Importance of Grazing Lands in the Agricultural Economy

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A QUARTER of a century ago, the late Dr. C. V. Piper (1924) reported that forage on pastures and range of the U. S. A. provided more than half the total feed requirements of all domestic livestock. There has been a steadily growing realization that grazing lands comprise an important component of agriculture, as a direct source of income, and as the means by which permanently productive systems of agriculture are achieved.

The value of feed produced on grazing lands and consumed directly by livestock has been measured for individual pastures and ranges on an experimental basis at many state and federal stations in the last two decades. Research on improvement of pastures and range has yielded important information which is being put to use in practical agriculture with highly satisfactory results on specific areas in nearly all sections of the country. It is evident that a slow revolution is occurring in the agriculture of the nation, which promises to carry us out of the stage when chief reliance is placed on exploitation of native soil fertility and into an era in which careful management of soil and plant resources will make possible greater returns with less cost and labor on an ever self-regenerating basis.

The rate at which progress will continue to be made in developing the proper place of grazing lands in connection with land use for cultivated and harvested crops, and the place of grazing lands as a permanent type of land utilization, is in large measure dependent on the emphasis which grazing lands receive in funds and manpower allocated for research, teaching, and extension activities. In part, however, progress will depend on the importance given grazing lands by those who determine land policies in legislative and administrative activities, and by the persons and agencies who must finance the changes in agricultural systems. The proportionate allocation of funds and effort may properly be expected to follow the collection of facts showing the importance of grazing lands.

The logical place to seek data on the importance of grazing lands is in the reports by the U. S. Department of Commerce (1943, 1946) of the Agricultural Census of the United States, given in detail every ten years and supplemented by the intervening five-year enumeration. The census is supplemented by the reporting service of the U. S. Department of Agriculture (1950), which produces an annual volume, Agricultural Statistics. A thorough study of these two sources of data soon reveals the inadequacy of data on the production of feed on the grazing lands of the country. Data on grazing lands is limited to a table on land utilization indicating the total acreages occupied by pastures and range, and another table on pasture condition in percent of a hypothetical standard. It becomes necessary, therefore, to estimate the importance of grazing lands by indirect means, on the basis of the net amount of livestock and livestock products which can be credited to feed consumed by grazing stock.

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The data on land utilization in the United States is indicated in Table 1. In 1945, land used for grazing totaled 616 million acres within farms, and 292 million acres not in farms (public ownership), making a total of 908 million acres. For all types of harvested crops 403 million acres were reported; these areas including crop failures. The ratio between land use for harvested crops and for grazing was 1 to 2.25. On the basis of this proportional land utilization, it appears that both census reports and annual agricultural statistics, are deficient in not providing a factual basis for determining relative or actual importance of grazing lands in the national economy.

TABLE 1

Land utilization, U. S. A. 1949

	MILLIONS OF ACRES		
	1930	1940	1945
Land in farms			
Crop land	413	399	403
Pastures	379	461	521
Pastured forest and woodland	85	100	95
Land not in farms			
Pasture and grazing (Primary use)	437	382	292
Total pasture and range	901	943	908
Ratio cropland to pasture and range	1 to 2.2	1 to 2.4	1 to 2.25

Grazing lands vary greatly from region to region in their feed producing capacity and their value for support of livestock. In semi-arid and arid regions, the feed producing capacity per acre is lower than in humid regions, and since acreages of grazing lands make up a high percentage of total land utilization in such climatic regions, there has been a tendency to minimize the significance of these extensive land areas. However, the great natural grasslands of the nation occur in regions with subhumid to semi-arid climate, and their total feed value is high. Moreover, it has become increasingly apparent from large scale experiments that management of these grazing lands plays a dominant part in their productive capacity. As it becomes generally realized that natural grasslands require efficient management for continuing productivity, rather than simple exploitation of a natural resource, the need for adequate research and the extension of the findings to practical grassland management, becomes more obvious. In humid regions, the significance of grazing lands and pastures has been rather belatedly receiving recognition and support, but even in these regions, the traditional preoccupation with harvested crops results in a proportionately heavy allocation of funds and effort to the crops. Much of this lack of balance in support of research, extension, financing of grassland improvement may be traced to the absence of comparative data on the significance of grasslands versus harvested crops.

Since direct measures of grassland production are not presently available, perhaps the best estimate available is that derived from the forage supplied to the livestock population. This has been estimated for the entire nation in a single year on the following basis:

Total feed requirement of all domestic livestock *minus feed supplied from crops, milled feeds and concentrates* equals the balance supplied directly by grasslands.

Table 2 shows the total feed requirements and feed sources for all domestic livestock in the United States for 1949. The unit chosen is total digestible nutrients (T.D.N.) and the figures are reported in billions of units. The TDN requirements for maintenance of stock carried through the year plus the TDN required from production of live weights

or animal products sold and slaughtered were calculated on the basis of average TDN requirements reported in numerous feeding trials. Even though poultry and hogs consume a small proportion of the total forage on grasslands, they must be included in this procedure for estimating grassland production by indirect means. Total feed requirement for the livestock listed is 957 billion TDN.

TABLE 2

Total feed requirements and feed sources for livestock, U. S. farms, 1949

REQUIREMENTS (BILLIONS T.D.N.)		
Beef cattle & beef	423	
Dairy cattle & milk	192	
Hogs and pork	199	
Poultry and eggs	58	
Sheep and goats	36	
Horses and mules	49	
Total requirements	957	
SOURCES (BILLIONS T.D.N.)		
All feed grains	293	
Mill feeds and protein concentrates	26	
All hay	99	
All silage	7	
Total harvested feed	425	
Total requirement	957	100%
Total harvested	425	45%
Balance range and pasture	532	55%

The second item in the formula is the total feed nutrients supplied from grains, harvested roughage, and mill feeds and protein concentrates. Feed grains included in Table 2 are: all corn, oats, barley and grain sorghums, and probably are in excess of the amount consumed by livestock by the amounts utilized by industry and for human food. The mill feeds include the by-products of milling and processing wheat, rye, rice and buckwheat as well as the by-products of the feed grains processed for human use. The total feed nutrients supplied by all sources indicated is estimated at 425 billion TDN. This estimate probably is too high, but the error may be neglected in the interest of being conservative as to total feed requirements of livestock satisfied by "grass on the stem."

Table 2 shows an estimated balance of 532 billion TDN required for all domestic livestock, after deducting the nutrients provided in harvested feeds and feedstuffs. Since there is no other evident source of the 532 billion TDN, it is assumed that it was derived by livestock from standing forage on the pastures and ranges of the nation. A conservative estimate, therefore, is that at least 50 percent of all feed requirements for domestic livestock is provided directly by pastures and ranges. If poultry and swine are excluded from consideration, it is probable that the grasslands provide as much as 60 percent of all nutrients for other classes of livestock. It is interesting to note that this estimate is essentially the same as that made by Dr. Piper, a quarter of a century ago.

Since financial support, allocation of manpower to research and extension, and the administrative and legislative determinations of policies for public and private institutions are more sensitive to values expressed in dollars than proportional values, it is of interest to convert the TDN units of Table 2 into monetary units. This is done in the following tabulation:

FEED SOURCES	MILLION DOLLARS
Value of harvested feeds provides 45% of total feed nutrients required	8,714.8
Estimated value of 55% from pasture and range	10,632.0

The total farm values of harvested feed grains and roughage were summarized from the 1950 Agricultural Statistics, and the wholesale values of mill products and protein concentrates were used. The total market value of harvested feeds and feedstuffs available to livestock amounted to $8,715 million. Since this value of feeds accounted for 45 percent of the total feed requirements for all domestic livestock, the estimated farm value for the remaining 55 percent supplied by pastures and ranges is $10,632,000,000. As indicated from foregoing comments, this estimate of the value of forage consumed "on the stem" by livestock is probably too low rather than too high.

The relative importance of total grassland production may be determined by comparing its 1949 value of some 10 or 11 billion dollars with the total value of 17 billion dollars for 72 crops of all types, and 16 billion dollars for value of all livestock production. (See tables 648 and 649, 1950 Agricultural Statistics.) Out of a total of 33 billion dollars, some 10 or 11 billion dollars may be credited to the forage harvested "on the stem" by grazing livestock.

Whatever method may be used for estimating the values of feed produced on pastures and ranges and harvested directly by livestock, two features become apparent: (1) the estimated values indicate this type of asset to be an important portion of our agriculture, and (2) the data collected on this asset are exceedingly meager and inadequate. While it may always be necessary to measure production of grasslands in terms of livestock support, this should be made more accurate by direct reporting of livestock maintenance and production on specific areas and types of grazing land, to parallel the reporting of harvested crop production.

The collection of basic facts on feed produced and utilized on grasslands should not be beyond the capacity of modern procedures for use in census enumeration and agricultural reporting. Methods of evaluating feed-supplying capacity of ranges and pastures are now in use by the federal agencies concerned with administration of federal grazing lands. Methods are being used for the same purpose by the Soil Conservation Service and by the Bureau of Plant Industry of the United States Department of Agriculture. Nearly every stockman and rancher customarily conducts his operations on the basis of estimated feed supply on pastures and ranges. The reporting of actual production arising from feed consumed on grasslands should be less difficult than the prediction of carrying capacity, since it merely involves recording of production facts.

A satisfactory system of determining the value of production on grasslands may be divided into two parts: (1) collection of field data, and (2) treatment of data by the agency concerned, to provide summaries and reduce detailed facts to simplified significant statistics. The collection of field data might well include the following items:

1. Acreage of each class or type of grazing land.
2. Record of livestock maintained and approximate weight changes and livestock products removed for specific periods of the year, for each pasture or range unit. A record of harvested feeds produced elsewhere and given to grazing livestock must be provided for the same land units.
3. The season or seasons when forage production occurred, if different from the period of utilization, should be recorded. This would be valuable information, but not indispensable.
4. Determine proportion of total feed supply consumed by major game animals—deer, etc. This would be

useful information, but not indispensable.

5. Record additional produce harvested from the grazing land, i.e., seed, hay and silage. This item is needed to prevent duplicate reporting of acreage and to permit determination of total production on land units.

The first two of these items are the most important, and initially, the field recording of data might be limited to these. The classes or types of grazing land need not exceed 15 categories for the entire nation, and only a few of these would be found in any one region. These would be analogous to the various types of harvested crops on which yields are recorded. Field data for item 2 will require the cooperation of the operator and enumerator, in much the same manner as for recording field data on harvested crops.

It is not suggested that adequate recording of field data on production of grasslands can be accomplished without additional effort and cost. It is reasonable to expect that collection of field data on this resource that is the origin of about 30 percent of total agricultural income will not only require an appropriate allocation of funds and manpower, but that it will involve additional techniques and procedures not traditionally used in census enumeration and in livestock and crop reporting. The results should warrant the additional effort and expense, by providing a more complete picture of agricultural production than is now provided by a system of reporting in which 30 percent of the total is being neglected.

The feasibility of collecting field data on grassland production (as measured by livestock utilization), should not be confused with subsequent processing of data for publication. The collection of field data should be the primary consideration. Tabulation, summarization, and interpretation will be possible by more highly trained office personnel than is required for field collection of data. The cardinal requirement is the collection of basic field data on production of grasslands. When these data become available, it may be expected that grasslands as a national resource will begin to receive the attention they deserve, in terms of funds and manpower for research, teaching, and extension; in terms of private and public financing of required improvements; and in terms of attention to land policies and the administrative and legislative decisions regarding grazing lands.

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