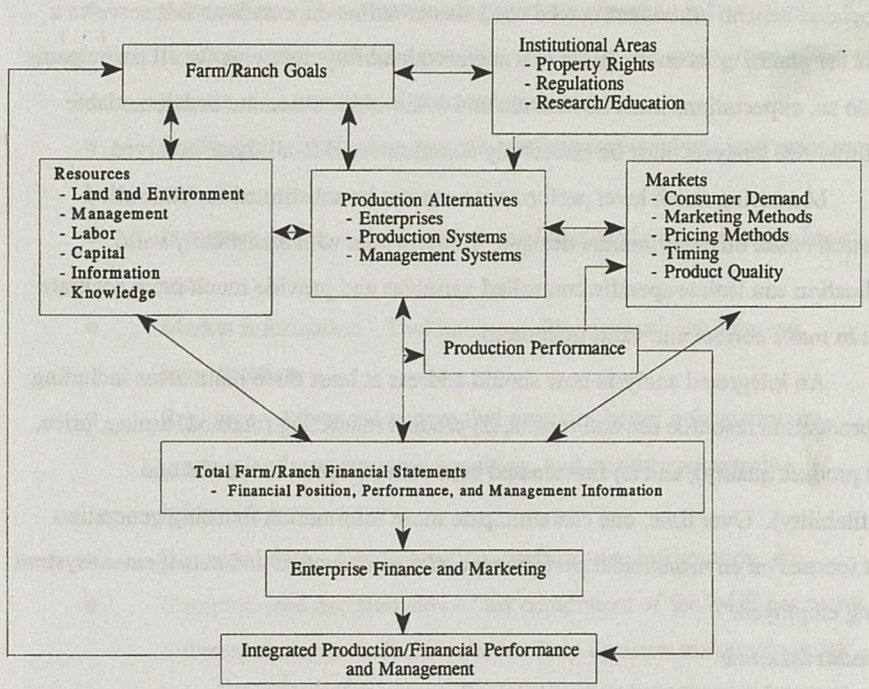

Figure 1. Components of an Integrated Ranch Management Information System

Users of the IMIS

Integrated system data and information are not only used by the business oriented producer, but also by outsiders including lenders, consultants, input sales

persons, tax advisors, lawyers, etc. Accuracy of data and confidence in understanding the methodology employed is important to all these potential analysts. Developing systems that meet the needs of multiple users helps to reduce duplication and is efficient for all users. Participation of all users in the design of the system is necessary to meet diverse needs.

Analysis of production, marketing, and financial results involves comparison within an individual operation or enterprise across years. Comparisons between ranches of similar size in a similar resource region also help identify areas for change. Comparative analysis requires consistent standardized criteria of measurement and benchmarks to judge specific performance results. Performance measures and associated benchmark values can be used also to define expectations that serve as a basis for planning incentive programs and accountability measures for all participants. To do so, expectations must be realistic and achievable. Accurate understandable performance analysis must be effectively communicated to all those involved.

Measuring ranch level performance can not be substituted for controlled research based on experimental designs. Experiments with statistically valid replication can isolate specific controlled variables and provide much more accurate data to make correct and valid inferences.

An integrated analysis now should address at least three main areas including; (1) production resource use and results, (2) product marketing (method, timing, price, and product quality), and (3) finance and economics (capital use, costs and profitability). Over time, one can anticipate more information focusing generation that focuses on environmental performance of the production and management system being employed.

Standardization

The importance of using standardized methodologies in accounting, production measures, and performance analysis cannot be over emphasized in IMIS development. Standardization reduces cost, improves the effectiveness and efficient of user education, and allows for development of benchmark values for comparative analysis. Texas A&M faculty have participated in two major standardization efforts;

the Farm Financial Standards for financial statement content, analysis criteria, and measures; and the Standardized Performance Analysis (SPA) on integrated financial, marketing, and production analysis system developed for beef cattle producers (Farm Financial Standards Council and McGrann et. al., 1996). These methodologies are widely used in the IMIS activities including participation on national benchmark performance data base. These methodologies focus on managerial information needs, integrated analysis, and calculation of the cost of production.

Major Components of IMIS

Each ranch situation differs but all IMIS have the following major components that can viewed in Figure 2 and are briefly described below.

- Accounting - This generates required tax reporting information, financial statements, and provides enterprise cost accounting. Best described as managerial accounting system.
- Production - Production records, performance analysis, and resource use.
- Inventory system - For livestock feed use, land use, and major input use.
- Market information - Tied into a satellite network for data and interpretation.
- Resource - Advanced system that provides better information on grazing land use, resource condition, and resource monitoring information.
- Personnel data - Job description, performance information, etc.
- Computerized decision aids - This component of the IMIS has many different decision analysis tools that help decision makers do quick calculations but also uses methodologies that help them in terms of organizing data and thought, and applying knowledge often in the "what if" content. The electronic spreadsheet is an important tool to drive these tools. Managers of commercial ranches need to know how to operate and develop spreadsheets.

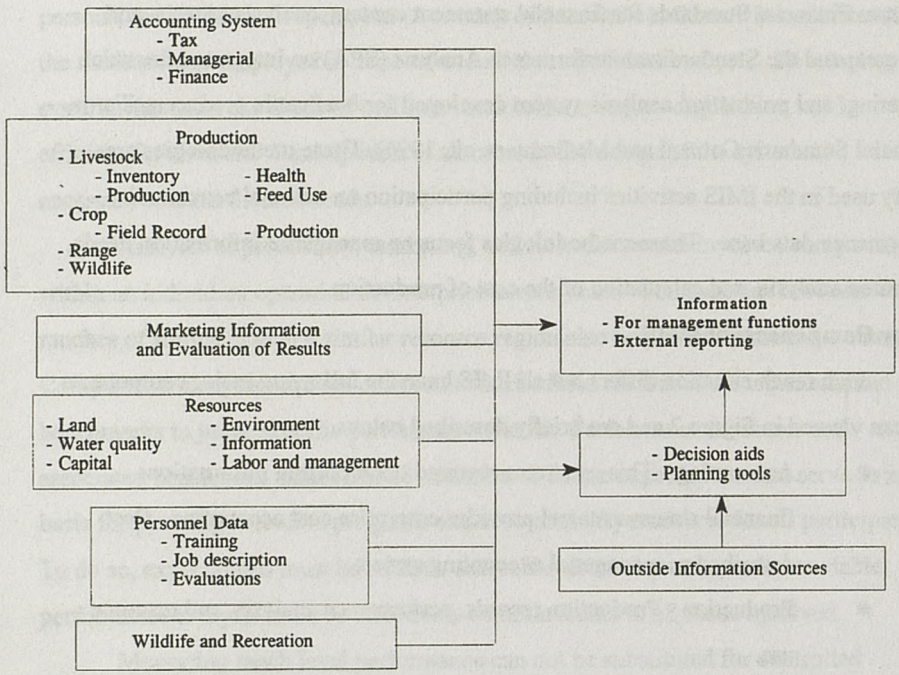

Figure 2. Modules in the Ranch Integrated Management Information System

IMIS Cost

Hardware and software are the least expensive part of the IMIS. A modest IMIS hardware and software will cost $4,000 to $8,000 with an annual maintenance and update cost of $500-1,000. Training operation personnel and their salary represents the largest cost ($10-20,000 annually). This activity is frequently accomplished by the rancher's wife. A great deal of time commitment is required by decision makers to utilize IMIS information and acquiring good business analysis skills. Often the business management analytical skills have to be developed.

Evaluating IMIS

Evaluating IMIS development effectiveness is accomplished by taking an initial assessment of what information is needed, what is being generated, identify who are the decision makers, and how they use information in decision making. Progress can then be evaluated in terms of progress toward meeting needs. This need

assessment does not have to be a lengthy process and frequently can be accomplished in a couple of hours by a ranch visit and asking key questions on production and financial performance, production costs, education level in business management, and an overview of the IMIS. In family operations, it's good to have a discussion with the husband, wife, and older children. With ranchers who have employees its good to talk to them about data collection information flowing back to them. If information is not coming back, its a good indicator of flaws in the IMIS. A publication has been developed with worksheets that can be used with producers to guide the process of assessing IMIS needs (McGrann et. al., April 1996).

Research that would establish the contribution of an IMIS to ranch net income has not been accomplished. Success is very dependent on user knowledge and decision making skills. This makes it difficult to place a monetary value on the IMIS contribution.

ALTERNATIVE EDUCATION SUPPORT ACTIVITIES

Extension Delivery System

The Texas Agricultural Extension Service (TAEX) has limited capacity to serve the business oriented producer's education needs in development and use of IMIS. Approximately 10 or 15% of the states 160,000 farmers and ranchers account for 90% of gross income. These are the producers that benefit from improving their IMIS. The state has ten Extension specialists that focus on farm and ranch business management education. An equivalent of three specialists focus on ranch business management. The majority of the non-economic Extension specialists focus on production areas. County agents that have very broad responsibilities have limited education responsibilities in the area of business management or training to assist producers develop and use their IMIS.

Target Audience for IMIS

The target producer audience for development and user training is approximately 5% of total ranchers that earn a substantial portion of their living from ranching. Given the structure, competitive position, and low ranching returns on investments, an integrated management approach is needed. The Extension support

for facilitating IMIS development is led by agricultural economists, with back-up support from production specialists, falls into areas including (1) software development and support, (2) contract research and development, (3) continuing education for accountants, veterinarians, and consultants, and (4) producer education workshops. Each of these activities is described as well as the advantage of each approach.

Software Use Education and Development

Commercially available accounting software meets the needs of ranchers in financial and tax accounting. Accounting software with modification to the chart of accounts and sub-accounts capabilities can be set-up to provide managerial information in addition to meeting tax and external reporting needs. Many programs are available for individual cow records and their analysis. Extension education programs are organized to help producers use commercial software. There are fee based education workshops, in convenient locations, taught primarily by Extension management specialists using portable notebook computers.

The Texas Agricultural Extension Service has complemented commercial software by developing decision aid software. One of the primary delivery software for decision aids is the electronic spreadsheet. The dynamics of information needs means decision makers need to have good spreadsheet development and operating skills to address specific needs. There is no better "what if" analysis tool than the spreadsheet.

Decision aid software development and support is an effective way to help producers develop analytical skills and provides a tool they can take home and use. Software provides a great opportunity to help standardization and incorporate integrated analysis methodologies.

The effectiveness of Extension education could be enhanced if there were bachelor of science trained professionals teaching many of the courses rather than the Ph.D. professional faculty. The primary limitations of software development is the high cost of software maintenance to keep up with the change in microcomputer technology.

Contract Research and Development

There are limited opportunities for university research and extension specialists to do contract research with the larger ranchers. The private contract does fund the development and education activities that directly meet the ranches needs. This work also provides the opportunity to develop new analytical tools and methodologies that can be used by the general public. An advantage of contract work with ranches is being able to test the IMIS and do user training during the development process. Contracts can be written for long term commitment and include both development and training components. This provides the real world challenge and learning opportunities for the faculty and graduate student participants. It provides the opportunity to work with data and information in the decision making environment. Access to a broader interdisciplinary professional group gives some advantage for ranchers to contract university faculty over direct contract with a private firm.

The limitation of the direct contract approach is that a ranch operation has to be large scale, likely 500 cows or more, and generate annual gross income in excess of $200,000 before they can justify a meaningful direct contract. There are 1,200 herds in Texas with 500 or more beef cows. With reduced funding in research and development, there is no doubt that direct contracting will be increasingly important for those university professionals who wish to participate in the real world of IMIS development.

Continuing Education for Accountants, Veterinarians, and Consultants

The accounting, veterinarian profession, and many consultants have compulsory accredited education requirements to maintain their professional license. Although a majority of these professionals provide narrow services to ranchers, a number are moving toward expanding their knowledge and services. A limited number of private ranch management consultants actually are available in Texas that address the traditional management, finance, marketing, and management information system areas. Managerial accounting and the Integrated Resource Management (IRM) approach education activities appeal to those professionals as they broaden

their fee based service.

Training these professionals by Extension specialists also provides a very positive effect for the limited number of Extension faculty with the managerial accounting and IRM interest. Accountants and veterinarians are clearly the most widely used professionals used by ranchers. They do much of the one-on-one consultation and can directly influence IMIS content. They can also train producers on how to utilize information while measuring their contributions to the business. They are big users and participants in IMIS development.

Accredited course content must be approved by the professional association and are monitored to maintain quality. These professional are encouraged to participate in producer workshops to re-enforce the formal accredited course training.

Professional continuing education opportunities is a very effective way to utilize Extension faculty. These education programs can be almost self supporting through user fees and have a large multiplier effect.

Producer Education Workshops

The most effective way to develop IMIS for ranches is to do the development work one-on-one at the ranch with owners and employees over several years with periodic interactions and training. Taking experience to the surroundings where decisions are made and communications take place offers the greatest opportunity to accomplish the task. This approach is also the most costly, in terms of Extension specialists, to achieve.

The second best one-on-one approach is to organize fee based workshops where Extension specialists can work with groups of ranchers. Producers are asked to pre-register for the workshops and are provided forms and a phone call before the meeting advising them on data to put together for the workshop analysis. Each participating ranch has their own table to ensure confidentiality of their information. After completion of the financial statement and the beef cattle integrated SPA analysis, producers are provided a private meeting to go over their results, define ways to improve their IMIS, and identify areas for change. Ideally follow up sessions and replicated annual analysis with help direct IMIS development.

The advantage of the workshops is the efficiency gained by grouping 15 or 20 ranchers together at a location. This minimizes travel costs and greatly facilitates getting more educators involved.

CONCLUSION

Ranching is important in Texas, in terms of its history and culture, and accounts for 71% of agriculture land use. The cow-calf enterprise in the primary economic activity of ranchers. This is a difficulty enterprise for ranchers to make a living because of competition from the non-business producers, loss of market share to poultry, and over valued land resources which all leads to a return on investment of approximately 2.5% during a high price phase of a very cyclical industry. Producers attempting to make a living in the sector can benefit from more informed decisions by using an Integrated Management Information Systems (IMIS) which supports the systems approach to decision making.

Texas Agricultural Extension Economists have used four approaches to assist ranchers in developing and using their IMIS. Success in this activity stems first by effectively identifying the business oriented target audience. This audience actually represents about 5% of the total beef cow-calf producers. Four Extension activities supporting IMIS development and use include (1) software use education and development, (2) contract research and development, (3) continuing education of accountants, veterinarians, and consultants, and (4) producer education workshops. All forms of delivery are fee based. Other than direct contract work, fees cover operating costs but not the cost of faculty. All methods are effective based on producers participation and observation of their changes but they have not been scientifically evaluated in terms of the IMIS impact on net ranch income.

The direct contract research and development is most effective as it allows IMIS development to fit the IMIS to the ranch and its personnel. However, only the larger ranches can afford this approach. The producer workshops are efficient in terms of working with more producers by limited Extension specialists. The follow-up activity with producers may be the shortcoming of this approach. Software development and support is difficult to achieve in the public institutions due to its costly nature. Educating producers who use commercial software are effective,

especially if trained professional rather than Extension specialists can be used. Training other professionals to assist ranchers is cost effective as it offers the greatest multiplier opportunity for the limited Extension faculty trained in the business management and IMIS development area.

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