CHAPTER IV

NATURAL VEGETATION AND CATTLE-WEALTH OF BUNDELKHAND

In this chapter we do not propose to deal with forests or other forms of natural vegetation in such details as are not directly concerned with agriculture. We have limited our discussion to an examination of the uses which have a bearing on agriculture of the region i.e. providing fodder for livestock, fuel and timber for rural population and protection for soils liable to erosion. We have also included in the later section a survey of the cattle wealth of the region because of their dependence on the grazing potentials which these forests provide to the cattle. Details of grazing lands and their potentials have been discussed in the Chapter on Land Utilization.

Before starting their examination, it is, however, necessary to give a brief account of the extent and distribution of such areas as are covered by natural vegetation and the policy of the government in regard to their uses for agricultural purposes.

(a) Forests: their importance, distribution and kinds

Bundelkhand has an estimated area of 13.76 lakh acres under forests which forms 10.6% of the total geographi-
cal area of the region; out of which very small area is under reserved forests. Prior to the formation of the present Madhya Pradesh the southern districts of Bundelkhand formed a major part of the former State of Vindhya Pradesh. In that state forests covered about 34.3% of the total geographical area. Felling of the trees was about 16,000 cub. feet per annum from 1949-50 to 1951-52. The value of the forest products was about Rs. 40 lakh per annum. The outturn of minor forest produce was also substantial. Thus annually about Rs. 8 lakhs are earned even now from bamboo and canes, Rs. 28 thousands from drugs and Rs. 3.5 lakhs from grazing. Grasses and other fodders earn about Rs. 5 thousands, gums and raised Rs. 75 thousands and much more from other items. (1)

From the figures published on the subject, we gather that the average outturn of timber and other woods during the year 1951 was approximately 4,000 cub. feet or Rs. 250 per sq. mile in M.P. Bundelkhand. The value of other minor forest produce was about Rs. 700 per sq. mile, the greatest yield of Rs. 900 per sq. mile being from reserved forests and least i.e. Rs. 500 from unclassed forests. Protected forests yielded an average of about Rs. 575 per sq. mile of the forest area. (2)

(2) Ibid.
This is not the complete picture of the importance of regional forests. They have great influence on regional drainage, soil-moisture and soil erosion. They modify extremes of temperature and increase the atmospheric humidity. Economically they give rise to many cottage industries and provide employment to many.

Unhappily, the forests of Bundelkhand are not rich enough in their timber resources. They are chiefly composed of hard-wood stunted trees which form a substantially large source of fuel-wood rather than timber. Valuable woods like teak and sal scarcely grow in the region except in isolated patches in Chhatarpur and Panna districts.

Distribution of Forests (Plate VII Map No. A)

In Datia district the trees met in the jungles are of no great value, but in more favourable localities 'mahua' tree is found. Its flowers are used for eating and distillation of indigenous liquor.

In Tikamgarh jungles cover a considerable part of the district but these again consist of only small trees and rough under-growth. The principal species are 'dhak', 'semal', 'Salai' and many types of acacias. In this district forests were previously classified as type I (i.e. teak,
acchar, tendu, bel etc.), type II (i.e. seja, khair, neem and reonjhar), Type III (i.e. chhiula, salai and other trees). Forest work is generally done by jungle tribes called 'Sahariyas'. In all, more than 50 varieties of trees are found in Orchha area of Tikamgarh district.

In Panna district, there are no reserved forests, but everywhere scrub lands in which plentiful games are found. Vindhyan Ranges in Ajaigarh tahsil are, however, densely forested with teak, tendu and brush woods. Fine grasses, which are annually leased out, grow over Kalinjhar hill.

Most of the forests of Chhatarpur district are confined to Bijaigarh tahsil where teak, saja, tendu, mahua, khair, jamun, ber etc. grow mixed.

In U.P. Bundelkhand, the forest wealth is very poor and almost all the Northern Plain, once fully forested, is now devoid of trees. Forests may be found only in isolated patches of riverine tracts and on undulating lands unfit for cultivation. In Hamirpur, northern half of the district is not distinguished by tree growth of any kind; it is devoid of trees. On the black soil the hardy 'babul' grows spontaneously and in ravine tracts there are generally miscellaneous jungle trees of small and stunted type. Babul is useful for making ploughs and carts.
Khair is a common tree, but not much utilized. 'Hingota', 'karondha' and 'kareel' are utilized for goat grazing. Many of the hillocks around Mahoba and Kulpahar are covered with trees which are of little importance. The only tree that grows in abundance there, is the 'tendu' or Indian Ebony. Village groves containing neem, imli, sheesham and jamun are found near the 'abadi' area. Mahua is most valued for its fruits, timber, flowers and seeds and is, therefore, rarely cut down.

In Banda, the forest area is found only on the 'patha' slopes. Mahua, hingota and saijana are well adapted there. Dhak favours clayey soils and is chiefly found on black soils. It covers large areas which had never been cleared. Trees are generally denser along the stream courses and sparse away from them.

In Jalaun district, the original cover of forest has been completely removed and the land for cultivation has been snatched. Forests, specially reserved, are found in four or five isolated but compact blocks.

In Jhansi, forests are found in Lalitpur tahsil on the Vindhyen Plateau. They are dense in the west and south-west margins.
Classification of forests

Following table gives the administrative classification of forests in U.P. Bundelkhand:

Table IX

Administrative Classification of Forests in U.P. Bundelkhand
(Acereage & Percentage)

<table>
<thead>
<tr>
<th>Type of forests</th>
<th>Jalaun</th>
<th>Jhansi</th>
<th>Hamirpur</th>
<th>Banda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved</td>
<td>8,996</td>
<td>1,14,293</td>
<td>2,620</td>
<td>56,644</td>
</tr>
<tr>
<td></td>
<td>(14.43%)</td>
<td>(47.69%)</td>
<td>(4.00%)</td>
<td>(32.56%)</td>
</tr>
<tr>
<td>Protected</td>
<td>--</td>
<td>2,125</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.85%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unclassed</td>
<td>53,348</td>
<td>1,23,210</td>
<td>62,973</td>
<td>1,17,318</td>
</tr>
<tr>
<td></td>
<td>(86.57%)</td>
<td>(51.42%)</td>
<td>(96.00%)</td>
<td>(67.44%)</td>
</tr>
<tr>
<td>Total</td>
<td>62,344</td>
<td>2,39,628</td>
<td>65,493</td>
<td>1,73,962</td>
</tr>
</tbody>
</table>

Map No. B and C in plate VIII give the area of forests as percentage to total forest area and the total geographical area of each district. From these maps it is clear that the forest area in district as percentage to total regional forest area and as percentage to total geographical area of the district are very low for all the northern districts, whereas

(1) Courtesy : Deputy Chief Conservator of Forests (Planning) U.P.Lucknow. The area is different from one reported by Patwari papers. Both maintain their own figures. No accord has yet been reached on this question.
their percentages are relatively high over area covered by Vindhyan Ranges.

**Scrubs and Grasses**

As a matter of fact most of the so called forests in Bundelkhand are truly termed as 'jungles' in which scrubs and grasses predominate. Because of moderate and uncertain rainfall, high rate of evaporation and rapid run-off, water in the soil is nearly always deficient for optimum growth except in the rainy season. Accordingly most of the trees are stunted with luxurious under-growth, which dries up as quickly after the rains as it springs up in the beginning.

Scrubs-lands are specially extensive in Datia and Jalaun where rain fall is normally deficient, but they are also found wherever run-off is quick and stony surface is laid bare. Various types of acacias or thorny bushes such as kareel, ber, jharber, babul, reonjhar and wild sarifa grow better in drier parts.

Grasses of various kinds also grow throughout the region; majority of them are annuals. Their nutritive value (leaving a few) is very low. They become unpalatable to the livestock on their full maturity.

The famous Kalinjhar grasses are leased out annually. In Mau and Karwi tahsils extensive areas of 'patha' are
covered with grasses; they are cut and utilized by military authorities at Allahabad. A military branch-farm is situated near Bairagarh. An average of 45,000 mds. of hay is annually cut here and is partly baled out and partly sent loose to Allahabad. In the west of Jhansi again there are military grassland reserves. In Lalitpur tahsils grasslands are open for domestic animals.

Following are the chief types of grasses found in Bundelkhand :-

Musel

It is the finest tropical grass with high nutritive value. It is two to three feet high and grows on the field embankments and waste lands of mar and kabar soils. Sweet and scented, it is very much liked by all animals. It springs up in the rainy season and matures in October and then cut later on.

Ukra

It is about four feet high. It has a thicker stalk than musel. It grows best on mar and kabar specially where ground is wet and swampy. When green and young, it is eaten by all the animals but rarely when dry and hard.

Guner

Guner is also about four feet high and grows on the
black soils. It also grows on parua soils. It has prickly
spines and hence eaten only in its early stage.

Karta
Karta grass is similar to gunar in having prickles.
It is, however, only two feet high and has a bushy under-
growth. It grows on dry parua soils.

Marona
Marona is occasionally six feet long and grows over
waste lands in the wet season only. It dries out soon after-
wards. It is not cut but commonly grazed.

Pasai
It grows in the shallow ponds and lakes, specially
along their fringes. It is two feet high and resembles
paddy. When young, it is eaten by animals and when ripe,
certain low-caste people such as Chamaras and Koris brush it
out for rice-like grains which are consumed by Hindus on
fasting days.

Aunria
It grows in July and August on mar and kabar soils
and spreads on the surface with knots and joints. Its
seeds are black like 'bajra' and are eaten by low-caste
people.
**Gurgowa**

This grass grows in company with jwar and bajra. It is two feet high. Its stalks are thick like reeds. It is cut along with kharif crops and given to animals.

**Rub**

Rub is abundantly found on parua soils, specially in 'tir' and 'kachhar' lands. It is of white and green variety. It runs along the surface with knotty stems. Animals graze on it. It is very nutritive and palatable.

**Kans**

Kans or thatching grass is a pernicious perennial grass. Its growth is very luxurious on mar and kabar soils, specially when excessively wet. It throws hundreds of acres of wheat land out of cultivation. When young, it is cut and given to animals, but after maturity it is used for thatching purposes only.

**Dabh**

Dabh is as pernic-ious as the kans. It is locally termed as 'kush'. It is two feet high. Ropes and mats are prepared from it. It also grows on black soils.

**Gandar**

Gandar grows near the water courses on black soils. It is cumuliferous. Its roots, called 'khas' are used for
extracting essence. Blades are cut for thatching, while its culms are used for broom-making.

In addition to these main types there are others, such as 'akari', 'wild-gobhi', 'jharia' or 'jharberia', 'bhat-katiya' etc. These grow on dry mar and kabar soils. It may be noted from the above description that these are chiefly the black soils of the region on which most of the good grasses grow, but which are also infested with perennial weeds and grasses. These are of no avail; on the contrary, they are very harmful to the regional crops.

Policy in Regard to Grazing in the Forests

The Royal Commission on Agriculture in India clearly emphasised the importance of forests in the agricultural economy of the country. The sole object with which the state forests are being administered is entirely for the public benefit, but in regulating and restricting, the rights and privileges must be limited. These restrictions were as regard to both grazing as well as extension of cultivation in the forest area. These limits are as follows:

1. Honey-combing of valuable forests by patches of cultivation should not be allowed.

(1) Report of the Royal Commission on Agriculture in India, 1928 p. 260
2. Only permanent cultivation may be permitted in the forest area, that too with certain reservations i.e. it must not be allowed to extend and encroach upon the minimum area of forests.

3. Minor forests and grazing lands must be managed in the interest of the regional population.

4. For the purpose of using forests for grazing permits and licences should be issued and fine charged per cattle; young stock should be preferred to the aged-cattle.

These rules are still in operation in the region, but at times many more animals enter into the forests than permitted so that grasses are eventually over-grazed during the period of fodder scarcity.

The importance of regional forests in providing fodder for starving cattle was fully realised during all the previous famines in Bundelkhand. Forest grasses were cut in huge quantity and baled out to areas of scarcity. Animals were allowed to graze in the forests. Besides saving cattle from starvation, regional forests immensely helped in checking soil erosion from hilly areas and keeping water table relatively higher than it was possible without them.
Fauna

But whereas forests and their grazing lands have rendered valuable service to the regional population, they have also been a source of constant botheration resulting from frequent invasions of their crops by wild animals inhabiting them. As the trees in the forests are stunted and sparse, they do not provide cover for larger beasts such as lion and tiger which are scarcely found in them; leopard is, however, fairly common in Panna, Mahoba and Ajaigarh tahsils.

But the damage to crops is not done by these animals; more harmful are such small beasts as the chinkara, wolves, hyaenas, black buck, which live in the ravines. Deer and 'neelgai' are very common in Pailani, Baberu and Basauda parganas of Banda district.

Experience of cultivators suggest that greatest damage to their crops is done by wild bores which raid their fields in the night. They not only eat away ears full of grain but also destroy the plants on a large scale. They have been a menace to the farmers in the neighbourhood of forests where they keep hiding during the day. Deer, foxes, and jackals are equally destructive. They are, however, very timid and runaway at the presence of men so much so that a caricatured statue called 'bijuka' is sufficient to keep them away from the fields. But wild bores are undaunting
and fearless. Their free shooting is, therefore, permitted. Rabbits, which enter into the fields through holes in the fences, also destroy the harvest.

Besides, there are various kinds of flocks such as green parrots, peacocks, water birds and others which enter the fields in full swarm. Usually birds are kept away either by throwing stones at them with the help of a string called 'gulel' from a raised platform called 'machan' or by beating the tin plates or a drum. It requires day and night long vigilance to save the crops from a host of these intruders including the thieves.

(B) Cattle wealth of Bundelkhand

The importance of live-stock (specially cattle) can hardly be over emphasised in a non-machanised system of farming as is practised in Bundelkhand even now. The entire work of traction and transportation falls on the shoulders of domestic animals. They also provide the regional population with milk, mutton or beef and various other products such as hides, skins, bones and hair on which many village industries largely depend. Thus animals are source of animate energy when alive and means of income when dead. They are integral part of the regional economy.

In spite of their intrinsic value in a predominantly
BUNDELKHAND

DISTRIBUTION OF LIVESTOCK

ONE DOT REPRESENTS 1000 HEADS OF CATTLE

rural set-up, it is difficult to say that they have ever been properly fed and looked after in Bundelkhand. Their breed is so poor and their number so large, that schemes of live-stock improvement have not met with much success so far. The defects lie partly in the regional climate and partly in our management.

**Live-stock : Their Number and Distribution (Plate IX)**

The total number of live-stock in 1963-64 in Bundelkhand stood at 6.8 millions,\(^{(1)}\) out of which Jhansi had 1.3, Jalaun 0.6, Hamirpur 1.0, Banda 1.2, Datia 0.3, Tikamgarh 0.9, Chhatarpur 1.1 and Panna 0.6 millions.

Their tahlis-wise numbers have been shown on map just referred to. Although grazed in forests and other uncultivated lands, they are generally found to co-habit with rural population in the villages. Therefore, their distribution is very similar to that of men (Plate XII Map A).

Out of the total live-stock number, 3.37 m. are cattle and buffaloes, 0.98 m. sheep and goats and 1.73 m. horses and ponies. The rest are mules, donkeys, camels and pigs.

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\(^{(1)}\) This includes the actual number of livestock of M.P. Bundelkhand as published by Veterinary Department, Bhopal and projected number (over 1961-62) of live-stock of U.P. Bundelkhand for the same year i.e. 1963-64
Bovine population is largest in Jhansi district, closely followed by Banda. In both these districts enough grazing facilities exist. Jhansi again tops in the number of sheep and goats (36 lakhs) the second place is held by Chhatarpur (30 lakhs). Tikamgarh with 27 lakhs and Hamirpur with 26 lakhs rank 3rd and 4th respectively. In all these districts there are extensive areas of ravine lands and rocky-wastes where short grasses, which these animals utilize, grow. Sheep or goat rearing is a lucrative business of Ahirs of Banda and Hamirpur districts.

Animal husbandry is an important side business of landless labourers throughout Bundelkhand, except in Jalaun where their flocks are small and grazing facilities limited.

**Working cattle (Plate X map No. D)**

Since the working cattle are of direct consequence to agricultural operations, a brief examination on their number is essential here.

All cattle above three years, which are not reserved for breeding and milk, are termed as working cattle and may include bulls, and buffaloes. Their total population in the region is about 1.46 millions of which 99.9% are oxen. The Map explains that although for the region as a whole,
the number of cattle heads per 100 acres of net sown area comes to 117, their ratio falls down to 25 only when only those cattle are considered which are used for agricultural operations. This is clear from the following table. Tahsil-wise ratios have been shown in plate X map No. D.

**Table X**

**Working cattle in Bundelkhand (1963)**

<table>
<thead>
<tr>
<th>Districts</th>
<th>Net sown area 1963-64</th>
<th>No. of working cattle 1963-64</th>
<th>No. of working cattle per 100 acre NSA</th>
<th>No. of working cattle per 100 ploughs</th>
<th>Excess or deficiency (based on col. 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jhansi</td>
<td>108,345</td>
<td>290,240</td>
<td>27</td>
<td>226</td>
<td>+ 26</td>
</tr>
<tr>
<td>Jalaun</td>
<td>789,200</td>
<td>119,125</td>
<td>11</td>
<td>198</td>
<td>- 2</td>
</tr>
<tr>
<td>Hamirpur</td>
<td>1,166,642</td>
<td>228,667</td>
<td>16</td>
<td>236</td>
<td>+ 36</td>
</tr>
<tr>
<td>Banda</td>
<td>1,148,160</td>
<td>267,119</td>
<td>27</td>
<td>221</td>
<td>+ 21</td>
</tr>
<tr>
<td>Datia</td>
<td>298,832</td>
<td>51,167</td>
<td>16</td>
<td>171</td>
<td>- 29</td>
</tr>
<tr>
<td>Tikamgarh</td>
<td>396,868</td>
<td>177,993</td>
<td>50</td>
<td>191</td>
<td>- 9</td>
</tr>
<tr>
<td>Chhatarpur</td>
<td>617,715</td>
<td>220,485</td>
<td>33</td>
<td>192</td>
<td>- 8</td>
</tr>
<tr>
<td>Panna</td>
<td>428,577</td>
<td>135,384</td>
<td>25</td>
<td>248</td>
<td>+ 48</td>
</tr>
</tbody>
</table>

| 6,015,389  | 1291,680               | 25                            | 210                                   | + 87                                 |

This table shows that the deficiency of the working cattle is greatest in Datia, moderate in Tikamgarh, Chhatar-
pur and Jalaun districts. This may be partly responsible for insufficient tillage of the fields resulting in low productions.

Mere number of working cattle is far from giving us the relationship between cattle and agricultural efficiency because when their quality and health (and therefore working capacity) is considered the picture becomes sordid with respect to maintenance and management of farms. It is generally agreed that the quality of working cattle, in Bundelkhand is poor. Breeds are indigenous; their stature is short and working capacity limited. Working capacity of these cattle is also reduced owing to the nature of soils and character of surface relief. Mechanization of farms is still insignificant.

Some persons have suggested that the plough and cattle ratio gives a fairly good picture of the work-load on the animals in a given region. This ratio also indicates whether ploughing is done sufficiently or not. At the same time it may be pointed out that plough-cattle ratio is not a very good index for any of the above considerations, because neither all cattle are used for agricultural operations nor all the ploughs kept by the farmers are actually used in the

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(1) There are only 581 tractors in the whole region (1963-64).

J P Saxena
fields though they are certainly counted by official investigators. A better approach for understanding the work-load of the cattle is by examining the number of working cattle only against the net sown area of the region. Investigations suggest that a pair of bulls of average health can manage from 8 to 15 acres of land in Bundelkhand, but calculations point out that average work-load of a pair of bullocks in the region, as a whole, is 9.4 acres only. This means there are more working-cattle in the region than actually needed for the purpose. Under the present circumstances, however, the existing number can not be regarded as in excess, specially when considered against their normal health which is certainly poor. Their number can certainly be reduced by improving their health as also by adopting some sort of co-operative farming which would permit a fuller utilization of their energy.

Besides the distribution and density of live-stock, some other features of their relationships have been shown on map Nos. A, B, C and D in plate X.

Map A shows the relationship between the density of population and the density of live-stock. It is striking to note the inverse ratio of human and animal densities. In southern part of the region, where human population is small, there are comparatively more animals than in the north where
density (human) is great. The reason is that while conditions for agriculture are not very favourable in the southern parts owing to high relief and infertile soils (hence extensive waste lands), the grazing potentials are by no means poor. They are in fact very much more than those in the Northern Plain which is intensively used for cultivation of crops. For these reasons, in the extreme north-western part of the region (District Jalaun), the number of livestock per 100 persons is even less than 50 while it is more than 150 in the southern part.

Map B on the other hand shows the relationship between the number of livestock and the net sown area (such a ratio has been investigated by Royal Commission on Agriculture for each province). In Bundelkhand maximum density of this ratio is found in the Nivari tahsil of Tikamgarh district. It is 225 cattle per 100 acres. It is again owing to better grazing facilities in the tahsil. The density falls down to between 50 and 75 in the north-western part of the region. The same reasons as advanced in the analysis of map A are responsible for this kind of variation and for that reason both these maps are more or less similar in appearance.

Map C shows the relationship between the bovine population to 100 acres net sown area.
In Map D only working cattle were considered in relation to 100 acres net sown area. As working cattle form an important part of the bovine population both these maps are similar in density and distributional pattern. While map C may indicate the density of these useful animals, map D gives us more precisely the idea about the work-load of cattle in farm operations. Following conclusions are apparent from the maps:

1. Bovine cattle are more numerous in the south-western part of the region specially in Jhansi, Tikamgarh and Chhatarpur districts. In these districts their density, in relation to 100 acres net sown area, varies from 125 to 150 while in the north-western part their density falls down between 50 and 75.

2. Working cattle are also found decreasing from south (45 - 50) to north (10 - 15) where-as farming becomes more and more intensive. This means the work-load is maximum in areas which are agriculturally very rich, but where working cattle are not in sufficient number.

3. The distribution and density of total bovine or working cattle does not appear to be governed as much by their demand as by grazing potentials which are definitely more in the south than in the north.
Improvement of Bundelkhand Live-stock

The average efficiency of the cattle in Bundelkhand is limited by economic and environmental conditions. Herding, as an occupation is, therefore, always subsidiary to crop-farming. An average Bundelkhandi farmer does not possess much grazing facilities for his animals and the available feeds can not sustain more than half of the existing number of animals. Besides, the quality and breed of the animals is poor and there is considerable shortage of good bulls of known breeding quality. For these reasons the rate of growth of animal population is slow because interval between calving period is very long. Investigations carried out by the Veterinary Department of Madhya Pradesh(1) show that the number of cows per bull in Datia district is 482, Chhatarpur 239, Tikamgarh 254 and in Panna 451. Under these conditions quality of animal breeds can not be improved at all.

For an overall development of live-stock the Government of India has recently established the Central Council of Gosamvardhan. The functions of the council, in brief are :-

1. To advise, co-ordinate and assist the states and regional 'goshalas' in matters relating to their develop-

ment in all their spheres.

2. To encourage the establishment of key-villages for breeding of cattle on scientific lines.

3. To take such measures as may be necessary to prevent the slaughter of useful and productive bovines.

The success of the scheme depends on the setting up of such organisation as 'Key Village Scheme' the object of which is to establish a net-work of 'key-villages' in suitable localities where undesirable bulls would be replaced by bulls of known quality and to introduce other measures of cattle improvement such as better feeding, control of diseases and utilization of the remains of dead animals.

It is unfortunate that, there are only a very few such centres in Bundelkhand and extensive areas are not covered at all by this scheme. It is surprising that there is not a single 'Key Village Scheme' centre in the whole of M.P. Bundelkhand.

Cows

Of all the animals in Bundelkhand, cow needs the greatest attention for milk as well as for producing good quality calves. Unfortunately she is one of the poorest animals in the region. She is weak, starved and unproductive.
Her calving capacity is also very low. Total number of cows in the region at present is 1.12 millions, of which 7.1 lakhs are in U.P. and 4.1 lakhs in M.P. Bundelkhand. The average Bundelkhandi cow gives milk for a period of five to six months at an average rate of about 700 lbs. per annum only whereas the Punjab breeds give about 1,250 lbs. and the Gujrat breeds 1,000 lbs. For this reason the chief source of milk-supply in Bundelkhand is from Buffaloes and not from cows.

**Experiments at Bharari Farm Jhansi**

Experiments conducted at Bharari State farm near Jhansi establishes the fact that 'Hariana' cows can be kept in the region, though their capacity to give milk is reduced by 25 to 30%. The quality of indigenous cow can also be improved considerably by introducing improved bulls. Experiments made so far show very encouraging results.

Proper feeding of cows on a balanced diet is equally important for their improvement. Shrivastava (1) of Bharari farm has evolved a grazing and fodder calender for Hariana cattle in consultation with Animal Production Branch of F.A.O. & C.A. The fodder has been classified in four categories:-

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(1) Whyte, R.O.: The Grass lands and Fodder Resources of India, I.C.A.R., New Delhi, Scientific Monograph No. 22 p. 179
110.

Category A: It includes berseem, lucerne, oats, cow-pea, month, juar, anjan, maize, guinea-grass, maize-silage, juar legume mixture and sweet-sudan.

Category B: It includes juar, makhari, napier grass and para grass. These are all green fodders. The dry fodders have been further sub-categorised into (a) which includes oat-hay, berseem-hay, lucerne-hay and cow-pea-hay. Sub-category (b) is made up of gram-straw, mung-straw, urad-straw, pea-straw, anjan-hay and juar-hay. Sub-category (c) includes wheat, barley, paddy and oat straws and grass-hay. The quantities of each item have also been fixed for daily diet in different months.

Category C and D: They are still more elaborate and need not be mentioned here.

It is difficult even to imagine how would an average Bundelkhand farmer follow such an elaborate menu for his animals. It is impossible so long as he does not improve his financial condition, nor can he regulate these prescriptions rigidly. In practice, he gives good fodder in monsoon season but when the season is over animals are let loose to procure their own food from the fields and pastures of the village. Condition becomes deplorable between March and June when loose animals raid the crops and cause huge losses to the farmers.
who guard their fields day and night. In fact during
 scarcities the problem of fodder becomes even more serious
 than the food itself because it can be transported neither
easily nor cheaply from place to place on account of its
huge bulk and small value. (1)

Buffaloes

Buffaloes in Bundelkhand are the chief source
of milk and the milk products. They give more milk, which
contains more fat. They also donot require frequent movement
to pasture lands and are usually kept at home on green or
dry fodder.

In all, there are about 9.8 lakh buffaloes in Bundel-
khand; their largest number is found in Banda and least in
Datia district. Out of the total buffaloes only 1.8 lakh
are milch buffaloes. They are well adapted to hot-wet
regions and their milking capacity increases greatly during
cold or wet months. A normal buffaloe gives about 1200
seers of milk annually. Its diet is usually heavier.

The following table gives the ratio of milch-cows and
cow-buffaloes to per 1,000 persons in the year 1961 (2).

(1) Jathar and Bery, Indian economics Vol. I, O.U.P. Bombay,
1949, p. 218

562-565 (for M.P.) and office records of Board of Revenue,
U.P., Lucknow (for U.P.)
Table XI

Number of Milch Cattle per 1,000 persons in Bundelkhand Region

<table>
<thead>
<tr>
<th>District</th>
<th>Number of milch cattle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jhansi</td>
<td>110</td>
</tr>
<tr>
<td>Jalaun</td>
<td>106</td>
</tr>
<tr>
<td>Hamirpur</td>
<td>127</td>
</tr>
<tr>
<td>Banda</td>
<td>147</td>
</tr>
<tr>
<td>Datia</td>
<td>324</td>
</tr>
<tr>
<td>Tikamgarh</td>
<td>427</td>
</tr>
<tr>
<td>Chhatarpur</td>
<td>509</td>
</tr>
<tr>
<td>Panna</td>
<td>543</td>
</tr>
</tbody>
</table>

Sheep and Goats

The natural habitat for goats and sheep is the region of dry and temperate climate with short green grasses and rough topography. It is, therefore, clear that the climatic conditions of Bundelkhand, with extremes of temperatures and variability of rainfall are far from ideal for them. They are generally found in hilly areas of Vindhyan Plateau where they are largely grazed. There total number at present is almost the same as that of buffaloes, but they form an important subsidiary occupation of part-time agricultural labourers or full time pastoralists. Their raising is
generally monopolised by village 'gararias'. In Banda and Hamirpur it is a lucrative occupation as these animals provide milk, mutton, skin and hides.

**Improvement of Sheep and Goat**

Sheep breeding experiments\(^{(1)}\) made as early as in 1923 in U.P. on the selective country breed prove that cross breeding with marino results in four times product of wool from the hybrid lambs. However, \(1/4\) of the experimented sheep did not show any improvement. The best three-quarter breed marino, when mated with pure marino produced very good wool which was valued at marino rates.

This holds out great potentialities for improving the country breed of sheep and goats. The government of Uttar Pradesh, encouraged by these experiments, opened sheep experiment farm near Orai to conduct further researches in this field. This farm also supplies improved breeds.

**Animal Diseases**

One of the greatest obstacles in the improvement of regional live-stock of Bundelkhand is the intensity of pests and diseases which frequently sweep over the whole area. This is the consequence of regional climate which is tropical.

\(^{(1)}\) adapted from Royal Commission on Agriculture in India (1923) Report - p. 173
Indirectly many grasses which grow in the region are not palatable and some are even harmful. Consequently a large number of useful animals die of them annually. The most formidable disease that afflicted the regional cattle till recently is 'rinderpest'. It is a virus disease and catches cloven-hoofed animals. 'Cattle of pure or hybrid breed are more susceptible to it. Mortality rate from this epidemic is from 8 to 100%; in the cattle of the plains it is 20 to 50%.' Incubation period of the disease is about 3 to 7 days when the animal develops temperature between 104° and 106° F and soon raw ulcers appear in the mouth and render the animal incapable of eating anything. Serum simultaneous method of incubation offers the only best known system of treatment and that too in time before this plague breaks out. All the veterinary hospitals in the region keep incubation material.

As a result of the scheme of its eradication(1) its intensity has been greatly reduced now. On the other hand, 'foot and mouth', 'anthrax', Haemorrhagic septicaemia (H.S.), black quarter (B.Q.) and smallpox continue to afflict the cattle. These contagious diseases are not easily cured if steps are not taken in time. Farmers are generally reluctant to send their animals to the hospitals which are certainly quite far off from their villages. They, therefore, mostly depend upon the indigenous medicines as known to them from their ancestors. Of late the regional farmer of Bundelkhand

(1) Scheme of Eradication of Rinderpest in M.P. was launched in January, 1958.
has also started changing his outlook. He is now convinced of the prophylactic vaccination carried out against various categories of diseases. 'Dissemination of improved germ plasm of better breed of cattle, sheep, goats and poultry has been taken up in urban centres and their nearby villages on a large scale. But the actual improvement in either quantity or quality is not yet visible because the type of nutritional environment needed for the expression of genetical improvement of the upgraded stock does not exist in the region. It is admitted that grass and cultivated fodder are the only cheap source of feed nutrients for livestock and very little has been done in the field of feeds and fodder development programme in the State.(2)