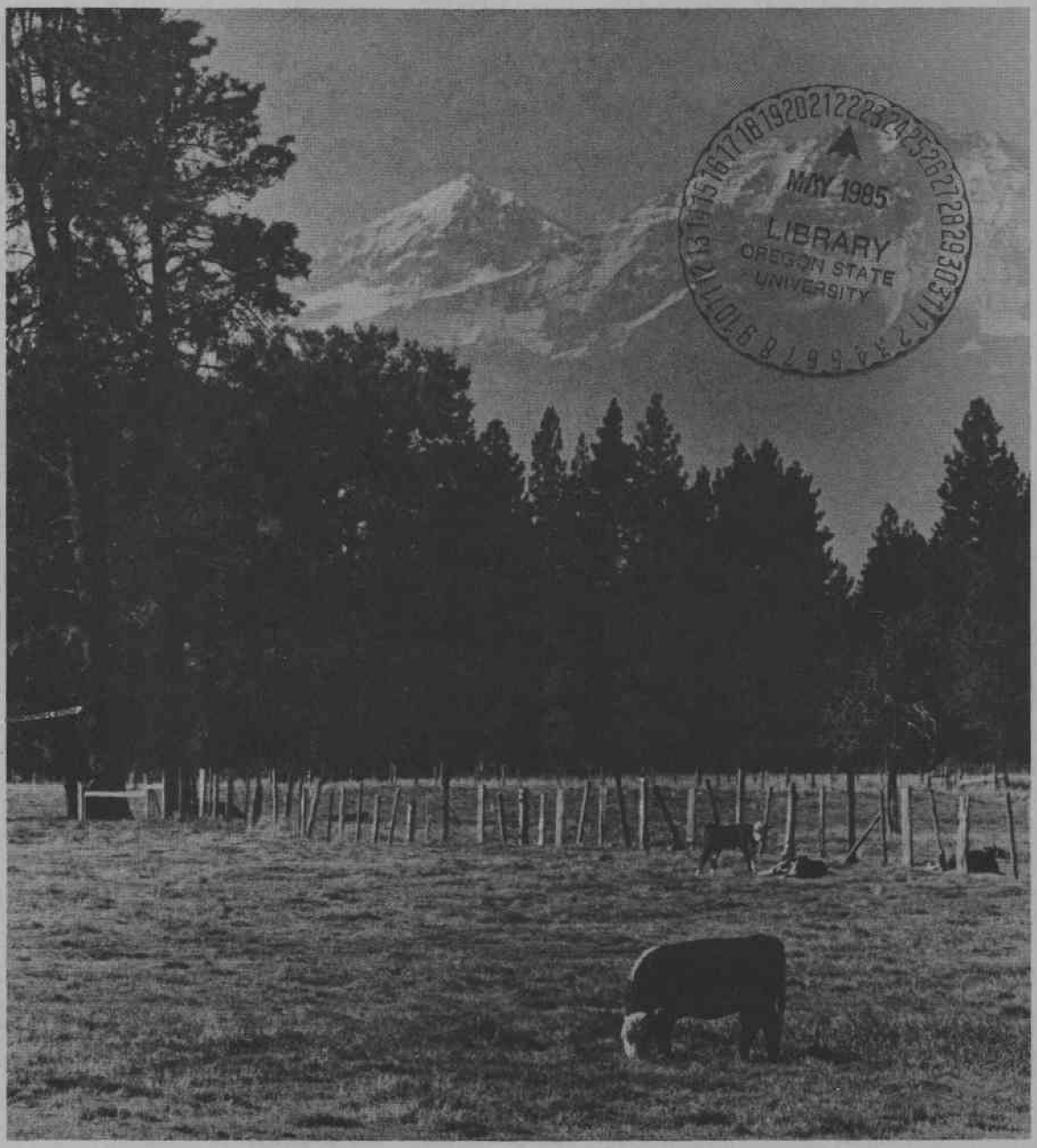
1985 BEEF CATTLE DAY

Resource Integration: A New Approach to Research-Extension



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PROGRESS REPORT ON OREGON'S INTEGRATED REPRODUCTIVE MANAGEMENT PROJECT WITH BEEF CATTLE

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INTRODUCTION

Beef cattle producers must strive to achieve high conception rates and a 365-day calving interval if they are to realize economically efficient production and the biological reproductive potential of their cattle. Weaning weights of calves are strongly correlated with age of calf. Calves born early in well-defined calving seasons are older and, therefore, heavier at weaning. It is important to breed heifers early in the breeding season and maintain short calving intervals thereafter. Calving interval is largely determined by the anestrus period after calving which is affected by condition of the cows at calving or prepartum nutrition level, condition at breeding or postpartum nutrition level, disease status, and dystocia. Dystocia can be a major factor influencing the calving interval, particularly in heifers, as well as reducing conception rates and increasing death losses. Nutritive levels, size of dam, sire, pelvic area of dam, condition of dam, and shape and size of the calf all can affect ease of calving. Predictive equations identifying the major causes of dystocia and delayed breeding would be a valuable asset to cattlemen to assist them in avoiding these problems. Gross farm sales of cattle and calves in Oregon exceed $300 million. Even a modest increase of 10% in production by reducing calf losses from dystocia and shortening the anestrus period in beef cattle would add some $3 million to the state's economy.

If heifers are to calve by 24 months of age, they must conceive by 15 months of age. The importance of early conception is further magnified since first-calf heifers have longer postpartum intervals than mature cows. The occurrence of any first estrus or puberty is affected by breed, sire, age, and size of heifer. The most controllable factor which has been shown to affect puberty is nutrition. Heifers which breed early have a tendency to calve early in subsequent years, wean heavier calves, and to have a higher percent calf crop.

Over or under feeding is equally undesirable in heifers or mature cows. Weight change in cows reflects nutritional levels, however, condition scores

are probably of more value for reproductive predictive purposes than weight per se. Studies have shown that cows in thin body condition or excessively fat condition have longer postpartum intervals, lower pregnancy rates, and produce calves with lower weaning weights than those in moderate or good condition. It has also been shown tha condition scores at breeding are significantly related to calving intervals.

Milk production, as reflected by weaning weights of calves, also has an effect on conception rates and anestrus periods. Cows weaning heavy calves typically lose condition and have longer calving intervals than poor milkers on the same nutritive level.

Dystocia problems have a marked detrimental effect on reproductive performance and increase labor and calving expenses. Most data indicate that birth weights can be altered by reduced energy intake, but dystocia rates are only influenced when animals become extremely fat. A low energy prepartum intake reduces birth weight, does not alter dystocia, increases the anestrus period, and decreases conception rate; whereas a high energy intake increases dystocia, conception rate, and calf mortality. Choice of sire and breed of sire have been shown to affect dystocia problems irrespective of nutritive level. Difficult birth of calves has been highly correlated to pelvic area of the dam and size of the calf in many studies.

There are many factors that affect overall reproductive efficiency in beef cows. Dystocia and other influences on calving intervals are extremely important to reproduction. Base data for developing predictive information would be beneficial for developing management plans to improve reproductive efficiency.

This study was initiated to assemble data on calving performance from which to assess the current status, identify future research needs, and suggest possible management changes. Specific objectives are to determine the effects of the above parameters on dystocia and calving interval in first-calf heifers and mature cows. Predictive equations will be developed to aid in selection, culling, and management procedures to alleviate these concerns. This report describes the work completed to date.

METHODS

Field data are being collected from experimental herds at Oregon State University, Eastern Oregon Agricultural Research Center in Burns and Union, and from commercial herds of cooperator ranches. Additionally, herd records are being compiled to provide information for many of the measures being recorded. Data collection concentrated on spring-calving herds.

Collection of field data included pelvic measurements, weights, and body condition scores of heifers. When available, mature cows were observed and their body condition was estimated. When available, mature cows were observed and their body condition was estimated. Internal pelvic area was measured before breeding. Each heifer was measured via the rectum using a Rice Pelvimeter. Body condition was estimated before breeding, using a 1 to 9 scoring system outline below.

1. Poor. No palpable fat cover along backbone or ribs. Starving, bordering or inhumane; survival questioned during stress.

2. Very thin. Some fat present along backbone but no fat cover over ribs. Poor milk production; chances for rebreeding slim to none.

3. Thin. Fat along backbone and slight amount of fat cover over ribs. Lowered milk production; poor reproduction.

4. Borderline. Some fat cover over ribs. Reproduction bordering on inadequate.

5. Moderate. Fat cover over ribs feels spongy. Minimum necessary for efficient rebreeding; good milk production, generally good overall appearance.

6. Moderate to Good. Spongy fat cover ribs and fat beginning to be palpable around tailhead. Milk production and rebreeding very acceptable.

7. Good. Spongy fat cover over ribs and fat around tailhead. Fleshy, maximum condition needed for efficient reproduction.

8. Fat. Large fat deposits over ribs, around tailhead, and below vulva. Very fleshy. No advantage in rebreeding from having animals in this condition.

9. Extremely fat. Cows extremely over-conditioned. Wasty and patchy; may cause calving problems.

Herd records are being compiled to collect the following information: breed and age of dam; birth weight, breeding weight, and calving weight of dam; date dam bred; calf birth weights; calving dates; length of gestation; sex of calf; incidence and nature of calving difficulty; age of calf weaned; weaning weight of calf; sire identification and breed; age and birth weight of sire. These data are being collected with the assistance of county Extension agents, and recorded on the form shown in Figure 1. It is not possible to collect all the above data on each herd and on all individuals within a herd; however, adequate observations can be made for each category.

Birth weights and calving dates of individual calves have been collected over a number of years on the experimental herds. This will provide solid data for determining the effect of calf size at birth on calving intervals. Calving difficulty records are not as complete, but will still provide a solid data bank. Cooperators were requested to record incidence and severity of dystocia for first-calf heifers and mature cows during parturition in 1985. Each birth will be coded on a 1 to 5 scale as shown below.

Dystocia Score	Description
1	no assistance
2	light assistance
3	hard pull
4	Caesarean section
5	abnormal presentation (e.g. breech)

Experimental herds have been bred artificially for several years, so the majority of calf data can be identified back to individual sires to determine the effect of different sires on birth weights, dystocia, calving intervals, and weaning weights.

ADDRESS: _____ RANCH: _____ COUNTY: _____

OPERATOR: _____ PHONE: _____

DAM										CALF										SIRE				
IDENTIFICATION NUMBER	BREED	BIRTH DATE	AGE	BIRTH WEIGHT (LBS)	PELVIC AREA (cm2)	CONDITION SCORE	BREEDING WEIGHT (LBS)	CALVING WEIGHT (LBS)	DATE BRED	IDENTIFICATION NUMBER	BIRTH DATE	GESTATION (DAYS)	BIRTH WEIGHT (LBS)	SEX	CALVING PROCESS	DATE WEANED	AGE WEANED (DAYS)	WEANING WEIGHT	SIRE IDENTIFICATION NUMBER	IDENTIFICATION NUMBER	BREED	BIRTH DATE	AGE	BIRTH WEIGHT (LBS)

Figure 1. Form used to collect data.

PRELIMINARY RESULTS

A total of 15 cooperators were identified in nine counties through the assistance of county Extension agents. For the mature cows, herd records are being examined to collect those data shown in Figure 1. Experimental herds have provided the most complete records to date. These include the spring 1983-1984 calving records for Oregon State University, and spring 1981-1984 data for the Eastern Oregon Agricultural Research Center (EOARC) in Burns and Union. Data were collected on 210 cows from the OSU herd, 284 and 239, respectively, from the Burns and Union herds. Data from cooperator ranches are still being compiled.

Records of heifers that calved for the first time in 1984 were examined to study the incidence and nature of dystocia. Preliminary results indicate 36% of these heifers experienced difficult parturition. Of the total births, 10% were abnormal presentations; 14% required light assistance, and 12% required a hard pull.

Data on more than 1,300 births have been acquired from experimental herd records. More than 600 observations of calving interval are available to date. Work is continuing to correlate these to parameters detailed in Figure 1 and will be reported at a later date.

Preliminary field data have been collected for a total of 1,146 first-calf heifers before breeding. These data consisted of heifer identification, pelvic measurements, breed, body condition, and body weight. Most animals observed were crossbred. However, data were collected on a limited number of purebred Hereford, Simmental, and Angus. Not all information on the dams from Figure 1 were gathered during visits to cooperator herds, so summarization of much of the data is not yet available until these sheets are completed. Calf and sire information will not be available until after calving in 1985.

Pelvic area on the 1,146 yearling heifers ranged from 99.75 to 255.75 cm^2. Body weight of each animal was not always available because of lack of scales. However, 463 heifers were weighed with the mean weight being 630 pounds. The body condition score of each heifer was estimated. Most fell into the "moderate" classification, with scores ranging from 3 to 7. Simple linear correlation was used to examine the relationship between body weights and pelvic area of 100 heifers (Figure 2). Results indicate a moderate ($r^2 = 0.57$) but significant ($P<.01$) correlation.

Tables 1, 2, and 3 present some simple relationships between heifer weight, birth weight, and pelvic area with dystocia incidence. As expected, dystocia increases with lighter heifers, heavier birth weights, and smaller pelvic openings. This would indicate that dystocia could be reduced by improving any one of these factors. Numbers represented in all tables are very limited at this time, but give an indication of the importance of each of these factors. We hope to have close to 1,000 observations by the end of the calving season.

Table 1. Heifer weight after calving and dystocia (EOARC-Burns)

Heifer weight	Number	Dystocia
lbs		%
700+	7	43
600-700	23	83
Under 600	4	100

Table 2. Birth weight and dystocia (EOARC-Union)

Heifer weight	Number	Dystocia
lbs		%
60-70	4	0
70-80	22	36
80-90	23	57
90+	12	75

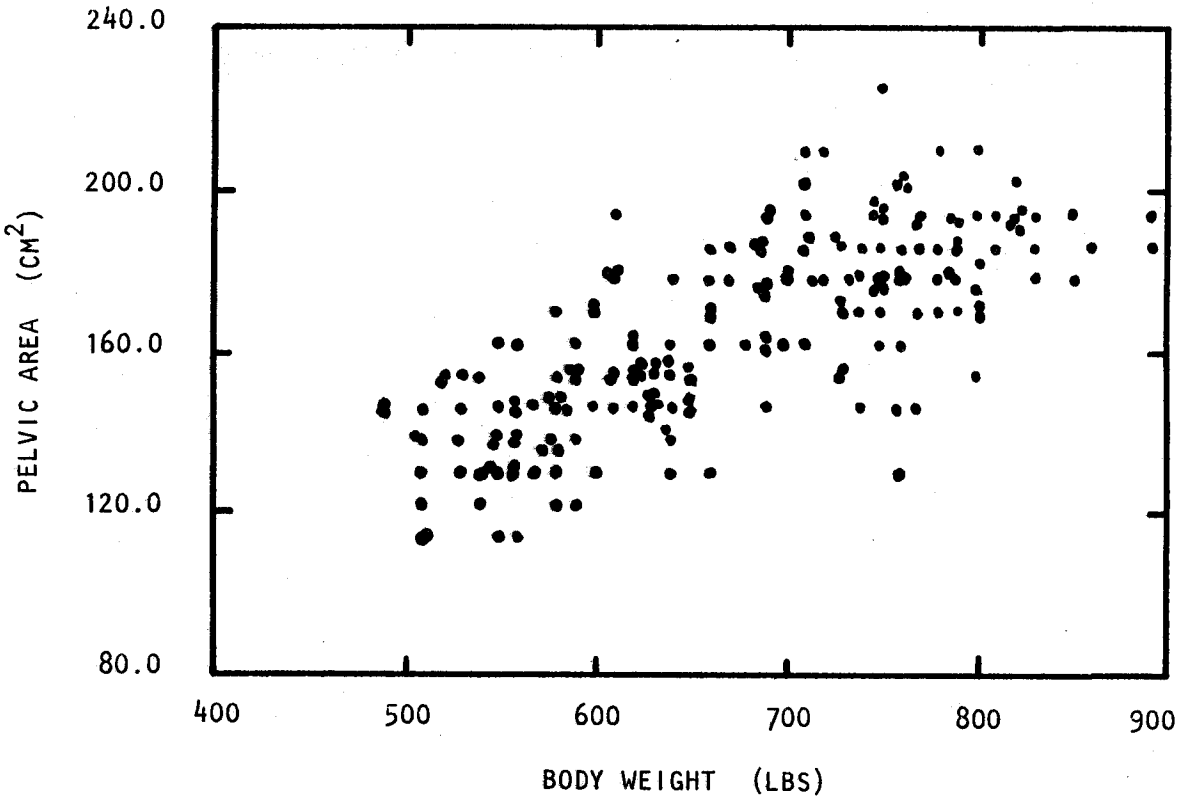

Figure 2. Scattergram showing relationship between body weight and pelvic area of first-calf heifers before breeding

Table 3. Pelvic area and dystocia (EOARC-Union)

Pelvic area	Number	Dystocia
Cm^2		%
200+	7	14
180-200	22	41
160-180	26	62
Under 160	8	75

Data in Table 4 indicate that when heifers have a calf below the mean birth weight in the herd and her pelvic area was above the herd mean, the incidence of dystocia was 20%. When either the birth weight went above the herd average or her pelvic area was below, the incidence of dystocia was roughly tripled to 60%. With a combination of above average birth weight and below average pelvic area, dystocia was quadrupled and ran around 80%. Adding a third factor, heifer weights at calving, also presents an interesting picture, but our data are very limited at this time.

Table 4. Birth weight in conjunction with pelvic area and dystocia (EOARC-Burns and Union)

Measure	Number	Dystocia
		%
Below $\bar{x}$ birth wt. and Above $\bar{x}$ pelvic area	18	22
Mix	51	59
Above $\bar{x}$ birth wt. and Below $\bar{x}$ pelvic area	24	79

Using rule of thumb developed in another part of the country (dividing the pelvic area in cm^2 of a yearling heifer by 2, which is an indication of the size of calf a heifer should be able to have on her own) we find that in the herd at Union, 32% of these heifers required calving assistance. Those delivering calves heavier than this, required assistance 88% of the time. Again, numbers are small.

If all the data can be completed that we think we can accumulate, we should have some very interesting data by next spring. Predictive equations will be developed and hopefully some "rule of thumb" guidelines for reducing dystocia problems in first calf heifers. These data along with the calving interval data from mature cows will be presented at future beef days at OSU or EOARC when completed.

TOTAL RESOURCE MANAGEMENT FOR CATTLE PRODUCERS

by Eric Davis
Rancher
Bruneau, Idaho

I want to preface my remarks this afternoon by conveying my appreciation for the opportunity to be a part of this program. Hopefully, when I am finished, you will have a better understanding of what some of us think IRM (Integrated Reproductive Management) can do for industry, basically the beef industry.

Some of you have already heard what I am going to say, at other times and places. You are probably tempted to think it is very presumptuous of me to come here and speak to you who have made careers in research and education about some things that I perceive to be shortcomings in the system and some potential methods to improve those shortcomings. I would remind you that the concept of integration in research/Extension is not a spur of the moment idea that originated with one person. It evolved over a period with input from many people in industry and academia. I am here today to give you my perception of what has brought us to the planning and development phase of IRM and what some of us from the industry side hope to see accomplished by the implementation of the concept of integration.

Before we get too specific about IRM, let's back up a bit and review what has brought us to this planning and development phase of IRM. Now, I am not going to go back too far and name all of the legislative acts that established the Land Grant Colleges, the ARS, the CES, the SAES, the CSRS, etc. You know the legislative history as well as - probably better than - I. It is important to note, though, that these agencies have certainly been instrumental in making American agriculture the most productive industry in the world. There is no question that our free-enterprise system, coupled with the world's best agricultural research, teaching, and extension system, has resulted in the best food-producing machine ever known, i.e., American agriculture.

The fact that we have gained such a lofty status certainly does not mean that we have solved the world's food supply problems for all time. There is room for improvement in all endeavors and American agriculture, with the research, teaching, and extension system that supports it, is no exception.

With this in mind, and under increasing industry criticism, the Cooperative Extension Service, the ANCA, and the NLFA formed what has come to be known as the Extension/Industry Beef Resource Committee.

The first meeting of this committee was held in 1976 and it was a dandy. The Extension Service opened themselves up for a gut shot by asking what industry felt they were doing right; what they were doing wrong; what they should be doing that they weren't; and what they were doing that they shouldn't be.

I hope it is fair to summarize that meeting by saying that the industry representatives wanted the Extension Service to get that wealth of information produced by agricultural research into the hands of the producers without innundating us with mass mailings. Extension, in turn, said okay, but help us, tell us what your priorities are, and let's continue to communicate about what is and isn't working.

In this process, reproductive efficiency of beef cattle surfaced as a very high priority. At about the same time, it became evident through the Farm Forum that reproductive efficiency is a high priority of producers of all major species of farm animals.

Somewhere in this process of renewed communications, I, and I think many others, faced the reality that we are on a <u>much</u> faster track today, and the old pass-down philosophy of component research results going from the researcher to the Extension agent to the producer in a nice, neat, one-way, summary form simply couldn't get the job done efficiently anymore. We need a system in which we all have input into the identification of a problem and how to attack it in a united effort so the results are system oriented, instead of coming out in component parts.

Now, keep in mind we identified a need for increased reproductive efficiency and we identified the need for a united effort to attain this goal; hence, the specific concept of Integrated Reproductive Management, and, more importantly, the general concept of integrated problem solving, or a multi-disciplinary approach to problem solving. If you will also keep in mind that this process started evolving eight years ago, you can more fully appreciate the dismay many of us feel with the lack of understanding or acceptance of this concept by many administrative people from the Land Grant System right through the USDA agencies.

We realize the potential for administrative problems with the implementation of this integrated approach. After all, it does involve different funding mechanisms and different management approaches to research and extension activities. However, we also know that the job has been accomplished in a few cases. I will refer specifically to one with which I am familiar ... the Pegram Project.

I don't think we need to review the details of how this project was put together, but let me tell you why I think it is a classic example of integration.

Producers in eastern Idaho were having a problem ... they were losing up to 20% of their calves - that is a problem.

Ed Duren was the Extension man being asked the question, "What is the University doing to help me?" Cy Card, at the time, was in both a research and an administrative role at Idaho and he was made aware of the problem. Industry, through the Idaho Beef Council and private sources, put up some $50,000 to try to solve the problem. A hands-on demonstration-type project was put together and successes began to happen.

What makes this a classic example?

Industry identified a problem; Extension carried it to research; research and Extension personnel working in concert came up with some solutions that Extension could take back and show the producer how to apply; he applied them; and death losses fell to less than 3%.

Some have criticized the Pegram Project because no new research was conducted. That is precisely why we need closer cooperation between research, extension, teaching, and industry. The answers were in the data bank, research had already found solutions to the problem, but industry hadn't applied them in their management. How much more information is there in the data bank that hasn't been applied, even though the time to apply it may be at hand? I suspect there are reams and reams of such information in the files that are not being used. And, finally, we in Idaho must ask ourselves, "Was there really no research being conducted that wouldn't have dovetailed nicely into the Pegram Project in an applied manner?" In retrospect, we know there was.

Now, I said Pegram was a classic example of IRM, not a unique example. The only thing unique about the Pegram Project is that it was completed. The problem was identified, the stops were pulled to solve it, it was solved, and industry was told how it had been solved. But ... this was not done without some administrative pain. It was a three-year project and we were lucky to have two successive deans who kept interdepartmental rivalries from destroying the project.

I reiterate that industry realizes the potential for administrative problems with an integrated approach. Part of the success of our agricultural research, teaching, and Extension system is because of organizational autonomy of the various departments and agencies from the college to the federal levels. No single department or person can address all the facets of ... say, reproductive efficiency. Industry accepts the premise that "two heads are better than one," so to speak. However, at times, the tendency has been to think that since "x" is autonomous administratively, it can also function autonomously in a problem-solving role.

At the National Meeting of Regional IRM Developmental Committees in St. Louis in December 1981, the statement was made that researchers don't really have a teaching and Extension responsibility. This may be true in a literal sense if the researcher does not have a split appointment. However, I believe this type of thinking increases the tendency to revert to more <u>competition between</u> agency lines for funding (at the federal level now) at a time when we are asking for more <u>cooperation across</u> agency lines for problem solving.

This is a potential roadblock to the successful implementation of IRM that industry may not be able to do much about directly. I see it as being in your best interests to see that these types of entanglements are not allowed to develop at the state or federal level. Keep in mind that the producer (your client) who is faced with the immediate problem really doesn't care what departments, or colleges, or agencies are brought to bear on that problem. He wants the problem solved and he doesn't care if these various entities are accustomed to cooperating or not; if they need to cooperate to solve the problem, he wants to see them cooperate. He does not want to see them competing for funding because they are more concerned with perpetuating their autonomy than with solving the problem.

In short, don't construe industry's acceptance of organizational autonomy for these agencies or departments to be an endorsement of political infighting between the agencies for funding. That type of competition does not enhance the problem-solving efficiencies of the agencies and cannot be tolerated.

Research, teaching, and Extension personnel, you folks, are going to have to provide a proper environment for IRM to succeed in increasing reproductive efficiency. An environment of competition for funding is not one in which IRM can succeed.

It surfaced at the meeting in St. Louis that departmental regulations made it extremely difficult, if not impossible, for ARS, CSRS, SAES, and CES to share funding in an integrated approach to problem solving. Those of us representing industry groups assured them that if they couldn't solve such problems administratively, then we would try to solve them legislatively. The attempt was made to earmark funds in the 1983 federal budget for implementing the IRM program. NCA and NWGA both supported this attempt. It is important to note that we were not asking for new funding, but for a diversion of existing funding into a specific line-item appropriation for the implementation of IRM. We were outfoxed on this one, and that didn't happen - so we keep trying. But, a strange thing happened during this funding battle - awareness of what could be accomplished with an integrated approach began to dawn on a number of people within the Land Grant System and the industry. The Extension Committee on Organization and Policy in a December 1984 publication, "Regaining Farm Profitability in America," suggests that an interdisciplinary approach to problem solving is a proper approach in responding to today's agricultural problems.

So, where do we go from here? Let's look at the role industry needs to play. For years, we have been grossly negligent in identifying our priorities so that research could be conducted in those areas. Oh, we have been very vociferous in complaining about what has been done after it has been completed. I ask you to recognize also that it seems to be an inherent characteristic of the livestock industry in general (and the beef industry, in particular) to react to developments that affect us instead of creating orderly change. The types of decisions we make daily in running our businesses tend to make us impatient with what appears to us to be an extremely slow and repetitive process in generating sound scientific

information. I guess you could say that we never know what our priorities are until a problem whacks us right between the eyes, then we expect the Land Grant system to provide us with a solution to the problem on our first phone call!

We need to change that attitude and set up the machinery to identify our priorities before the research begins and to constantly monitor and communicate about the progress that is being made.

I don't know for certain what structure it will take within the beef industry to accomplish this goal. The Research and Education Committee of the NCA annually updates a list of research priorities that should serve as a general guideline to academia of what we see to be our most pressing areas of concern in the beef industry. For obvious reasons, this priority list can only serve as a general guideline. Not every Land Grant institution or USDA agency has the same resources to draw upon and not every beef producer in every locality has the same concern as his neighbor. The last thing we need is a Pegram Project in every county in the United States. Neither do we need nearly every reproductive physiologist in the western United States studying the effects of dystocia on calving interval as happened recently with the earmarked ARS funds for IRM. I am not saying these are bad projects. I am saying that the problems are too many and the resources to solve them are too few for everyone to be working along the exact same track.

As an industry, and as individuals, we owe it to ourselves and to the public to identify those areas where there are gaps in knowledge and the application of knowledge so that the Land Grant System can respond with resources to fill those knowledge gaps.

In Idaho, we have opted for a state IRM committee to serve as the vehicle to identify our priorities and communicate them to the proper university personnel. This committee is made up of cattle growers, cattle feeders, veterinarians, bankers, associated industry representatives, research and Extension personnel. This committee can't cease to function as soon as it identifies the priorities. It must continue to monitor the progress being made and communicate that progress back to the supporting organizations. In Idaho's case, we went so far as to try to mandate an interdisciplinary approach with research policies of the Idaho Beef Council that gave funding priority to those types of projects. Dr. Davis was at Idaho at that time and he can bear witness to the number of hackles that action raised.

Please let me elaborate a bit on why that action came about. For as far back as I can remember we in Idaho (and I suspect other states) experienced a phenomenon in relations between the College of Agriculture and the beef industry that I call the "Three-Year Upheaval." The scenario went like this: Each year the college presented an overview of its programs and asked for industry input and support at the legislative level to secure adequate funding to carry out those programs. Usually the response was apathetically positive and a resolution would pass through the cattlemen's convention supporting agricultural research and Extension. About every three years someone would stand up and blast the dean, department head, or Beef Council representative (whoever was giving the report) and elaborate in great generalities about how little benefit the industry was receiving from the programs of the College. The question would be asked, "What are the priorities of the industry?" That question might or might not be answered in the next year and then forgotten for another three years. In the meantime, the Legislature would meet and, amid much hand-wringing and gnashing of teeth, cut the Agricultural research and Extension appropriation because they perceived that the college didn't have the support of the industry.

You know that after a certain length of time in that type of scenario, the question of survival becomes very real. I hope you realize that those Beef Council research policies and the state IRM committee did as much to jar the industry into accepting its responsibility as it did to effect changes in the way the College of Agriculture was conducting its programs. And so far, it is working for us in Idaho.

To broaden the application of the integrated approach by earmarking federal funds, or by mandating it where private funding is concerned, raises some very legitimate researcher concerns. Some of these concerns are:

1) Industry telling the researcher what to do;
2) Extension shouldn't be involved in research;
3) If everybody is involved, whose project is it -- how is the researcher evaluated; and
4) Not all research lends itself to integration.

These are legitimate concerns but I don't happen to believe they raise unanswerable questions.

Let's take Numbers 1 and 2 together:

If an individual researcher thinks he can answer the problems of an industry without first talking to the industry to find out what the problems are, then we have a longer row to hoe than I have thought.

Integration does not imply that industry is going to tell the researcher what to do; integration does imply that industry is going to play a role in prioritizing those problems affecting the industry. Integration does not imply that Extension personnel and industry laymen are going to be stumbling around in the laboratories getting in the way of the researcher. Integration does imply that researchers, Extension personnel, and industry laymen are going to work in concert with one another in identifying a problem and finding a solution that can be put to use. Otherwise, we revert to the old pass-down philosophy I referred to earlier that does not result in an efficient and timely solution to the problem.

It is at about this point that some industry people are going to say, "We don't need the Extension Service at all; we can get this information from private companies that have picked up on the research." It's true that we do gain much of our technical knowledge today from companies that have a product to sell -- and we will continue to do this to some extent. But, it would be a very serious mistake for us to rely totally on a vested interest for our information.

Furthermore, some of the information that will come out of the integrated approach is not going to be in a nice, neat, salable product form. No, some of it is going to be in the form of improved management techniques as a result of putting together what is already known, with no new research at all.

We need the Extension Service to disseminate this information at the producer level.

The third concern is the stickiest.

How is the credit for a well run, integrated project going to be divided among the research and Extension personnel involved? We in industry are going to know who is accomplishing beneficial results for the producer. However, industry recognition doesn't count for much when the professional evaluation for the researcher is based on the "publish or perish" premise.

On one hand, we have industry saying we want the information in usable form, but don't blitz us with bulletins. On the other hand, are the professional scientific associations saying we want to read about your work in the technical journals.

I accept the need for peer review within the scientific community. I also believe that there must be some middle ground here somewhere to shorten the time lag and hasten implementation of research results. I have no clear-cut solutions to this problem but I will throw out two ideas as food for thought. One would be a "lay" edition of the Journal of Animal Science. Something that is not couched in technical terms, does not have a three-year time lag from completion of project to printing, but still brings together in one place a review (a pre-view if you will) of research being conducted nationwide.

The second idea is a precursor of the first and is currently being done at the Southwest Idaho R & E Center in Caldwell. This is simply a brief bulletin that gets project results into the hands of industry within six months of the completion of the project. I realize that this may put the researcher on thin ice with the scientific community but the simple truth is that industry today can't wait three years for information that can bring about innovative change.

Number 4 is an easy one. Remember the Number 4 concern? It was that not all research lends itself to integration. That's true! No one ever said it did.

As we answer questions by working in a multi-disciplinary approach, we are going to uncover problems that will need to be referred back to a specific discipline for some basic research. But when that "component" research is completed, don't let the results languish in a technical paper somewhere -- kick it back into the multidisciplinary arena and see if it works in practice. If it does, tell the world it does, and how it does, so we can use it. If it doesn't, tell us that, too, so someone doesn't use resources to find out the same thing and bury it again.

Research results that tell us what not to do are just as important as those that tell us what to do. Maybe not as dramatic, but just as important.

Let me summarize quickly.

1) The old pass-down philosophy isn't working on today's faster track.
2) IRM is a program that will prove that the integrated approach to problem solving is a more efficient method.
3) Industry cannot, and should not be expected to tolerate autonomy among departments, colleges, or agencies if that autonomy hinders the efficiency of the problem-solving role of those entities.
4) Academia cannot, and should not be expected to tolerate unsubstantiated broadsides from any industry that is not willing to:
   a) Identify its research and Extension priorities;
   b) Monitor the programs to see that measurable objectives are being met; and,
   c) Insist that these programs be designed to optimize production for maximum net return.
5) Finally, we know that by working together, this can be accomplished; we just need more of it.

LOCATING WEAK LINKS IN RESOURCE MANAGEMENT

Thomas E. Bedell
Department of Rangeland Resources
Oregon State University

How well have you developed your management strategy or recipe for achieving profitability? Resource managers who do not utilize business management principles often are left without tenable alternatives. For success, a plan and procedure that works are a must.

Since ranches are based on land resources, there are certain steps one should go through in order to best utilize them for profitability. The following are suggestions for consideration. Recognize, however, that each will take some modification to be fully applicable to any particular situation:

1. GOALS are MANDATORY for success. Have you developed them for your resource situation?
2. Problems exist and PLANNING must be done to overcome them.
3. Planning may be repugnant and managers resist it, yet with work put into planning after appropriate goals are set, success can occur. Without it, success is virtually impossible.
4. Insure that all the decision makers are included (partners, family members, outsiders, lenders, etc.). No one should be left out since their input may be critical.
5. Recognize when help is needed. Delays often cost money. Do not dismiss a learning opportunity for apparent cost alone; consider the potential benefits also.

   Having addressed the points above, consider the following steps:

   A. Identify your management team. All persons on the team need to clearly understand their role and how they fit into the organizational structure. Having a hand in organizational development will motivate most people to improve performance.

   B. Set goals by the management team. They should be as specific as possible and within adequate time and space frameworks. They should be appropriate to the physical/biological resources. One especially needs to assess and/or reassess the various enterprises in the ranch busines. For example, it may well be that one cannot do what one initially envisioned within the constraints of the current enterprise.

C. Use a tested procedure in planning. A number are available. Two that apply to ranches and range resources are the Logical Framework approach and the Holistic Resource Management model. The Logical Framework approach is one which uses a prescribed format where inputs are required to achieve specific outputs which will help to achieve a purpose and in turn work toward a goal. It is a straightforward and, I believe, useful way to plan. The Holistic Resource Management model is another procedure designed to interrelate everything into one overall perspective to find the weak management links and to assess the best ways to correct these weak links. Both procedures have goal setting as the first step. See the list of references.

D. Establish hierarchies in terms of STRATEGIES, TACTICS to achieve strategies, and then the OPERATIONS necessary for carrying out the tactics.

E. One must know the extent, nature, response to season and management, and limitations of the resources. This kind of a complete INVENTORY is absolutely necessary for efficient operation. Without it one could easily make biological and economical mistakes.

After accomplishment of these several steps, you are ready to plan more specific detail:

1. Develop the production flow needed for each purpose in meeting your goals(s).
2. Contrast your current production flow to that needed for the goal(s).
3. Note discrepancies and define and characterize the differences. Pay particular attention to weak links in your current management. Rank and prioritize the weak links, thus establishing a logical plan of attack for correcting them.
4. Now you can develop alternative procedures and costs necessary to correct the weak link(s). Use the approach of marginal reaction per dollar spent. The idea behind this concept is to spend each increment of money available in the way that will return the greatest net benefit over the long term. This is not usually too different than what many producers now do. However, consideration is given to all the ramifications of what results each increased increment of input will bring.

5. As each weakest link is tackled and corrected, progress to the next one. But, be certain to monitor progress on correcting the previous weakest link. Overall, one should plan, implement, monitor, and then replan.

General considerations and examples:

A. Planning is extremely hard work. It is uncomfortable and complex until one starts to succeed. Recognize this and do a little at a time, setting goals and accomplishing them in a step-wise fashion.

B. Recognize that things to do with people and their management skills are often the weakest link in management chains. If this is your case, do not assume that it is unchangeable, but that it may take a special mindset to combat. Often this change in attitude will call for a rethinking and maybe even retraining. Special goal setting, management skills and planning seminars offered by land grant universities, community colleges, or private enterprise may be extremely valuable. Certainly your local library can give you a host of excellent materials on the subject.

C. Livestock grazing management coupled with the actual day to day handling is often overemphasized, or at least placed somewhat out of context. There is no question that grazing management, range forage yield capability, and the various breeding and supplementing technologies associated with production and utilization are critically important. BUT several other decisions should be made before many changes in this area are made.

D. One cannot realistically control all the factors that affect an enterprise. For example, prices, weather, and interest rates are outside our sphere of influence. One also cannot make rapid changes in calving dates. You may influence but you cannot control government policies; however, you can and should investigate the feasibility of hunting leases, varying production levels within enterprises, varying enterprises, using other resource mixes, e.g., hayland to pasture and buying hay, altering times of sales, pooling equipment uses, etc.

Conclusion

Finally, if after going through all the planning and production steps suggested in this article, you find that certain changes appear warranted, you must decide if you are willing to do the work and take the risks involved. Someone, somewhere, is going to make profits producing beef cattle. If you want to be one of these people, you need a realistic goal, assessment and plan. These things do not happen simply because one wishes them to. They happen because one carefully plans, executes, and replans.

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Holistic Resource Management. Contact Allan Savory, Executive Director, Center for Holistic Resource Management, Albuquerque, New Mexico.

DO WE NEED INTEGRATED REPRODUCTIVE MANAGEMENT (IRM)?

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Generally speaking, information is provided to producers in component parts, or pieces.

For example, there are programs on range and pasture management, forage production and forage utilization; there are programs on heifer development, selection and management; there are programs for cow management, calf management, and cow-calf management; there are programs for bulls, selection, development, soundness evaluation, etc.; there are programs for herd health, disease prevention, disease control and management; finally, there are programs on all aspects of nutrition, ideas for marketing like preconditioning, extended ownership, as well as financial packages which help determine cost/unit or profit/unit of measurement.

These programs are fairly broad in scope, but, there are also programs that are narrow and specific such as: feeding replacement heifers, synchronizing heat, estrus detection for A.I., control of trichomoniasis. I could go on, but I think I've made my point. There is more information and techniques available than any one producer can use, let alone have enough knowledge to make sound economic decisions on their potential use at the ranch.

We are told the cattle market is mature. Consumers are eating less, or at best, eating the same amount of beef, depending on who is doing the telling. We <u>feel</u> the costs of feed and operating capital rising and the price for our product at the market not keeping up.

So for many producers today, there is an urgency for cutting costs and increasing efficiency. In other words, capitalizing on opportunities and improving net profits.

The remaining question is, how are you going to do that? How can you optimize for increased net profit? There are literally dozens of schemes to choose from. These schemes are all in pieces and parts. How can you put a package together which will keep you in business? Please notice that emphasis on "optimizing net profit" and "keeping in business."

One way is to talk to neighbors, sales persons, veterinarians, and Extension agents, assemble the information at home and pick a program and/or some techniques and "give'er a try." However, I think we are on a fast track and short time. I think you will need to make decisions that are based in sound economics, decisions that are timely and fit into your resources and finally, decisions based on your capabilities to implement and maintain your choices. In other words, make decisions to improve overall efficiency and economic return that include the total ranch resources based on the best information available to be applied to current resources, as well as, develop longer range plans based on potential resources.

I would like you to consider another way. TRM, an Integrated Reproductiv Management concept. In Oregon we have coined the title of Total Resource Management to replace IRM, but the concept is the same. The concept is one of problem solving by integrating expertise from a spectrum of sources including producers, veterinarians, animal scientists, range and pasture specialists, agriculture economists, and other allied industry. The main purpose of TRM is to identify and demonstrate economically feasible management practices which can help cow-calf operators enhance their profits.

Let me give you some examples of how this works.

A rancher with 200 cows weans 170 calves (85% calf crop) at an average of 435 pounds with a range of 350 to 510 pounds. There were a number of areas that revealed themselves for potential improvement of efficiency and net income. The rancher saw light calves at weaning and less than desired calf crop percentage. Using the expertise of an IRM team, base data were gathered on production, and team members visited the ranch operation. The operator collected data on his next calving season and some of the results follow.

Table 1.

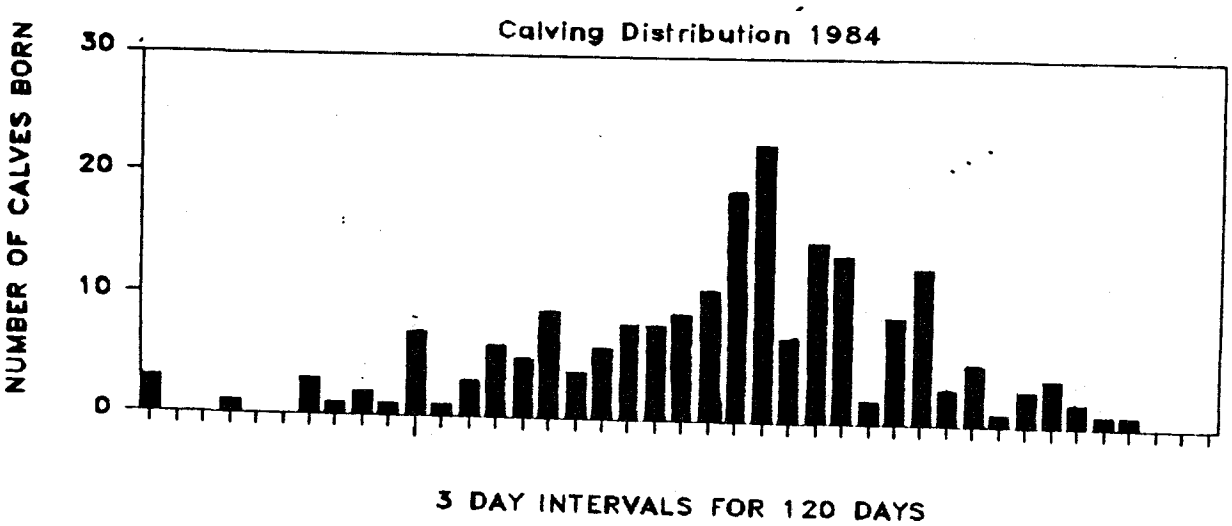

Table 1 shows the number of calves born during each 3-day interval of the season. You can see from the table that only about 3% of the cows calved the first 20 days of the season; in fact, by day 42 of the season, only 13% of the cows had calved. During the next 20 days, another 23% of the cows calved, so that by day 63, 37% of the herd had calved.

One problem revealed by this information was that many cows were not being settled during the first 65 days after the bulls were turned in.

Drawing on the recommendations given by the IRM team, this rancher made choices to correct the problem. He increased the nutrition of the cows, raised the conditioning of his bulls, and managed the range a little differently so his off-take was increased by 6,880 pounds at a cost between $.30 and

$.40 per pound gained. This move changed his cash flow sufficiently to allow for some implementation of longer term plans for range improvement and heifer development while focusing this year on calf survival through more efficient use of facilities and implementing an improved herd health program.

Another example is a rancher who owns 230 cows, and weans 207 calves @ 492 pounds average. After working with an IRM team, he decided to upgrade his heifer development and to develop an extended ownership program with his calves.

His first step was to pre-condition all calves. This enhanced their survivability and, because it decreased their susceptibility to disease, it increased their growth production.

He now had market options open to him with the pre-conditioned calves. He elected to sell the steers in a "pre-conditioned sale" and keep the remaining heifers. When the heifers were about 12 months of age, he selected replacements from the group after taking pelvic measurements of each heifer. The pelvic measurement, taken from inside the heifer, can be used to predict the size of calf that heifer can deliver without difficulty at calving time. He selected the best heifers for his replacement stock.

The remaining heifers were spayed, implanted and sold at slaughter. The technique used in spaying is relatively new and more time is needed to prove the profitability of it.

Table 2 shows the results of a feedlot trial comparing the new spay technique ("autograftet") with standard spayed heifers and steers in feedlot performance.

Table 2 Comparative Feedlot Performance

Group	Number	ADG	F/G	Profit/Hd.
Spayed heifer	137	2.85	10.85	$44.16
Spayed autografted	187	3.24	9.88	$63.75
Steers	185	3.16	9.81	$51.83

As you can see the heifers spayed with the new technique outperformed all groups.

The rancher used in this example has improved his production efficiency in a number of areas including heifer development, growth rate, and has

taken advantage of marketing channels which improved his net profit/unit while doing it.

The thrust of TRM or, Total Resource Management, is, as we've said, an integrated problem solving concept. Its success will rely on input that producers, livestock agents, veterinarians, and other allied groups place into it. It will rely on the existence of a cooperative spirit among these groups that will allow rapport so that lines of action can be developed quickly that will have a measureable impact on industry or the operator. TRM success will also depend on the ability to identify measureable blocks to economic production. It will rely on a willingness to support the concept with a line of directed action to remove the block on the part of cooperating producers.

As an example, let's say a group of ranchers in Rawhide County decide that calf survival is an important and measureable constraint to production efficiency and thereby optimum profitability.

There are many possibilities to consider that could impact negatively on calf survival. Poor nutrition, mineral deficiency, disease, management, and weather are only some of the possibilities. By grouping their efforts and money they were able to conduct a regional data collection scheme similar to the Pegram project. The results of the study showed disease to be the major cause of calf mortality. The options for a line of action (Step 2 in an IRM concept) were to change management and/or use a vaccination program directed at improved antibody protection for the calves through the colostrum of the dam.

Not all participants in the original group chose to act on the information. Of those who did, significant gains were made against calf deaths. Those remaining as cooperators continued to collect and analyze data from their operations resulting in discovery of other areas of needed improvement such as calving interval, heifer development, dystocia, and other disease prevention. This information would result in a new line of action directed at one of the other areas of need.

So far the discussion has been on the need for an integrated concept of problem solving. Now, let me share with you some of the how to's of the IRM.

If this approach is going to have a positive impact of the beef industry of Oregon, the line of action must have certain characteristics. It must be:

- PRODUCER OWNED -
- MEASUREABLE -
- APPLIED AT THE RANCH LEVEL -
- ECONOMICALLY FEASIBLE -
- A NET PROFIT IMPROVEMENT -

There are a number of production parameters that affect net profit. Some of the very measureable factors include: 1) Growth. At least average performance can be measured and a total counted when animals are sold. 2) Open Cows Counting all cows that fail to calve, or pregnancy checking cows will give you this number. 3) Length of Calving Season. The days between the first and last calf born is one way. The number of calves born during each 21-day period may be more meaningful. 4) Death Loss. Anyone can count dead animals but age at death will be better information. 5) Net Profit. Should be calcul by dividing a gross net profit by number of cows or acres or some other unit for a profit/unit measurement. This list may not include some of the factors you may think of, but most of a ranching operation's potential for profit are in these factors. Their other principal advantage is that any operator can measure them. Putting the numbers together with the help of an IRM team should lead to the development of a line of action towards improvement of #5 - Net Profit.

Finally, the action is not complete until the results and impact have been shared. The overall objective of TRM is to improve the beef business for Oregon producers. Meetings, publications, and demonstrations at the ranches need to be developed so that information can be shared and applied by other operators to improve the business status of their ranches.

Benefits to the industry will be:

1. A continued flow of technology that is applicable and useable to the industry.
2. A demonstration of the application of proven practices.
3. A continued isolation and prioritization of research needs of the industry.
4. Improved efficiency of Oregon's beef herds thereby making them more viable in the highly competitive meat industry.

Hansen:ss
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OREGON STATE UNIVERSITY BEEF BREED EVALUATIONS

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Crossbreeding research initiated at Oregon State University in 1978 was designed primarily to evaluate the strengths and weaknesses of three continental European breeds for beef production in the Pacific Northwest. The breeds were the Simmental, already well-known and popular at that time, the Tarentaise (from France), and the Pinzgauer (from Austria). All three breeds were chosen because of their expected potential for maternal contributions. All have a dual-purpose history, with some selection emphasis for milk production. We believed that the high milk production potential could be supported and utilized effectively in our environment, where mild, wet conditions generally produce an abundance of forage.

In this report, we present information on breed effects, both direct and maternal, on calf birth and weaning weights and then summarize breed differences in reproduction and cow longevity. The experiment is planned to run through 1987, so final conclusions will not be available until then.

Description of the Experiment

The experiment began with the 1978 breeding season. In June of that year, approximately 200 mostly Hereford and Hereford x Angus crossbred cows were divided, within age, into groups to be mated with semen from Simmental, Tarentaise, and Pinzgauer bulls. The sires were from commercial A.I. studs, and we used six to eight bulls per breed. This was to ensure sampling the breeds as widely as feasible but did not allow accurate progeny testing of any individual sire. This same procedure, mating with semen from the three continental breeds, was used on the foundation British cow herd for the duration of the experiment. In later years, though, semen was often donated by private breeders and we are very grateful for their generosity and cooperation. Insofar as possible, we used different bulls each year. In the years covered in this report, cleanup bulls were Herefords or Hereford x Angus crossbreds, of our own raising.

Replacement heifers, both continental and British crosses, were mated with semen from Angus bulls to calve first at two years of age. Thereafter, they were mated in a three continental breed, rotational scheme. For example, a Tarentaise x Hereford cow could be mated either with Pinzgauer or Simmental semen, but a Simmental x Tarentaise cow would be mated only with Pinzgauer semen.

At the OSU Soap Creek Ranch, near Corvallis, mating is in June and July, with calving from March into May and weaning in October. In a typical year, summers are quite dry, but temperatures seldom exceed 85° F. Fall rains begin in September or October, causing some usable new pasture growth. Rains continue until June, causing muddy conditions during the winter that prevent effective grazing, despite fairly mild temperatures. It is seldom colder than 24° F. Therefore, cows are wintered on grass silage and hay and usually are back on spring pastures as calving begins. By the middle of the breeding season, the pastures are dry and dormant, providing feed of adequate quantity but generally of marginal quality.

The herd has fluctuated around 200 cows and first-calf heifers, and in this report, records from the 1979 through 1983 production years are summarized. For birth and weaning weights, there were 888 calf records. Our findings on reproduction and longevity, though, are based on a much smaller number of records, so they should be considered as more tentative.

Birth and Weaning Weights

Our analysis of birth and weaning weight records was based on the premise that an individual calf's weight was influenced by four genetic effects of interest: 1) the direct influences of the calf's own genes or inheritance, or more specifically the breed contributing those genes, 2) influences from the breed or breeds of the calf's mother, or so-called maternal genetic effects, 3) heterosis or hybrid vigor effects, if the calf was crossbred, and 4) maternal heterosis, if the mother was a crossbred cow. We used a method called multiple regression that considered all these effects simultaneously, for all 888 calves with birth and weaning records. Results for birth weight are summarized in Table 1.

Nearly all calves born in the experiment were crossbreds, but we are presenting the results, for breed comparison purposes, as the expected or

most-likely weight of a straightbred calf of each of the five breeds involved. Look at the "direct effects" column for example. Our data indicate that straightbred Hereford and Simmental calves (with dam breed effects held constant mathematically) would average 76.6 and 90.0 pounds at birth, respectively. Notice that for these individual or direct genetic effects, the Angus, Hereford, and Tarentaise were similar, with moderate birth weights, and that Simmentals and Pinzgauers were similar to each other but much heavier. Maternal breed effects on birth weight are estimates of the size of calf that would be produced by straightbred cows of each breed, with calf breed effects held constant mathematically. It is of interest that Tarentaise and Angus are low, that Herefords and Simmentals are similar and intermediate, and that Pinzgauers are high.

The heterosis values for birth weight should be interpreted as follows: A two or three breed crossbred calf is expected to be 4.7 pounds heavier at birth than the average weight of calves belonging to the straight breeds contributing to the cross. Maternal heterosis was 2.4 pounds, indicating that a crossbred cow, on average, would produce a calf that much heavier at birth than a calf produced by a straightbred cow.

Excessive birth weight can be an important problem to commercial beef cattle producers. Heavier birth weights are associated with greater calving difficulty and higher calf mortality. Also, cows having a difficult calving are slower to rebreed, so the problem can carry over to the next production year. Cattle breeders might, therefore, be more interested in the frequency of occurrence of birth weights above some critical amount, 100 pounds for example, than in average birth weights for breeds or breed crosses. To examine this, we first counted the number of calves out of 888 that had 50% or more inheritance from each of the five breeds, then the number of calves from each of these five groups with birth weights of 100 pounds or more. From these figures, percentages of calves per group with dangerously heavy birth weights were computed (Table 2). For Herefords and Angus, 5 to 7% of calves were in the heavy category, as were 10% of Tarentaise crosses and from 22 to 25% of Pinzgauer and Simmental crossbreds.

Comparable percentages of heavy calves for cows with 50% or more inheritance from each of the five groups are also presented in Table 2. Tarentaise crossbred cows produced a very low percentage of calves more than

100 pounds; Hereford, Angus, and Simmental crossbreds were similar and intermediate; Pinzgauer crossbred cows produced the highest percentage of heavy calves.

Our results suggest that birth weight may be a potential concern to seedstock producers of Simmental and Pinzgauer cattle. Breeders of the other groups in our experiment likewise cannot afford to ignore birth weight, particularly if they are practicing intense selection for growth to weaning or in the feedlot. Selection for growth at any age is likely to cause a concomitant increase in birth weight.

Direct breed effects on weaning weight were important, as were maternal breed effects (Table 3). The continental breeds all transmitted more rapid growth potential to their calves than did the British breeds. Of the continental breeds, Simmental and Tarentaise were similar and slightly exceeded the Pinzgauer. For maternal breed effects, the Pinzgauer was highest by more than a 20-pound margin. Simmental and Tarentaise were similar and intermediate, while Angus and Herefords were similar and lowest for the maternal effects.

Crossbred calves and crossbred cows each added about 26 pounds to expected weaning weight. This amounts to approximately 6% individual and maternal heterosis, values consistent with previous crossbreeding research in beef cattle.

Cow Reproduction

There are many ways to describe cow reproduction. Pregnancy rate, calving rate, calves weaned per one hundred cows bred, and calving interval are some of them. At the OSU Soap Creek Ranch, in all but unusual circumstances cows and heifers diagnosed open in the fall of the year were sold rather than carrying them dry through the subsequent production year. For this report, we are documenting reproductive performance as the number of calves born and weaned per cow year. Breeds are not penalized, in these figures, for failing to become pregnant, because open cows were sold and did not generate maintenance expenses. In a later section, though, breed effects on cow longevity (largely a function of pregnancy rate under our management) are described.

Heifer calves born in 1979 first had the opportunity to calve in 1981 with subsequent opportunities in 1982 through 1984. Thus, they had four opportunities to calve. The 1980 heifers have had three opportunities to calve and the 1981 heifers only two. The "breed" designation in Table 4 actually refers to the breed of a heifer's sire. In most cases, therefore, "Simmental" (for example) means a 50% Simmental crossbred. Also, since the number of individuals per group per year was not large, Angus and Hereford-sired heifers were pooled into a single British group. CI in the table refers to calving interval, the average number of days between calvings in adjacent years. For this statistic, cows that were diagnosed pregnant but which subsequently failed to calve were excluded from the records. There were, in other words, no two-year calving intervals.

Results are presented in Table 4. Look first at the 1979 birth year group heifers. Breed differences in calf production were not large but favored British and Pinzgauer-sired females for calves born and weaned. The groups were nearly identical in average calving interval. For 1980 heifers, all groups except Simmental crossbreds had a 100% calving rate, and all groups weaned more than 90 calves per one hundred "cow years." For the 1981 birth year group, Pinzgauer crossbred females were poorest; differences among remaining groups were not large, particularly considering the limited number of observations in some groups. Average calving intervals were quite similar among groups and always were in an acceptable range. With the amount of information that we have collected so far, indications are that no group has a clear-cut superiority in reproduction. All groups have been quite satisfactory in calf crop percentage born and weaned and in average calving interval.

Longevity

In Table 5, we have summarized the percentage of females retained as replacements in each breed group that were still in the herd as of November 1984. If important differences had existed in these percentages, it would indicate that some groups were not well adapted to our physical and(or) management environment. Unfortunately, the percentages are not very reliable because they are based, in many instances, upon very limited numbers of observations. The best that can be said at this point is that there are no

apparent differences among the exotic breed groups (at least, none that are repeatable across birth years) to suggest differential adaptability or longevity. It is interesting that heifers with a high proportion of British ancestry are leaving the herd, on average, more rapidly than the exotic crosses. In most instances (after their initial calving) they would be raising exotic crossbred calves. Possibly the lactation strain from those high growth potential offspring is reducing their pregnancy rate in the subsequent production year.

Conclusions

Our analyses support the existence of important direct and maternal breed effects on birth and weaning weights of calves. All three of the continental European breeds transmitted genes for heavier weaning weight to their calves, compared to Hereford and Angus individuals. The Tarentaise accomplished this feat without increasing calf birth weight above that of Angus cattle in the experiment, whereas Pinzgauers and Simmentals did not. Both those breeds caused a substantial increase in birth weight. The maternal contribution of the continental breeds also enhanced weaning weight, with groups ranking Pinzgauer, Simmental, and Tarentaise for this effect. Only in the case of the Pinzgauers, however, did continental females produce substantially heavier calves at birth than did the British groups. Individual and maternal heterosis percentages were positive and substantial for both birth and weaning weight.

At this stage of the experiment, there are no indications of large differences among the breed groups in reproductive traits or in cow longevity, but we will be looking at those characteristics more carefully when more data have been collected.

Our herdsman reports that temperament and behavior of all groups are satisfactory. There are a few renegade or difficult-to-handle cows in all the breed groups. The Pinzgauer crossbreds are, he indicates, definitely the most docile.

Table 1.

Birth Weight (lbs.)

Breed	Direct Effects	Maternal Effects
Hereford	76.6	85.5
Angus	82.9	80.5
Simmental	90.0	85.5
Pinzgauer	90.5	90.4
Tarentaise	83.7	81.7
Overall Average	84.7	84.7
Heterosis	+4.7	+2.4

Table 2.

Predominant breed of calf (first column) or dam (second column)	Percentage of calves with birth weight greater than or equal to 100 lbs.	
	Calf Effect[a]	Dam Effect[b]
Hereford	7	11
Angus	5	11
Simmental	25	12
Pinzgauer	22	23
Tarentaise	10	3

[a] These percentages were computed as follows: Of 888 calves in the experiment, 522 had at least 50% inheritance from the Hereford breed. Thirty-five of 522, or 7%, had birth weights 100 pounds or larger.

[b] From 888 calvings, 676 of the cows had at least 50% inheritance from the Hereford breed; 75 calves from these cows (11%) had birth weights 100 pounds or larger.

Table 3.

Weaning Weight (lbs.)[a]

	Direct Effects	Maternal Effects
Hereford	438.5	413.3
Angus	458.2	408.1
Simmental	488.2	499.1
Pinzgauer	468.4	522.4
Tarentaise	480.8	491.3
Overall Average	466.8	466.8
Heterosis	+26.8	+26.0

[a] At approximately 190 days of age.

Table 4.

	Birth Year of Heifer							
	1979			1980			1981	
Breed[a]	Calves[b] born	Calves[b] weaned	CI[c]	Calves born	Calves weaned	CI	Calves born	Calves weaned
British	97	89	365	100	96	372	88	80
Simmental	93	85	364	95	95	372	92	92
Pinzgauer	97	87	363	100	91	367	75	67
Tarentaise	90	81	364	100	93	361	100	83

[a] Breed of a cow's sire

[b] Calves born or weaned per 100 cow years, that is, per 100 cows present in the herd at calving time.

[c] Calving interval, the average number of days between calvings in adjacent years.

Table 5.

	Birth Year of Heifer		
	1979	1980	1981
Breed[a]	Percent Remaining[b]	Percent Remaining	Percent Remaining
British	55	50	62
Simmental	83	75	71
Pinzgauer	75	91	50
Tarentaise	67	100	67

[a] Breed of a cow's sire.

[b] Percentage of females entering the herd as a replacement heifer still present in the herd following pregnancy testing in November, 1984.

LIVESTOCK IMPACTS ON RIPARIAN SYSTEMS

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IMPORTANCE OF RIPARIAN ZONES:

Riparian issues have become "buzz words" in natural resource planning. Recognition of riparian zones as the focal point of watershed, wildlife, recreation, and livestock production concerns is now fairly common. Satterlund (1972) in his book Wildland Watershed Management emphasized land uses and their impact on quantity, quality, and timing of streamflows, which has a direct relation to riparian zones. Thomas (1979, p. 41) pointed out the importance of riparian zones to wildlife by stating that "of the 378 terrestrial species known to occur in the Blue Mountains, 285 are either directly dependent on riparian zones or utilize them more than other habitats." He further pointed out that stream margins are disproportionately important for forest and range uses, with these margins frequently containing the most highly productive timber and forage sites. Roath (1982) found that cattle use in a forested grazing allotment in eastern Oregon was disproportionately heavy in the riparian zone. In his study location, 1.9 percent of the land area was classified as riparian and yet it accounted for 81 percent of the herbaceous vegetation removed by livestock. Wildland recreation is also closely correlated to water; with favorite campsites, fishing, frolicking, and scenic values often found in association with riparian zones.

Perhaps the most obvious conclusion one can draw from looking at the literature is that there is incomplete scientific information appropriate to this issue. This does not imply that we are without knowledge in this area, but one must recognize that much of what we have been able to glean comes from observation of isolated, and frequently non-replicated, demonstrations. The obvious importance of these zones has sparked considerable interest and volumes of reports, studies, and opinions.

DEGRADATION FROM ABUSIVE PRACTICES:

Meehan and Platts (1978) published an article quantifying many of the known relationships between livestock grazing and water quality, quantity, and fish habitat. Through use of some 60 papers which they cited, they demonstrated an obvious deleterious relationship between the riparian system and abusive grazing. It is clear that significant negative changes have been brought about by overgrazing. What is less clear, however, is what constitutes overgrazing on any given system; to what degree geologic events are operating independent of grazing; and what ameliorating effects might grazing systems, season of grazing, and animal behavior modification have. These questions need to be quantified and answered before land managers will be able to fully understand and allocate the resources entrusted to them.

SEASON OF USE:

One of the landmark riparian zones about which one often hears, at least in the Pacific Northwest, is Camp Creek, a tributary of the John Day River, in northeast Oregon's Blue Mountains. A riparian restoration effort on Camp Creek involved the fencing of a stream corridor and periodic observation of the resulting changes. Claire and Storch (1983) note that when Camp Creek was fenced in 1964, the streamside was void of a shrub canopy and exposed streambanks were common. They reported that by 1974, though the condition of the stream outside the fenced section remained unchanged, inside alder and willow shrub canopy was providing up to 75 percent shade to the stream. They further noted that maximum water temperatures outside and downstream from the fenced area averaged 12 degrees Fahrenheit higher than those samples taken within the fenced area. They found that daily water temperature fluctuations averaged 27 degrees outside compared to 13 degrees inside the fenced area. Fish composition was such that within the fenced area, game fish made up 77 percent of the population. Outside the fence, game fish were only 24% of the total fish population. Since 1968, Camp Creek has been opened to livestock grazing again. The fenced area now serves as a special-use pasture, providing late-season (after August 1) livestock grazing which is carefully monitored. In the 10 years since grazing has been reintroduced, the authors reported that no measureable change in fish population had

been identified as a result of this type of livestock use. These observations, though not replicated and rigid, serve to make me believe that riparian zones have a remarkable ability for rapid recovery; and once in good condition, they are capable of supporting managed livestock grazing. In this case, late-season use was the prescription.

GRAZING SYSTEMS:

Hayes (1978) studied three meadows and their associated streams in the Idaho batholith. One of these meadows was ungrazed and two others were grazed under a rest-rotation grazing management system. He reported that rest-rotation grazing in the meadows did not significantly alter channel movement. He found that occurrence of degradation during spring discharge along ungrazed streambanks was significantly greater than degradation occurring along the grazed streambanks. Hayes suggested that ungrazed or unburned meadows, in fact, may suffer from a lack of vegetative vigor, and thus be susceptible to undercutting. He noted, however, that some degradation, attributable to livestock during the grazing season, was present in the grazed meadows.

Johnson (1965) reported that season-long grazing in mountainous areas had been found to increase use of the meadows, and especially the riparian zones, into the latter part of the season. Hayes (1978) speculated that since the probability of bank degradation increases as livestock concentrations intensify along streambanks, especially late in the growing season when the vegetation is reaching maturity, that a rest-rotation livestock system would avoid such concentrations at critical times.

Buckhouse, Skovlin, and Knight (1981) investigated a number of livestock grazing practices on Meadow Creek in the Blue Mountains of Oregon and discovered that the relative stability of that system was not statistically changed after two years of systems grazing at a level of 3.2 ha/AUM. They reported that the grazed treatments experienced a sloughing of cutbanks at the rate of 16 and 14 cm per year during 1976 and 1977, respectively. During the same period, cutbanks in ungrazed, control sections lost 11 and 8 cm annually. In both cases, the grazed units showed higher mean annual erosional losses, but the differences were not significant ($P<.10$). They also observed that higher streambank erosional rates were associated with the winter months than during the summer

grazing period regardless of whether these were grazed or ungrazed treatments. As a consequence, they concluded that at that particular grazing rate, the over-wintering processes associated with high water and ice floes were agents that were at least as important in streambank erosion as the perturbations associated with the livestock.

In further investigations on Meadow Creek, Bohn (1983) found, in an eight-year absence of major ice floes, that continuous, season-long grazing for five consecutive years caused significant streambank erosion. However, managed systems of grazing ameliorated the impacts and responded much like the ungrazed control pastures.

Bryant (1984, personal communication) indicated that during the 1983-84 winter, a severe ice floe occurred on Meadow Creek and damaged banks with little regard to the previous grazing histories.

It becomes evident that grazing makes a difference, that managed grazing ameliorates aspects of destruction associated with unmanaged use, and that the forces of nature are dramatic indeed.

STREAMSIDE VEGETATION:

Roath (1983) noted that the riparian zone accounted for a disproportionate amount of forage production and consumption, yet he reported the streambanks to be stable in his study location near John Day, Oregon. Roath noted that Kentucky bluegrass (Poa pratensis) was the dominate grass in that riparian zone and speculated that it exerted major control over the relative stability of the associated vegetation communities. He concluded that since Kentucky bluegrass has been demonstrated to be highly tolerant to defoliation, grazing at an intensity such as to reduce and maintain the grass at a stubble height of about an inch had small impact on vigor and cover.

In addition, Roath noted that those riparian zones where use was deferred until late August showed a much lower livestock utilization on the herbaceous component. He speculated that this was attributable to a combination of low palatability relative to that found on shady slopes and cold air accumulation on the meadows. He suggested, therefore, that utilization of herbaceous components in the riparian zones could be manipulated by changing season of use, matching relative succulence and palatabilities of the hillside and riparian vegetation.

ANIMAL BEHAVIOR:

In a separate analysis, Roath (1980) also investigated cattle behavior patterns. He found that the livestock, much like big game, have a distinct home range. Of the animals studied, one group had a home range which encompassed only upland areas. Although additional work is necessary to more fully quantify the social structure and learning processes associated with choosing these home ranges, it is interesting to consider the ramifications of this. For example, would it be possible through breeding, training, and/or herd culling practices to establish a group of animals which actually preferred and selected upland rather than riparian sites while foraging?

CONCLUSIONS:

I believe that several observations can be drawn from these studies:

First, I think it is clear that riparian zones are important focal points for most of the products and uses associated with many natural ecosystems.

Second, it has been shown that abusive land use practices can result in a degradation of these areas. Abusive practices which cause such degradation could be improper forestry, grazing, road construction, or farming.

Third, the inherent capacity for recovery of degraded riparian zones is remarkable. This may be because of vegetation such as Kentucky bluegrass, which is exceptionally tolerant of heavy use and provides considerable stability for the system. Or it may be a function of the rich nutrient and soil resource or relatively higher moisture availability which is associated with this zone.

Fourth, it appears that by exercising the appropriate managerial tools which are available to range managers--tools such as control of grazing intensity and season of use--that livestock grazing can be compatible with the other uses and values germane to these unique and important areas.

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OPPORTUNITIES IN FINANCING LIVESTOCK OPERATIONS

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The current situation in agriculture is described euphemistically as "financial stress." But what does this mean and what is causing it? The current situation is not the same as the perennial cost-price squeeze. Agricultural prices have actually shown some improvement during the past year and prices paid by farmers for production inputs have stabilized. The present situation is better described as a cash flow and credit crunch. It doesn't affect all ranchers -- only those who have high debt-to-asset ratios.

This cash flow and credit crunch is a result of high interest rates and asset devaluation. For ranchers with heavy debt loads, these higher interest rates have increased the cash flow required to service debt. At the same time, changing net return expectations, along with the higher interest rates, have caused decreases in land values. These decreases in land values reduce ranchers' borrowing capacity -- there is less opportunity to refinance debt to reduce payments and spread them over a longer repayment period.

The Causes and Effects of Financial Stress

The roots of the current financial situation in agriculture can be traced to the inflationary decade of the 1970s and the adjustments to the sharply different economic conditions of the 1980s. During the 1970s, agricultural exports were expanding rapidly, inflation was at double-digit rates and the real interest rate (the nominal rate minus the inflation rate) was low and, in some cases, negative. These forces provided incentives for farmers and ranchers to borrow capital to invest in new equipment, purchase land that was appreciating in value, and to expand the sizes of their operations.

In the early 1980s, two significant events occurred which would have dramatic effects on the agricultural economy. The first was the change in the policies of the Federal Reserve System regarding the management of the supply of money. The second was the tax decrease of unprecedented size, initiated by the Economic Recovery Tax Act of 1981. As a result, inflation has been slowed, interest rates are higher, and the federal budget is generating record-level deficits.

The higher interest rates are attracting large sums of money from foreign investors, who are finding the United States to be a safe and profitable source of investments. As a result of this flow of currency

into the United States, an already strong dollar is even stronger, relative to other currencies. The stronger dollar, not only makes U.S. commodities more expensive to importers, it also attracts competitors who can compete with U.S. farm exports because of their cheaper currencies. This is the main reason why the United States is losing export markets.

An important characteristic of the current financial situation in agriculture is the great differences in how farmers and ranchers are affected. Based on current interest rates and levels of net returns, a recent USDA study concludes that farms and ranches with debt/asset ratios of more than 40% are likely to have inadequate cash flow to meet all their obligations. The study also concludes that farms and ranches with debt/asset ratios of more than 70% are almost certain to have serious cash shortfalls.

The USDA study estimates that 11.1% of all farms and ranches (243,000) have debt/asset ratios of 40-70%. These farms are experiencing serious financial problems that will require refinancing, extension of loan repayment, or liquidation of some assets. Another 6.6% of all farms and ranches (143,000) have debt/asset ratios above 70%. Some of the farms in this category are technically insolvent. Others are facing extreme financial problems that will require major adjustments within the next 1-2 years if they are to survive. With debt/asset ratios greater than 70%, there is not enough income to pay interest and other obligations and also to provide for family living expenses. Significant adjustments will be required to improve returns or reduce debt.

How are livestock producers faring in this depressed financial environment? The USDA categorizes four types of livestock production units: general livestock, dairy, poultry and egg, and other specialized livestock operations. Table 1 summarizes the percent of operations according their debt/asset ratios and compares this with the percentages for all farms. Most beef producers would be categorized in the general livestock or other livestock categories. The data in Table 1 indicate that the incidence of high debt/asset ratios for these two categories of livestock operations are very similar to that for all farms and ranches.

The January 1985 inventory of cattle and calves in the United States fell 3% compared to January 1984. The size of the nation's cattle herd was estimated at 109.8 million head as of January 1985. This is the lowest that has been reported since 1968. Thus, there is some basis for optimism for beef cattle producers. However, even though there are good prospects for stronger cattle prices during 1985, there are still a number of uncertainties regarding the cattle outlook and, even with an improvement in prices, it may not be adequate to solve the financial problems being faced by many ranchers.

The situation in agriculture is putting greater emphasis on the management of capital and the financing of ranch assets.

Table 1. Distribution of Farms and Ranches by Debt/Asset Ratio and Type of Operation, January 1, 1984

	Debt/Asset Ratio	
	40-70 Percent	Over 70 Percent
	(percent)	
All farms and ranches	11.1	6.6
Livestock operations:		
General livestock	10.6	7.1
Dairy	17.8	8.7
Poultry and egg	17.9	17.7
Other livestock	12.6	9.1

Source: USDA-ERS Agricultural Information Bulletin No. 490.

Financing Ranch Assets

Ranchers use four sources of capital to finance the assets of their ranching businesses:

1. The owner's net worth -- the rancher's own capital invested in the business.

2. Debt capital borrowed from a lender who extends credit in exchange for interest payments.

3. Outside equity -- money that others invest in exchange for a share in the ownership and profits of the business.

4. Leased assets -- land is the most common example, but equipment and livestock are also leased.

The rancher's own net worth or equity in the business is the most important single source of capital invested in agriculture. However, this capital is often difficult to acquire -- savings, gifts, and inheritances may not be available to contribute to net worth. Also, after paying income taxes and providing for family living expenses, the net ranch income remaining for reinvestment may not be enough to provide any noticeable effect. Thus, ranchers must rely on other sources of capital. The most important of these other sources are agricultural credit suppliers, but outside equity and leases also have potential for providing capital to finance ranching operations.

Using Agricultural Credit

There are many sources of credit available to farmers and ranchers. The best source depends on the type of credit desired and the rancher's circumstances. Ranchers should know and understand the alternative sources of credit available, and the trends regarding the availability of credit.

Credit Sources in Oregon

Agricultural credit is typically classed in one of two categories: real estate and nonreal estate. Real estate credit is usually associated with land purchases or the refinancing of nonreal-estate debt. Loan repayments can take from 10-40 years. Nonreal-estate credit includes short-term operating loans to be repaid in one year or less and intermediate-term loans for capital purchases to be repaid in less than 10 years. As of January 1, 1984, there was a total of $2,300 million dollars of outstanding real estate debt and $1,180 million nonreal-estate debt owed by agricultural producers in Oregon. Thus, real estate credit accounted for 66% of total Oregon agricultural credit, and the remaining 34% is represented by nonreal-estate credit.

Sources of Agricultural Credit

The major sources of agricultural real estate loans in Oregon and their relative shares are indicated in Table 2. Federal Land Bank associations are part of the farm credit system which provides real estate loans. The other major suppliers of real estate credit to Oregon agricultural producers are life insurance companies, the Farmers Home Administration, commercial banks, the Oregon Department of Veterans Affairs, and individuals (usually sellers of real estate).

Table 2 also shows how the shares have changed over time. The share of agricultural real estate debt held by the Federal Land Bank associations has increased by 10 percentage points over the past 5 years, from 27 percent on January 1, 1979, to 37 percent five years later. The trend has been downward for life insurance companies and the share of real estate debt held by the Farmers Home Administration has increased slightly. Commercial banks account for a very small share of real estate debt in Oregon and this is relatively constant. The total share for other lenders, including the Oregon Department of Veterans Affairs, has decreased over the last five years.

The total amounts of Oregon's nonreal-estate agricultural debt outstanding by source and relative shares, as of January 1, 1984, are indicated in Table 3. The production credit associations are the short- and intermediate-term lenders of the farm credit system and account for the largest share of nonreal-estate debt at 30%. Commercial banks are second at 29%, and the Farmers Home Administration provides 12% of the total nonreal-estate debt in Oregon.

The Commodity Credit Corporation (CCC) is an agency of the U.S. Department of Agriculture operating through the Agricultural Stabilization and Conservation Service. This debt is associated with the price support loans offered for certain crops. These loans accounted for 9% of the total nonreal-estate loans in January 1984. The Federal Intermediate Credit banks are financial institutions other than production credit associations that obtained funds through the Federal Intermediate Credit Bank of Spokane. This source provides only about 2% of the nonreal-estate loans in Oregon. Merchants, dealers, and other sources of credit account for the remaining 13%.

The production credit associations have decreased their share of nonreal-estate borrowing from 33 to 30 percent over the past five years. Commercial banks have reduced their share from 37 percent in 1979 to 29 percent in 1984. The share of nonreal-estate debt provided by the Farmers Home Administration has increased from 7 percent to 12 percent over the past five years. The change in the share of nonreal-estate debt held by the Commodity Credit Corporation has also been significant, increasing from 2 to 9 percent over the five-year period. Changes in the shares of nonreal-estate debt by the non-PCA farm credit system sources, merchants, dealers, and others have not been significant.

Table 2. Farm Real Estate Debt Outstanding, Oregon, January 1, 1984, and 1979

Lenders	1984 Real estate debt	1984 Share	1979 Share
	($ million)	(%)	(%)
Federal land bank associations	847	37	27
Life insurance companies	214	9	14
Farmers Home Administration	114	6	4
Commercial banks	19	1	1
Others[a]	1,077	47	53
Total	2,300	100	100

[a] Includes Oregon Department of Veteran's Affairs and individuals.

Source: USDA.

Table 3. Nonreal-Estate Farm Debt Outstanding, Oregon, January 1, 1984 and 1979

Lenders	1984		1979
	Nonreal-estate debt	Share	Share
	($ million)	(%)	(%)
Production credit associations	349	30	33
Commercial banks	344	29	37
Farmers Home Administration	145	12	7
Commodity Credit Corporation	111	9	2
Federal Inter. Credit banks	18	2	0
Merchants, dealers, others	213	18	21
Total	1,180	100	100

Source: USDA

The roles of these various agricultural lending institutions are changing in response to new regulations, as well as economic forces. Some of these sources of credit are reducing and restricting their agricultural loan activity. At the same time, the credit needs of agriculture are expected to increase in the future. In the short run, additional funds will be required to facilitate the adjustments of farms and ranches to the current depressed agricultural situation. Increasing costs of farm inputs and new technology will also require additional capital. How these lending institutions react to the increasing demands of agriculture will have important implications for the productivity and well-being of Oregon farmers and ranchers.

Approaching the Lender

A rancher's borrowing capacity is an asset, and like any other asset, it must be developed and maintained. The loan application process is a crucial step in acquiring credit. Ranchers might view themselves as sales people in this application process -- they are selling their credit worthiness to the lender.

The first consideration in preparing the loan application is to understand what is important to the lender's decision. The prospective borrower should be prepared to explain clearly how much credit is needed, how it will be used, how it will affect the business, and how and when it will be repaid (with interest). And, to be most effective, the borrower's proposal should be written. Lenders will normally consider five factors when evaluating loan applications:

1. The Purpose of the Loan. Lenders want to know for what purpose the loan will be used. Reasons for loans might be classified as either "needs" or "wants." Needs are crucial to the continued success of the farm business; wants can be postponed or eliminated without harming profitability. Lenders also consider the purpose of the loan in terms of its effects on net income and cash flow. A loan that increases the net income and cash flow enough to repay the loan, a "self-liquidating" loan, is preferred. The purpose may also influence the length of the repayment period. Also, any special risks associated with the purpose of the loan or with the assets to be purchased are considered.

2. Reputation and Managerial Ability. Prospective borrowers must demonstrate their management skills and character, their honesty and reliability. Specific goals and a well-prepared plan involving the use of credit to reach them are a good starting point. A cooperative attitude, straight-forward communication, and full and accurate disclosure of financial information will help build mutual trust and confidence between lender and borrower.

3. Financial Position. Lenders are interested in the business' current and past financial position in terms of its profitability, solvency, and liquidity. The most recent financial statements along with those for the past three to five years will most effectively communicate this financial information.

   -- The balance sheet shows the net worth and solvency of the farm business. By comparing balance sheets over several years, the growth and progress of the business can be seen.

   -- Income statements demonstrate how well the farmer managed capital in past years.

   -- A cash flow statement for the past years shows the sources and uses of cash, that is, the cash available from nonfarm sources, cash required to repay current debt, family living expenses, and so forth.

   In addition to these financial statements, the lender may request copies of income tax returns for past years. As the lender reviews the financial statements, particular attention will be given to their completeness and accuracy. Are all debts fully disclosed? Are assets realistically valued? Does the borrower understand the statements and their implications?

4. Repayment Capacity. The ability to repay the loan is determined primarily by examining the cash flow budget. These projected cash flows over the next year, or longer for loans, indicate when money should be available for larger loans, indicate when money should be available to repay loans and is therefore helpful in scheduling the loan repayment so it matches cash availability. The cash flow budget also shows the lender how the borrowed funds will be used and the other sources, as well as the uses, of cash.

5. Collateral. Lenders need security to cover the loan in case things do not go as planned. Lenders are responsible for protecting the owners of the loaned money from default. Therefore, lenders usually insist that farm assets be pledged as security. They may require chattel mortgages on most of a farmer's assets. The balance sheet indicates the assets that might be used for security.

Borrowers should not be apologetic about asking for a loan. With a legitimate use for credit, there is no reason to be reluctant. The better the case they can make, the better their bargaining position for desirable loan terms. A complete application and well thought-out farm plan cannot fail to impress a lender. Relevant data will do much to inform lenders about the circumstances surrounding a loan request. This is one of the more valuable uses of farm accounts and records.

The process of selling credit worthiness does not end with the approval of the loan application. After the loan has been made, it is essential that the borrower abide by the agreed-upon terms. The loan agreement will specify what the lender agrees to do and what is expected of the borrower. The agreement may spell out when and from what sources repayment is to be made. If the borrower diverts funds that were to be used to repay the loan, future credit extension can be seriously affected. If circumstances prevent a borrower from meeting the terms of the agreement, the borrower should notify the lender immediately (lenders do not like surprises) and cooperate in developing a new plan.

Lenders like to see that borrowers are monitoring cash flow by comparing actual and budgeted cash flows each month and the year-to-date cash flows. The comparisons allow potential problems to be identified so that adjustments can be made before the problems become serious.

Borrowers should keep lenders informed as to their long-range and short-range plans. The borrower should not make major commitments to buy machinery or livestock without first consulting the lender and checking for any consequences to credit availability.

Providing a consistent flow of information to the lender regarding the performance of the business can also help build a farmer's borrowing capacity. Generally, farmers who effectively document their financial progress have more credit available to them with more favorable terms.

Finally, risk management can improve the availability of credit. Practices that reduce risk and the lender's uncertainty regarding loan repayment can expand the availability of credit.

Managing Credit

Proper credit management allows for additional borrowing and maintenance of liquidity. Credit management involves identifying and evaluating practices that expand or restructure the business's credit.

An important element is the lender's influence on the amount, terms, and use of borrowed capital. In general, the lender would prefer higher rates of interest over a relatively short repayment period, because loans represent earning assets to the lender. The borrower, on the other hand, prefers lower rates of interest for relatively longer repayment periods, which alleviates cash flow problems. Lower annual payments are easier to make in poor years. However, borrowers must discipline themselves to make larger payments in the good years to reduce interest charges. Prepayments also rebuild the credit reserve that can then be used to cover shortfalls in low-income years.

A common problem in credit management is that short-term loans are often used finance long-lived farm assets. As a result, borrowers find it difficult to generate adequate cash flow to meet the repayment schedule.

However, not all of the fault is the lenders'. Many borrowers do not aggressively seek longer loan repayment schedules.

Many agricultural lenders make nonreal-estate loans for one year knowing the loan will not be repaid in full when it falls due. At the end of the year, they review the loan with the borrower and decide whether to extend the loan. This loan may be for any number of purposes, such as purchasing machinery and financing production expenses. It is unrealistic to expect that loans to purchase machinery can be repaid in one year. Thus, at least a portion of the loan is likely to be extended. However, when borrowers sign loan agreements not expecting to repay them when due, there should be a clear understanding regarding the amount of the loan that the lender expects to be repaid by the end of the year. And, the borrower should be assured the lender is willing to make an extension if the borrower should need more time.

Attracting Outside Equity

Debt financing has the advantage of leveraging net income, but its disadvantages are rigid repayment schedules and uncertain business income. Thus, ranch operators desiring to expand their beef enterprises or wanting to reduce their debt/asset ratios should consider outside equity capital. Bringing in outside capital involves finding an investor interested in sharing the risks of beef production. It may be necessary to reorganize the farm business as a partnership or corporation to implement this alternative. Ranchers considering this alternative should expect some loss of control over the management of the operation.

The following steps outline the general process involved in attracting outside equity capital to an agricultural venture:

1. Identify potential investors. Direct personal contact is the most effective way to determine the interest of local investors, for example, local attorneys, physicians, or others who might find a farm investment attractive. Friends and relatives should not be overlooked. The place to start might be the local lender, who is undoubtedly aware of interested capital sources. Also attorneys, accountants, and investment brokers will be aware of individuals and organizations interested in investing in new ventures.

2. Find out what investors are looking for. Are they seeking short- or long-term investments? Tax shelters or profits? Capital gains or current income? To attract equity capital to agricultural ventures, several considerations are important:

   -- Tax advantages. Investors in high income tax brackets are looking for investments with tax shelter potential.

-- Glamour. People are attracted to cattle ranching and vineyard investments but are not as enthusiastic about hog production.

-- Quick, speculative profits. Cattle feeding is an example of an agricultural venture that has attracted speculative interest.

-- Long-term growth and capital gains. Land investments are appropriate for these investors.

3. Prepare and present an effective proposal. The proposal should be documented with projected balance sheets, income statements, and cash flow budgets. Competent legal and accounting advice will greatly improve the chances of securing capital. Ranchers seeking outside equity capital must sell themselves. Their managerial abilities are the key to the success of the venture, and potential investors must be convinced of these managerial abilities.

Many farm operators avoid turning to outside investors to help finance their businesses. Regardless of the reason for it, this attitude can lead to problems if a rancher attempts to build a business with inadequate capital. Once in financial trouble, it is too late to attract outside equity investors.

Negotiating Financial Leases

Another option for acquiring addition capital, reducing debt, and avoiding high interest rates is to lease assets rather than owning them. Leasing has been a common method of acquiring farm real estate. In recent years, the leasing of farm machinery and breeding stock has generated more interest, but is still not very common.

Financial leases are long-term contracts which essentially provide financing to the leasee. The contract usually runs for the useful life of the asset being leased. The lease is generally viewed as an alternative to owning the asset. Livestock producers with a heavy debt load might sell their breeding stock, use the proceeds to pay off their debts, and then lease the animals from the purchaser. Producers wanting to expand their herds might lease rather than purchase breeding stock because of credit limitations and high interest rates.

The favorable tax treatment of livestock investments has increased the interest in, and availability of, financial leases for livestock. Investors see breeding stock as an opportunity for a highly leveraged investment that generates investment tax credit, accelerated cost recovery and interest deductions, and capital gains income.

For producers, leasing may have the advantage of reducing cash flow requirements. The first lease payment is normally less than what the down payment would be if the asset were purchased. Also, lease payments may be lower than principal and interest payments for purchase. This is possible

when the leasor passes the tax benefits of investment tax credit and accelerated cost recovery on to the leasee in the form of lower lease payments. Through financial leasing, livestock producers can access capital that would otherwise be unavailable to agriculture.

The negotiation of an equitable leasing arrangement, one that is fair to both parties, involves budgeting the costs and returns for both parties. An equitable agreement distributes the income between the leasor and the leasee in the same ratio that they contribute resources and pay the costs of the enterprise. Of course, there may be some additional bargaining before the agreement is acceptable to both parties.

To determine the specifics of the lease agreement, some questions must be answered:

1. Who provides the replacements?

2. How are death losses handled?

3. What is the length of the agreement and what is the procedure for terminating it?

4. Who decides when animals are to be culled and sold?

5. How is the income from sales to be divided?

6. Who decides on the production practices, such as feeding, breeding, and housing?

There are several different possibilities for determining lease charges. Following are some examples that might be used for a beef operation.

1. A charge per cow per month.

2. A percentage of the cow value per month.

3. A percentage of the income from calf sales.

Studies have found that for typical livestock farm situations, purchasing animals with borrowed funds is often economically superior to leasing them. However, high interest rates and low taxable income tend to favor leasing. Income tax consequences are an important consideration in the negotiation of mutually beneficial lease agreements.

Closing Remarks

The current outlook for agriculture is not favorable, but long run prospects are more optimistic. Experience during the 1970s indicates how quickly things can turn around. Poor weather in a major food-producing area of the world, decreases in the federal budget deficits, or a lower value for the dollar compared to other currencies could dramatically improve the financial crunch in which U.S. agriculture currently finds itself. So, the challenge is to survive the short run and be in a position to take advantage of the profit opportunities that will arise over the longer term.

Financial management is of increasing importance to the success of livestock producers. Changes in interest rates and other economic relationships imply the need to change how livestock enterprises are financed. There are opportunities to use new approaches for acquiring outside capital -- leasing is one example. Production skills alone are no longer a guarantee of success. Financial management skills are of increasing importance in the challenging economic environment of the beef producer.