

Making the Most of the Research Dollar

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RESEARCH workers of today have the responsibility for providing a sound scientific basis for the conservation and use of range lands. This obligation extends to more than 950 million acres of range lands in the United States alone, about two-thirds of which are privately owned. The most productive ranges are generally in private ownership. Additional millions of acres exist in Canada and other neighboring countries. If their obligation is to be met and satisfied, even in part, range research workers must make the best use of every available research dollar. Today, with Federal agencies, State agricultural experiment stations, stockmen, and ranchers engaged in research of one type or another that relates to range lands there is urgent need for cooperation and integration of effort at all levels.

Such questions as, where should the program begin?; what should it include?; and where should it stop?, must be answered as a first step in outlining a range research program. This initial effort will reveal major unsolved problems and will determine which ones fall properly within the range research field.

Information concerning the type of range, how, when, and by what kind of livestock it is used, its relationship to other lands, and many other facts are essential for a full understanding of the situation. All of this information is gotten through a review of research already done, field examination of typical areas and through consideration of this information with stockmen, public land administra-

tors, and others interested in the research program.

In establishing priorities, problems of greatest importance to the region and its economy are usually placed highest on the list. However, consideration must be given to the need for meeting exigencies. In any program there are often opportunities to study some particular problem of great immediate importance. Such opportunity to perform a needed service that is in current demand cannot be regarded lightly even though the problem may have low priority in the over-all research program. As an example, about three years ago the Congress appropriated money for forest research in northeastern Washington where livestock production now largely provides the basis for local economy. Originally a heavy timber producing area, and perhaps best suited for that use in the long run, this area needed answers to local range problems. After thoroughly considering the situation with private land administrators and State and Federal agency representatives about a third of the money appropriated was directed to range reseeding and noxious range plant research. Behind the scenes, the regional analysis which is basic to a long-time research program is steadily going forward.

Once priorities are established many other considerations must be met in selecting the research to be undertaken. For example, personnel is a strong factor in selecting research to be done. There is only one specification for personnel to analyze a situation and formulate a program and that is that the very best man

or men possible should be selected. In every case men assigned to range research should have sufficient background, experience, and judgment to know and understand the problems.

Close working relations with other research groups and individuals and knowledge of their programs are other factors which help to govern the selection of research to be undertaken. Free exchange of ideas and thoughts should be the aim at all times. Many examples of successful application of this guide are known throughout the country where State and Federal groups work closely together and separately or in combination with ranchers and stockmen. The exchange of project analyses, and working plans for review and criticism as well as preliminary reports of results for verification and further test greatly facilitate this effort. This makes for inter-regional coordination and prevents unnecessary duplication of effort. In the case of re-seeding research in the Intermountain region, the decision to concentrate on the sagebrush zone was reached only after all parties concerned had agreed on first priority for that zone. The Utah deer study also illustrates how several State and Federal agencies often work together for a common goal. In this case the Congress specifically appropriated funds for certain kinds of research, then the Fish and Wildlife Service, the Forest Service, the Utah State Game Department and the Utah Agricultural Experiment Station jointly took on the job.

Thorough consideration of all factors is basic to the selection of research to be undertaken. But why make such an analysis at all? Simply because properly done it provides a logical, common sense means of determining *what* is needed, *when* it is needed, and *why* it is needed. Such an analysis is applicable particularly to a new undertaking. In many respects there

is also direct application where research has been in progress for years. Regardless of how familiar researchers are with regional situations a thorough analysis provides a means of "taking stock" of what has been done and of placing in writing the ideas, opinions, and knowledge of the most competent man, or men available. Without it, particularly in a new undertaking, popular opinion and local pressures might direct the effort into nonproductive fields at considerable loss of time, money, and effort.

Methods of study, throughout any project, should be sound to insure accurate, usable data, and as nearly as possible in accordance with proven techniques to insure acceptance and application of results. The project should be suitably located to insure reasonable freedom from disturbance for a sufficient time to accomplish stated objectives. Public ownership of land and facilities frequently offers advantages in this respect. Livestock, if involved, of the kind and class predominantly produced in the region should be selected for the project. Administration of the project should recognize practical aspects of range and livestock management yet remain scientifically sound throughout. Yearly analyses and a complete analysis of resulting data at the end of three years with definite plans to publish worth-while findings that have been adequately tested should be the goal in every undertaking.

PILOT TESTING OF RESULTS

Because of costs involved and the physical impossibilities of effectively studying vast range areas and large numbers of grazing animals, range research frequently must be conducted on a small scale. This is especially true at the outset of most projects.

Pilot testing of results developed from small areas and few animals on a practical

ranch or range basis makes for greater confidence in results and insures speedier application of sound findings. It consists merely of systematic testing under one or a few conditions, management practices, grazing systems, or other range aids on a large enough scale to furnish cost and return data and other important practical information.

In July 1950, the *Journal of Range Management* (3:190-197) carried an article by E. E. Meik concerning a pilot test of this sort relating to reseeding research results. Several years ago, Mr. Stanley Antrim, a sheep operator in the Bitterroot Valley of Montana, made available to the Forest Service about 10 acres of cheatgrass infested range land for reseeding research. Small row plots of various forage species were first established. Later, fractional acre plots of cereal grains such as barley, winter rye, and wheat were established by plowing and drilling. Following harvest of the cereal crop, forage species, mostly crested wheatgrass, were drilled into the grain stubble without soil preparation. Because of the need for greater and more reliable range forage production on his ranch Mr. Antrim began to use this method to convert formerly plowed cheatgrass infested lands to productive range. At first he pilot-tested research results on a rather small scale—50, 100, or 160 acres per year. Finally nearly 600 acres were included in the test. In addition, Mr. Antrim has reseeded three times the test acreage by the now well known preparatory crop method to increase his range production of lambs and wool. The preparatory crop method, with variations in some cases, is being used by other ranchers in western Montana today, not only because they have seen the small plots and are sold on what they saw but also because they have seen the research findings put to work on a practical scale

by Mr. Antrim. Many other examples of pilot tests could be quoted, from all parts of the country.

PUTTING RESEARCH RESULTS INTO PRACTICE

The range researcher's principal measure of accomplishment and satisfaction lies in making his findings and results available to range users and co-workers. This is done primarily through publications. Thorough analyses of situations and adequate selection and planning of research to be undertaken insures a rather steady flow of publications, with reasonable effort, from the start to final termination of each range research undertaking. These publications may be of many kinds; trade journal articles, research notes, technical articles, USDA bulletins, or perhaps even textbooks. Each has its place, its audience, and depending upon how well it is done, each does its part in bringing a problem solution to the rancher, stockman, and public land administrator.

Field days, such as Ranch Day at the Jornada Experimental Range, and show-me trips give stockmen and public land administrators an opportunity to discuss research results on the ground as they apply to their individual operations. These are particularly valuable for small local groups.

The final test of whether the range research dollar has been well spent lies in the extent to which results are accepted by range users and applied in practice and in the improvement in operation which is shown as a result of that acceptance and application.

When range research first came into the picture 40 or 50 odd years ago, little was known about native ranges or how they should be managed. Limited early efforts were followed by organized experiments throughout the western range

country. Rancher experience and "know-how" supplemented research throughout this development and their operations helped to provide needed proving grounds in many cases.

This trend is indicative of the growth of range research as a science and of the increasing recognition of the importance of thorough planning in every step of the research job. These early studies not only cut the pattern for range research as we know it today but together with ranch experience laid the foundation for many of the range management practices which are now in use. In some cases recommended practices based on early results

were only stop-gap measures that have since been refined or completely replaced by improved methods. More refinements are needed and will continue to be needed as maximum sustained production from range lands becomes more urgent.

The need for refinements in range grazing practices requires a closer look, and a more careful research approach. This means small scale, very intensive experiments on the range. Such experiments based on thorough analysis of situations, careful selection of research to be done, and adequate planning followed by pilot testing of results and good extension hold promise of full use of the research dollar



THE PUBLICATION OF RESEARCH—1.

The ultimate aim of research is publication. . . . Unfortunately, much scientific writing . . . is loose and indefinite in its expression, verbose often to the point of being tedious, and out of harmony with the ordered, exact, and logical nature of science itself. . . . The aim in publishing research, . . . is to leave the *field clearer than you found it.*—

E. W. Allen.