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THE AGRICULTURAL AND RANGE RESOURCES OF THE NAVAJO RESERVATION IN RELATION TO THE SUBSISTENCE NEEDS OF THE NAVAJO INDIANS

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THE AGRICULTURAL AND RANGE RESOURCES OF THE NAVAJO PESERVATION IN RELATION TO THE SUBSISTENCE NEEDS OF THE NAVAJO INDIANS*

The Navajo Reservation today is in a critical condition. The problem is not merely of local interest, but rather of national significance. The primary elements of the problem are some 15,000,000 acres of depleted land and an ever-growing population, which at the present time exceeds 50,000 persons. The local aspect of the problem is to immediately arrest the destructive processes and to restore the land to its highest productive capacity as rapidly as possible.

There are certain physical limitations which must be recognized at the outset. The acreage available for the support of the Navajo Indians has been determined by the laws of man. The productive capacity of the available land has even more definitely been set by nature. There are, at present, approximately 9,547 acres under irrigation, 27,962 acres in flood water farms, and 4,723 acres in what might be termed dry farms. Within the physical potentialities of soil and climate, this could be increased to an ultimate total of approximately 21,827 acres of irrigated land, 46,496 acres of flood water land, 10,000 acres of dry farm land, and in addition, water could be spread on approximately 160,300 acres to increase the production of native grasses - a small amount of which might be cut for hay.

The average size family on the Navajo Reservation is five persons and, on the basis of a population of 50,000, there are at present 10,000 families. If the present farm land was divided equally among all families, each would have, at the present time, 0.9 acres of irrigated land, 2.7 acres of flood water land, and 0.4 acres of dry farm land. Under the ultimate agricultural development, assuming that there is no further increase in population, there would be available for each family 2.2 acres of irrigated land, 4.6 acres of flood water land, and 1.0 acre of dry farm land.

The range resources are as strictly limited as are the agricultural possibilities. The present carrying capacity of the range is 560,000 sheet units. Assuming that the average family needs three

*Footnote: Prepared at the request of Superintendent E. R. Fryer by W. G. McGinnies, Director of Land Management, assisted by Ray Walker, Assistant Director of Land Management, T. L. Heggie, Chief of Range Management, C. Maddox, Range Economist and R. Van Valkenburgh, Assistant Soil Conservationist.

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horses, an allowance should be made for 30,000 horses which, converted into sheet units on a basis of 5 to 1, would mean that 150,000 sheep units should be subtracted from the 560,000 total carrying capacity in order to obtain the possible productive units which would be 410,000. It makes little difference whether these be considered as cattle or sheep, as the productive capacity of the range would be approximately the same - whether computed on a basis of sheep or on cattle. For the sake of simplicity, it may be computed on the basis of sheep alone. Our ten thousand families would then have 41 sheep each. It is rather difficult to predict the future increase in capacity of the range. Assuming that the present capacity could be doubled by proper range management and that the human population remains constant, each family could have 97 head of sheep.

If the present program is not carried out, the range will be rapidly denuded and much of the present farm land will be entirely destroyed. Under such conditions, it is quite apparent that at least half of the population must become dependent upon Government subsidy. Present records indicate that the absolute minimum for per capita subsistence needs is $36.00 per year. With 25,000 Navajos receiving subsistence, the tax payers would have to contribute $900,000 toward the support of the Navajos. This would be in addition to the regular administrative expenditures. On the other hand, if the present program is carried out to a successful completion, the resources of the Navajo Reservation should be at least adequate for the present population.

Some Facts About Reduction -

There has been no effective reduction through governmental aid to date, with the exception of the removal of 184,000 goats. In 1930, there was a total of 1,300,000 sheep and goats on the reservation. These increased to 1,400,000 in 1931, but were reduced to 1,200,000 by the heavy snows of the winter 1931-32. In the three year period, 1932-35, the total reduction was 207,582; 184,000 of which were goats. These reductions from 1930 to 1935 did not keep pace with the range depletion and, unless a sharp and decisive reduction can be made, the range will continue its rapid retrogression. At the time of dipping in 1935, there were 944,910 sheep and goats, 25,000 head of cattle, and 45,000 head of horses, mules and burros. Converting cattle and horses into sheep units, there was the equivalent of 1,269,910 sheep grazing on the reservation. The carrying capacity at this time was estimated at 560,000 sheep units. This means that a further reduction of 56% would be necessary in order to reduce the stock to the carrying capacity of the range.

The carrying capacity of a given range is just as definite as any other quantitative entity. The physical factors of climate and soil

determine forage production and this forage production can in no way be increased by prayers or religious fervor. It must be recognized that the forage production can neither be increased nor decreased by the prejudiced opinion of the observer. The measurement of grazing capacity by range surveys is accurate within very close limits and is carefully checked by the experimental stocking of demonstration areas. It may be possible that the actual carrying capacity of the range within the Navajo Reservation may not be 560,000 sheep units, but it is safe to say that it lies between 500,000 and 600,000 sheep units and it is certain that if more than 600,000 sheep units are allowed to graze on the reservation that range deterioration will continue and if stocked with less than 500,000 sheep units, range improvement can be expected.

The antagonists of the Navajo rehabilitation program state that the reduction to the carrying capacity of the range would result in the economic destruction of the Navajo people. They offer no other solution for the problem, and yet if the stocking is not reduced to the carrying capacity of the range, the economic destruction of the Navajo people is inevitable. However, a careful survey of the Navajo situation not only indicates that the reduction can be brought about without economic loss, but also indicates that economic improvement through the carrying out of such a program may be expected.

The livestock situation on the Navajo reservation at the present time may be compared to a dairy enterprise, where the dairyman is attempting to make a living with one hundred cows, each of which is producing one quart of milk per day. He may be competing with neighbors having ten good cows which produce as much milk and consume little more than one tenth as much feed as his one hundred cows.

The Navajo reservation as a giant livestock enterprise is very inefficient. The 1935 figures show that out of 1,269,910 sheep units, 59% are sheep, 24% horses, 9% goats, and 8% cattle. The horses at the present time are not producing a marketable crop. On the basis of the best figure available, the 46% lamb crop, the 58% kid crop, and the 41% calf crop produced a total of 18,000,086 pounds of meat. The majority of marketable lambs averaged 52 pounds - while at least 10% of the lambs were not marketable and it is estimated that they did not average more than 35 pounds. 90% of the yearling calves averaged 400 pounds - while 10% did not weigh over 300 pounds. Assuming that the Navajos need 30,000 horses, they could still graze 361,000 ewes and 9,000 breeding cows, provided that all other stock of low productivity, such as wethers, steers, goats, and excess horses, were eliminated. Under good range conditions and a reasonable system of livestock management, a calf crop of 75% and a lamb crop of 80% could be expected. Yearling calves should weigh 500 pounds and lambs 65 pounds. On this basis, 22,147,000 pounds of meat would be

produced - thus it is seen that a reduction in number of livestock to the carrying capacity of the range might be expected to produce a larger income than at present.

Another argument of the antagonists to the rehabilitation program is that any reduction of livestock will reduce the small owners to a point where they can no longer exist. The facts do not bear out this argument. In 1935, a total of 4,593 bands were dipped. Of these, 1,655 or 36%, consisted of less than 100 head of sheep and goats to the band. 2,938 bands, or 64%, of the total had more than 100 head of sheep and goats per band, but out of the 944,910 sheep dipped, only 97,219, or 10% were in the smaller bands and 847,691, or 90%, of the sheep and goats were in the larger bands. The larger bands averaged 288 units; the smaller bands averaged 59 units. It can readily be seen from these figures that the entire reduction necessary could be borne by the larger bands and if it seems advisable, no reductions will have to be made on the smaller flocks.

The Subsistence Problem on the Navajo Reservation -

With the present population of 50,000 Navajos, there is but a very small margin of safety above the actual subsistence needs. Considering the present condition of the reservation, the subsistence needs of its population are not being met. If it were not for the present Government subsidy, a large proportion of the population would be in actual need. This is due in part to the uneven distribution of wealth and in part to the depleted and undeveloped resources. The various economic surveys which have been made on the reservation have shown that the subsistence income of an average Navajo family is about $235.00 on a trading basis. It has been calculated that it takes 57 ewes or about six acres of irrigated land to produce this amount of income.

It is estimated that 7,500 families are chiefly dependent upon livestock as a source of income. The remaining 2,500 families secure part of their income from livestock and the remainder from farm produce, arts and crafts, and labor. On the basis of 57 ewes per family, the forage resources of the reservation - under proper stocking - would take care of 7,193 families. If all the available and potential irrigated farm land was divided equally among the remaining 2,807 families, each would have 7.7 acres.

If all the agricultural and range resources were divided equally among the 10,000 families, the probable income would be somewhat as follows:

6 tons alfalfa hay from 2.2 acres of irrigated land @ $15.50 per ton.....	$93.00
60 bushels of corn from 4.6 acres of flood water land and one acre dry farm land @ $1.00 per bushel.....	60.00
Income from 40 ewes @ $4.10.....	164.00
Total income per family from all agricultural resources.....	$317.00

Thus it will be necessary to have a more equitable distribution of wealth among all the families if they are tobe maintained above a bare subsistence level.

The above is a brief summary of some of the pertinent facts relating to the present conditions on the Navajo reservation. A great mass of data has been accumulated through comprehensive surveys and this material is available for study by any competent person, or persons, desiring to check the reliability of the figures used herein. Appended are summations of some of the most pertinent data used in the preparation of this report.

Respectfully submitted,

(Sgd) W. G. McGinnies,
Director of Land Management.

Approved:

(Sgd) E. R. Fryer,

General Superintendent.

May 12, 1936.

SUMMARY OF POTENTIAL FARM LAND ON NAVAJO AND HOPI RESERVATIONS

The results of the Agricultural surveys show that it will be possible to develop the following acreage of land.

12,280 acres of land which will have a dependable water supply for irrigation. (This included the Fruitland Project.)

18,534 acres which can be irrigated intermittently from flood water run off.

6,815 acres which will receive enough flood water some years to produce a crop of native hay.

160,300 acres of range land subject to flood water spreading.

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SUMMARY OF LAND NOW BEING FARMED ON THE NAVAJO AND HOPI RESERVATIONS

Compiled by Ray Walker, Assistant Director of Land Management

TOTAL OF ALL LAND NOW BEING FARMED	42,232 acres
TOTAL NUMBER OF TRACTS NOW BEING FARMED	6,241
AVERAGE SIZE OF FARMS	6.9

The above acreage is broken down into irrigated farm land, flood irrigated farm land, and dry farm land.

IRRIGATED FARM LAND

Includes farms with a permanent supply of water.

TOTAL IRRIGATED FARM LAND	9,547 acres
TOTAL NUMBER OF TRACTS OF IRRIGATED LAND	1,046
AVERAGE SIZE OF IRRIGATED TRACTS	9.1 acres

The actual ownership of farm designated above as tracts was not determined. It is very probable that these tracts in many cases may be owned by several individuals, and the actual size of individually owned farms may be much smaller.

FLOOD IRRIGATED FARMS

Where flood water from intermittent streams is being used directly on fields without storage, the water supply for these farms is dependent upon run off from local flood and is rather uncertain. In years when water supply is sufficient these farms are used for growing corn, beans, melons, and a few other drouth resistant crops.

TOTAL FLOOD IRRIGATED LAND	27,962 acres
TOTAL NUMBER OF TRACTS OF FLOOD FARM	4,330
AVERAGE SIZE OF TRACTS	6.45 acres

DRY LAND FARMS

Farms which receive no water except the natural precipitation. Yield on these farms is very uncertain.

TOTAL DRY FARM LAND	4,723 acres
TOTAL NUMBER OF TRACTS	865
AVERAGE SIZE OF TRACT	5.46

NAVAJO RESERVATION

ESTIMATED NUMBER OF STOCK OWNERS AND NON STOCK OWNERS FOR 1935

Stock Owner Families		Non Stock Owner Families	
6,891 families own sheep, goats, cattle, and horses.	69%	2,500 non-stock owner families.	25%
609 families own horses only.	6%		
	75%		25%

RESERVATION STOCK OWNING AND NON OWNING FAMILIES

Our records do not show the number of stock owner families, or non owner families, but we do have information on the total number of livestock herds, and the number of Indian families. Which necessitates estimates in order to show the information desired.

The dipping record (1935), shows 4,594 bands of sheep to have been dipped. We know that the ownership in these bands is more than one owner family per band, but less than two owner families per band. On the average there are about 1.5 owner families per band of sheep and goats. Some of these people own cattle, and almost all of them own either horses, mules or burros. Figuring 4,594 herds of stock multiplied by 1.5 families, equals 6,891 stock owner families, owning sheep, cattle and horses. We estimate that 75 percent of all families on the Reservation own horses. There are 609 horse-owning families not included in the 6,891 families mentioned above, and a total of 7,500 (75 per cent) stock owner families.

SOIL CONSERVATION SERVICE
DEPARTMENT OF AGRICULTURE

Grand Total Sheet By Jurisdition, Sheep, Goats, and Increase: Showing Total Stock and Number of Bands Having Stock 100 and Under Per Band, and Total Stock and Number of Bands Having Over 100 Per Band.

SUB-AGENCY Totals Based on Vat Counts 11/13/35 VAT

Sub-Agency	No. Bands Stock Under 100	No. Bands Stock Over 100	Total Stock Under 100 Per Band	Total Stock Over 100 Per Band
Leupp	47	169	2,914	52,365
Keams Canyon	109	322	6,669	91,509
Western Navajo	95	373	6,445	138,357
Eastern Navajo	462	487	25,794	124,016
Northern Navajo	437	546	26,173	128,915
Southern Navajo	505	1,041	29,224	312,529
Totals	1,655	2,938	97,219	847,691
	4,593		944,910	
Per Cents	36%	64%	10%	90%
	100		100	

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CLASSES, NUMBERS AND PERCENTS OF GROWN LIVESTOCK,
REDUCED TO SHEEP UNITS, NAVAJO RESERVATION ---- 1935.
Prepared by, C. Maddox, Range Economist.

	Number of Head	Number of Units	Percent of Units	Stock Class Percent
SHEEP				
Ewes	460,110		48.9	
Rams	15,621		1.7	
Wethers	72,848		7.7	
Total Sheep --------	548,579	548,579	58.3	58.3
GOATS				
Total Goats -----	92,222	92,222	10.0	10.0
CATTLE				
Cows	15,641	62,564	6.6	
Bulls	1,186	4,744	0.5	
Yearlings	1,227	4,908	0.5	
Steers	966	3,864	0.4	
Total Cattle --------	19,020	76,080	8.0	8.0
HORSES				
Mares	13,952	69,760	7.2	
Stallions	1,726	8,630	1.0	
Yearlings	2,557	12,785	1.4	
Mules	2,479	12,395	1.4	
Geldings	17,193	85,965	9.1	
Burros	2,363	11,815	1.3	
Colts	4,312	21,560	2.3	
Total Horses --------	44,582	222,910	23.7	23.7
TOTAL ALL CLASSES ----------	704,403	939,791		100%

In reducing all classes of stock to sheep units, the weight of four was used for cattle, and five for horses.

ESTIMATED GROSS MONEY VALUE PRODUCTION PER GOAT, 1935
NAVAJO RESERVATION

KIDS		
Number of Kids sold, 1935	8,500	
Number of Kids Retained	45,101	
Total number of Kids Produced	53,601	
Value of Kids sold (@ 1.75 per head average price)	$14,875	
Value of Kids Retained " " " " "	$78,927	
Total value of Kids Produced	$107,202	
Average Kid value produced per grown goat		$1.16
Mohair		
Number of grown goats sheared	92,222	
Pounds of mohair produced (@ 2 lbs. per head)	184,444	
Value of mohair produced (@ 14¢ per lb.)	$25,822	
Average value of mohair produced per goat		.28
Total Value Produced, Kids and Mohair	$133,024	
Total average production per goat (Kid and mohair)		$1.44

No running or carrying costs whatsoever are charged to the goats.

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U. S. DIPPING RECORDS SHOW NAVAJO FLOCKS

Mr. C. Maddox, Range Economist, herewith submits the following information on the Navajo Reservation, sheep and goat numbers since 1930. It is realized that in some localities the reduction in numbers has been greater than is shown, but in other localities on the Reservation the very opposite has been true, therefore, by using the dipping records for the entire Reservation, the general and average situation is revealed, rather than that of any particular locality.

DIPPING RECORD CENSUS BY YEARS 1930 - 1935

	TOTAL GROWN SHEEP	PERCENT INCREASE OR DE-CREASE FROM 1930	TOTAL LAMBS	PERCENT INCREASE OR DE-CREASE FROM 1930	TOTAL GOATS	PERCENT INCREASE OR DE-CREASE FROM 1930	TOTAL ALL CLASSES SHEEP AND GOATS	PERCENTAGE INCREASE OR DE-CREASE FROM 1930
1930	574,821		349,237		373,531		1,297,589	
1931	631,427	9.0% (+)	345,242	1.2% (-)	393,885	5.2% (+)	1,370,554	5.4% (+)
1932	575,913	0.2% (+)	257,148	26.4% (-)	347,169	7.1% (-)	1,180,250	9.1% (-)
1933	544,726	5.3% (-)	277,772	20.5% (-)	329,994	11.7% (-)	1,152,492	11.2% (-)
1934	502,619	12.6% (-)	289,178	17.2% (-)	294,851	21.1% (-)	1,086,648	16.3% (-)
1935	548,579	4.6% (-)	250,508	28.3% (-)	145,823	61.0% (-)	944,910	27.2% (-)

+ - Increase
- Decrease

Using 1933 as a base year, at which time the Government reduction program was started, the Navajos and Hopis had 1,152,492 head of sheep and goats at dipping time 1933. The 1935 dipping records show that this year (1935) they had 944,910 head of sheep and goats, or 82% of the 1933 numbers, so the reduction in sheep and goats from 1933 to 1935 inclusive amounts to 207,582 head, or 18%. By examining the table above, it can be clearly seen that goats have by far contributed most to the reduction. Out of the 207,582 head of sheep and goats reduced since 1933, about 184,000

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head or approximately 89% of this reduction was goats. The sheep reduction since 1930, was about 23,000 head or 11%. Lamb numbers this year are less and have been on a general downward trend in numbers since 1930, while at the same time there has been no great variation in the grown sheep numbers, in fact, from the year 1933 through 1935 grown sheep numbers have slightly increased. This reveals an undesirable condition existing on the reservation, and it is in direct opposition to results which will be derived from proper range management practices. It is further shown that the condition of the range is one of the primary essentials in the production of wool and in the production of a lamb crop. Greater numbers of grown sheep will not produce a larger lamb crop unless there is sufficient quantity and quality of feed available to carry and condition the old stock. In other words, a smaller number of ewes well fed will produce more wool and more marketable lambs in the fall than a larger number of ewes poorly fed.

The other classes of stock grazing the reservation ranges are, horses, cattle, mules, and burros, and even though we do not have definite figures as to their numbers prior to 1935, it is reasonable to estimate that there were approximately 75,000 or 80,000 head of cattle, horses, mules and burros grazing the ranges in 1933. The count in 1935 on these same classes of stock shows that the Indians have around 25,000 head of cattle and about 45,000 head of horses, mules, and burros. Reducing all classes of stock to sheep units that allow for differences in size and feed requirements, the total sheep units in 1933 was approximately 1,477,000 compared to 1,265,000 for the year 1935. Consequently, the net sheep unit reduction on the reservation ranges since 1933 will hardly exceed 200,000 units.

Many observers have noted that the size of flocks have materially decreased since 1930, but they have misinterpreted this condition to mean that a very heavy reduction has been made by all Indians. These observers have not taken into consideration the steady increase in the numbers of flocks on the reservation which have increased 29% since 1930. Everyone who has made a study of the type and quantity of ground cover on the Reservation agrees that a further material reduction in livestock is imperative in order to stop the present deterioration of the Indians' range. Fortunately most of the reduction would be absorbed by the disposal of unprofitable stock such as excessive numbers of wethers, goats, steers, aged and unproductive cows, and unproductive horses. A number of years ago the Navajo range was capable of carrying larger numbers of livestock simply because of the abundance of feed then available. But too much livestock and improper grazing practices have depleted the amount of feed until at the present time the number of livestock that the range will carry is considerably below normal. Along with this depleted condition of the forage the strength and the stand of the more palatable plants have been reduced to such an extent that many of them have been killed out and replaced by less palatable ones such as yellow brush, Russian thistle, rabbit brush, and snake weed. Such a condition is unnatural, unprofitable, and a serious one for the Indians to face.

Since 1930 there has been some reduction in stock numbers, but in spite of this reduction, the carrying capacity of the range has steadily declined, and will continue to decline until the number of livestock coincides with the carrying capacity. In other words the reduction in numbers to date has not been heavy enough to allow a forage comeback. However, if the stock numbers are once brought down to fit what the range can carry, recouperation and improvement will take place, and in time the range will reach a healthy and normal condition. Then, and only then can the Navajo range furnish what is now expected of it. Furthermore, if the present excessive numbers of livestock remain on the reservation ranges as they have in the past years, and if the present grazing policies are continued the Navajo Indian will eventually find himself without range resources.

It is probable that in the future they will not acquire additional extensive pieces of grazing land. So the logical thing for the Indian to do is to reduce the livestock numbers first by culling that kind which is unprofitable to him, and at the same time practice recognized grazing policies. He cannot overgraze and otherwise exploit year in and year out, and still expect a sustained income from livestock. Sooner or later, the Indian will learn, as many white stockmen have learned, that he cannot avoid the ill effect of an overgrazed range. Therefore, in order for the Indians to remain in the livestock business on a large scale it is necessary for them to adopt and practice the best means of regaining the normal carrying capacity of the Navajo ranges. The proper numbers of livestock, the proper distribution of this livestock on the range, and proper seasonal use of the grasses so that they will have a chance to mature seed and reproduce, all will go to help regain the lost range resource.