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APPLICATION OF CURRENT LIVESTOCK/RANGE KNOWLEDGE AND
EMPHASIS NEEDED FOR THE FUTURE

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Abstract

In an attempt to document and evaluate the extent to which practices resulting from livestock and range research are being applied in the 17 Western states, in the United States, 62 survey questionnaires were mailed during July, 1980, to extension specialists in livestock and range sciences. The questionnaire also contained a section in which the respondents were asked to indicate, on specific questions whether information was available, unavailable, or of limited interest. The limited number of responses made formal statistical inferences impossible. However, two trends were revealed: 1) accurate and precise information either does not exist or is not readily available on the extent to which specific practices in livestock and range sciences are being applied; and 2) extension specialists in the livestock and range sciences differ in their opinion on what topics require further research. A statistically analyzable questionnaire returned from an adequately sized, random sample of research, extension, and producer personnel is needed if we are to determine the extent to which research information is being applied and to indicate the emphasis for future research.

INTRODUCTION

In an attempt to document and evaluate the extent to which practices resulting from livestock and range research are being applied in the 17 Western states in the United States, 62 survey questionnaires were mailed during July, 1980, to 37 extension specialists in livestock science and 25 extension specialists in range science. Results can be grouped into three categories: 1) written response, plus the questionnaire answered in part or whole; 2) written response only; and 3) no response. Only 38 percent of the livestock and 32 percent of the range extension specialists attempted to answer the entire questionnaire and return it. However, of the 52 percent overall response, written responses only represented 11 percent from the livestock and 21 percent of the range extension specialists that replied.

The questionnaire had three sections. Both the animal and the

range sections were sent to those specialists having both livestock and range responsibilities, along with a third section asking the specialists to rank specific questions concerning research needs as to availability of information and interest in the topic. If the individual had extension responsibility in only one area, only that section of the questionnaire, along with the research needs section, was sent.

The 17 Western states included in the survey were: Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. At least one questionnaire or written response was returned from each state except Utah. The limited number of responses made formal statistical inferences impossible. However, several interesting trends may or may not reflect a true assessment of the facts. Caution is urged when interpreting the following data determined from this survey.

ANIMAL

Crossbred, commercial, cow-calf, livestock operations dominate the rangelands of the 17 Western states. By far the largest percentage of these enterprises are owner operated. Up to 14 percent of the enterprises may not keep books; therefore, it is difficult to obtain information on the various management practices being used. In addition we do not know what types of records are kept on 16 percent of the operations.

Semen is evaluated on 20 percent of the livestock enterprises reported on in this survey, and animals are tested for pregnancy on 38 percent of the enterprises. Animals are mated in all months except September, October, and November. Protein, energy, vitamins, and mineral supplements are used in 50 to 70 percent of the livestock enterprises. Insecticide spray and dust bags are the two most widely used techniques to control flies, lice, and ticks.

Fire branding is used to identify animals on 87 percent of the livestock enterprises. When calves are branded the trend is for male calves to be castrated (87%) and horned animals to be dehorned (76%). Vaccination for blackleg, malignant edema, brucellosis, leptospirosis, and vibriosis occurs on 85 percent of all livestock operations.

The four most important reasons cited for removing animals from a herd in order of importance were: bad udder (34%); failure to conceive (25%); lump jaw (23%); and bad teeth (14%).

RANGE

On the basis of federal, private, or a combination of land ownership patterns, extension range specialists were asked to supply answers in percentages or area of land or both, to specific types of treatments the ranchers or livestock producers in their service area had been involved in during the last 10 year period. Questions were asked in three categories: 1) range brush or weed control; 2) range manipulative treatments; and 3) grazing methods.

It is impossible to discuss with any degree of accuracy or precision the range part of the questionnaire because of the incomplete answering of questionnaires and the low overall response rate. However, a gap does exist in knowing how much of the available research information is actually being put into practice. This gap was reflected in several written responses we received. The following points were brought out:

- 1) This type of information has been needed for a long time.
- 2) If any information does exist, it is not in a readily available form and would require a substantial amount of time to summarize.
- 3) Other comments indicated ambiguity in the questionnaire, inexperience of the respondent for a particular area, and the proverbial statement, "shouldn't someone else have this information?" The most frequent comment was that the answers, at best, were very rough guesses.

Range brush or weed control

Aerial application of herbicides is the most widely used method for brush and weed control. Chaining/cabling, bulldozing, mowing/shredding, and rootplowing are the four most preferred mechanical methods for control of brush. Railing, roller chopping, plowing, and disking are used, but to a lesser extent.

Pelleted herbicides are used for some individual plant treatment. Fire, goats, and insects are used on a limited area as alternative methods to, or in combination with, mechanical and chemical control of brush and weeds.

Range manipulative treatments

From the limited number of responses, we were not sure how much area required manipulative treatment. However, seeding of native and improved plant species, fertilization (principally with nitrogen), water spreading, and fencing are the major range improvements used. Grasshoppers, range caterpillars, prairie dogs, and gophers are the pest species that cause most problems on rangeland.

Grazing methods

Native pastures and native pastures plus complementary pastures range in size from 0.8 to 20,234 hectares (2 to 50,000 acres). The ranches themselves also range from 40 to 283,280+ hectares (100 to 700,000+ acres). The largest ranches were reported in Nevada and New Mexico and included both private and federal land holdings. Stocking rate was reported to range from 0.4 to 243 hectares/animal unit (1 to 600 acres/animal unit). This diversity in size and ownership pattern reflects the complexity that is encountered when managing grazing livestock and trying to identify any discernible trends. Season of use is quite variable and depends primarily upon land ownership patterns and weather. On lower elevations, pastures are grazed during most seasons of the year whereas in the northern states and on higher elevations, pastures are grazed for short periods.

Continuous grazing of native range without complementary pasture is the predominant method of harvesting the herbaceous standing crop; a slightly greater amount of private land than of federal land is managed this way. Planned rotations are the trend on federal land, and rest rotation is the most frequently cited method. Also, the 4 pasture-3 herd, the short duration, and the deferred rotation methods were listed. Both seasonal grazing and rotational grazing are used for harvesting herbage in which native range and complementary pastures are used in combination.

RESEARCH NEEDS

Part three of the questionnaire was sent to both livestock and range extension specialists asking them to indicate whether information on specific topics was available, inadequate, or of limited interest. Table 1 is a summary of the respondents' ranking of research needs. Because the sample size was limited, responses by geographical area or by state were not summarized separately.

TABLE 1
Summary of research needs expressed as a percentage of responses from
extension specialists in livestock (beef) and range sciences, August 1980.

Category	Livestock			Range			Combined		
	(A)	(I)	(L)	(A)	(I)	(L)	(A)	(I)	(L)
A. Inventory and Classification									
1. Forage utilization, vegetation	25	54	21	35	65	0	29	58	13
2. Range trends	32	54	14	15	85	0	25	67	8
3. Assessment of annual forage crops	36	50	14	40	60	0	38	54	8
4. Land use	54	31	15	56	22	22	55	27	8
B. Revegetation/Ecology									
1. Availability of plant materials	50	29	21	60	40	0	54	33	13
2. Methods	57	36	7	55	45	0	56	40	4
3. Grazing adaptability	57	36	7	55	45	0	56	40	4
4. Unwanted plants (noxious, poisonous)	57	36	7	45	40	15	52	38	10
5. Insects plants	50	29	21	20	70	10	37	46	17
6. Insects animals	61	25	14	50	50	0	59	37	9
C. Manipulative Treatments									
1. Range fertilization	21	43	36	45	25	30	31	36	33
2. Chemical weed or brush control	50	50	0	55	45	0	52	48	0
3. Mechanical treatments (ripping, furrowing, etc.)	50	43	7	50	40	10	50	42	8
4. Burning	32	47	21	45	55	0	37	50	13
5. Water spreading	46	31	23	30	35	35	39	33	28
6. Development of animal water	64	22	14	95	5	0	77	15	8
D. Forage Resource									
1. Complementary pastures	39	54	7	35	65	0	38	58	4
2. Grazing systems	43	57	0	30	70	0	37	63	0
3. Time of grazing	46	54	0	25	65	10	37	59	4
4. Stocking rate	36	64	0	70	30	0	50	50	0
5. Proper utilization	31	69	0	40	60	0	35	65	0
E. Livestock									
1. Diet and nutrition	75	25	0	45	55	0	62	38	0
2. Performance	57	36	7	45	45	10	52	40	8
3. Trampling	0	64	36	15	60	25	6	63	31
4. Behavior	12	65	23	35	45	20	22	56	22
5. Distribution	36	50	14	65	25	10	48	39	13
F. Wildlife									
1. Diet	8	46	46	5	65	30	7	54	39
2. Wildlife - livestock relations	8	77	15	5	75	20	7	76	17

(A) = Available; (I) = Inadequate; (L) = Of Limited Interest

Livestock and range extension specialists responded similarly to the six major categories given in Table 1. Information is available on revegetation/ecology and manipulative treatments but is inadequate on the inventory, and classification of rangeland, the forage resource, livestock, and wildlife. The nonsimilarity in response to questions B5, C1, C5, D4, E1, and E5 in Table 1 concerning areas of research need may reflect true differences in needs due to the different backgrounds and interests of the livestock and range extension specialists. Also, either poor communication between the two groups regarding what information is available or lack of understanding in answering the questions as a result of wording of the questionnaire may account for the different responses between the two groups.

CONCLUSIONS

Based on the number and detail of responses, more information appears to be available to the livestock extension specialist than to the range extension specialist on matters concerning the applied research that has been adopted commercially. Hybrid vigor derived from cross bred cattle appears to be a well accepted principle on livestock operations. However, most operations could improve their record keeping. With improved record keeping the benefits to be derived from management practices will be easier to document.

There appears to be a serious gap in our knowledge of the available range research information that is actually being put into practice. With both private and government administered rangeland the complexity in management is substantial. However, to determine priorities for applied research efforts in the future we must know what is already being applied.

The dissimilarity in response to specific questions concerning research needs given by livestock extension specialists and range extension specialists may reflect differences in needs due to the different backgrounds and interests of the specialists. However, in some cases poor communication between the two groups regarding what information is available may be responsible for the differences.

A concise summary of the commercially applied research techniques is needed by states. To obtain this information a continuing dialogue must be established between extension specialists and producers. Once this dialogue is established a concise questionnaire written so it can be verified and adapted for statistical analysis should be answered by both extension specialists and producers in order to establish the direction of future research.

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DISCUSSION

Recorder: C.C. BOSWELL

HORN commented that Government Departments control large areas of USA. It is important to improve communication between foresters, land managers and various Federal Agencies. In addition Government land could be used to demonstrate principles to producers. ANDERSON agreed - 33.5% of the State of New Mexico is in State or Federal ownership.

MOCHRIE sought comment on a finding of his survey that range managers do more research, develop more methodology and expand these practices more to neighbours, than either University or Federal scientists. ANDERSON agreed that there were managers who were ahead of research scientists. Some of these were cooperating with researchers e.g. for short duration grazing research in Arizona and New Mexico.

MINSON pointed out that dairy farmers in Australia were considered in some respects to be ahead of scientists and their expertise was used; findings could be obtained from detailed surveys that could not have resulted from research experimentation. RIEWE felt that in USA the expertise of the producers was not being used because communication channels were not staying open. BARNES emphasized the need for increased dialogue between the researcher, producer and particularly the extension officer.

HORN stressed the need to know where farmers obtained the information they believed in. He cited a study in the Allegheny Mountains where the most effective means of disseminating knowledge of pasture improvement was found to be a program that made use of travelling gospel singers to attract an audience. Neighbours and feed stores were important but extension agencies were low on the list. MATCHES reported results of an American Forage and Grassland Council Survey which listed information sources in the order - seed dealers, fertilizer dealers, publications, and the public. MINSON agreed, 70% of new innovations came from the travelling salesman (e.g. seed and fertilizer merchants) due, he believed, to repetition of the same story. MINSON felt that pasture research has failed to recognize the need for repetition and the money to distribute the information.

MARTEN noted that the information from the seed dealer etc. is often from an extension or research source. ANDERSON agreed but wondered if all good relevant research got to them.

HOGAN reported two areas of successful extension in Australia - the occasional discussion of extension messages by the characters in a popular radio serial of country life and the demonstration of low cost systems on farms such as Toorak Field Station in Queensland.

On the subject of producer involvement in research programs JONES noted that producers had a place on advisory committees for CSIRO, the Queensland Department of Primary Industry, and University research. This was also the case at the University of Missouri (MATCHES) and elsewhere.

ROBARDS noted that about 70% of producers used records but it was not clear for what purpose. ANDERSON replied that he has asked only for a general comment on how many were keeping records at this stage.

It was noted that responses to the questionnaire may have been biased by the respondent's interest in justifying his area of work.