

# Livestock Biodiversity, Socio-Economic Status, and Constraints Faced By Indigenous Cattle, and Buffalo Owners under Field Conditions in the Mahakaushal Region of Madhya Pradesh

Mohan Singh Thakur<sup>1\*</sup>, Rajesh Kumar Vandre<sup>2</sup>, Mona Sharma<sup>3</sup>, Shrikant Joshi<sup>1</sup>, Asit Jain<sup>4</sup>, Akansha Singh<sup>5</sup>, and Kush Shrivastava<sup>6</sup>

<sup>1</sup>Professor and Head, Animal Genetics and Breeding, NDVSU, Jabalpur, M.P., INDIA

<sup>2</sup>Associate Professor, Animal Genetics and Breeding, NDVSU, Rewa, M.P., INDIA

<sup>3</sup>Assistant Professor, Arawali Veterinary, Sikar, Rajasthan, INDIA

<sup>4</sup>Associate Professor, Animal Genetics and Breeding, NDVSU, Jabalpur, M.P., INDIA

<sup>5</sup>Assistant Professor, Animal Genetics and Breeding, NDVSU, Jabalpur, M.P., INDIA

<sup>6</sup>Assistant Professor, Animal Biotechnology, NDVSU, Jabalpur, M.P., INDIA

\*Corresponding Author: [drmohansingh@gmail.com](mailto:drmohansingh@gmail.com)

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## Abstract

*The present investigation aimed to assess the animal biodiversity, socio-economic status of livestock keepers, and the major constraints faced by them under field conditions in Jabalpur, Mandla, Dindori, Seoni districts, and in parts of adjoining districts, including Narsinghpur, Balaghat, Chhindwada, and Katani of the Mahakaushal region of Madhya Pradesh. Mahakaushal is a culturally rich and geographically diverse region in central India that is located in the upper or eastern reaches of the Narmada River valley in Madhya Pradesh and is bordered by the Vindhya and Satpura ranges. In Madhya Pradesh, most of the animals of different species belong to the non-descript category. The state has a total of 40.63 million animals, out of which cattle and buffaloes constitute 71.49%, goat 27.23 % and the remaining 1.28 % animals include pigs, sheep and other animals. The livestock and poultry in state are poor producers with low genetic potential. The shortage of feeds and fodders, level of livestock management, Imbalanced livestock-environment interaction and conventional animal husbandry practices prevalent in field are the major constraints that affect the livestock production in Madhya Pradesh. The socioeconomic status of rural livestock farmers was poor in Mahakaushal regions. Livestock's in this region are usually grazed in the pasture which is called Khirka and mating normally occurs during grazing. The floors of animal houses were of Kachcha type with no proper drainage system. The population of cows and buffaloes found in the Mahakaushal region of Madhya Pradesh is a non-descript type. Based on the survey and 20th livestock census, it was estimated that about 1.5-2.0 lakhs non-descript cattle (Mahakaushali cattle) and 0.75-1.25 lakhs non-descript Buffalo (Mahakaushali buffalo) population are present in the different areas of Mahakaushal region of Madhya Pradesh. The non-descript population of cattle and buffaloes is distinct and unique and can be registered as a new breed from this region.*

**Keywords:** Biodiversity, Breeding Tract, Buffalo, Cattle, Mahakaushal, Non-Descript, Socioeconomic.

## Introduction

Madhya Pradesh is also known as the "Heart of India". The registered breeds of livestock in Madhya Pradesh includes 04 breeds of cattle, 01 breed of buffalo, 01 breed of goat, 01 breed of sheep, 01 breeds of camel and 01 breeds of poultry in addition to other species (NBAGR, 2024). In Madhya Pradesh, most of the animals of different species belong to nondescript category. Although these breeds are well adapted to their natural habitat, the productivity is quite low. The state has a total of 40.62 million animals out of which cattle and buffaloes constitute 71.49%, goat 27.23 % and remaining 1.28 % animals include pig, sheep and other animals (DAHD, 2024). Important recognized breeds of cattle considered as native breeds of Madhya Pradesh are Malvi and Nimari. Gaolao breed is found all over Vidarbha region of Maharashtra and adjoining areas of Madhya Pradesh (Chhindwara dist.) and Kenkatha breed of cattle in Panna district. Similarly, Bhadawari breed of buffalo is found in abundance at Bhind and Gwalior districts. Jalauni breed of sheep is found in Tikamgarh and Shivpuri which forms the border with Jhansi and Jalaun districts of Uttar Pradesh. Jamnapari breed of goat is found in various villages of Bhind district situated near Chambal River. Berari Goats are in the Nimar districts of M.P. Malvi camel is also found in Mandsaur district of Madhya Pradesh. In the poultry sector, Kadaknath is the native breed of Madhya Pradesh found in Jhabua (Tomar *et al.*, 2020). In general, the livestock and poultry in state are poor producers with low genetic potential. The shortage of feeds and fodders, level of livestock management, Imbalanced livestock-environment interaction and wrong conventional animal husbandry practices prevalent in field are the major constraints that affect the livestock production in Madhya Pradesh. India is largely dependent on agriculture, with agriculture providing financial assistance for around 70-75 per cent of the people (BAHS, 2024). Cattle or Buffalo are kept as an auxiliary to crop cultivation for milk production, mechanical power for different agricultural activities, village transit, irrigation and manure generation. In general, the animals are fed agricultural leftovers and crop wastes. Landless, Small and marginal farmers, as well as landless laborers, are mainly accountable for animal husbandry. The landless and small farmers are mainly depending upon the livestock for supplemental income. Thus, identifying strengths and weaknesses, as well as understanding of present management practices may be useful in developing appropriate intervention strategies.

Madhya Pradesh is particularly rich in livestock, with over 40 million animals (20<sup>th</sup> Livestock Census). The livestock economy in this state is predominantly centered around cattle, with 18.75 million cattle heads (20<sup>th</sup> Livestock Census), contributing the highest proportion (>46%) of the total livestock population (BAHS, 2024). These cattle possess high heat tolerance, disease resistance, and can thrive on the limited feed resources available in the state. They also provide essential work power for agricultural operations, transportation, and fuel for cooking with minimal input.

## Materials and Methods

The survey was planned to study the livestock biodiversity, Socio-economic status and constraints faced by indigenous cattle and buffalo owners under field conditions in the Mahakaushal region of Madhya Pradesh under the ICAR-NBAGR project "Characterization of local Cattle and Buffaloes populations of Mahakaushal region of Madhya Pradesh (2018-2022). Mahakaushal, a region of central India, lies within the upper or eastern reaches of the Narmada river valley within the Indian state of Madhya Pradesh. The region lies in between Latitude: 23° 08' 60.00" N Longitude: 79° 55' 58.80" E.. The climate of the Mahakaushal is humid subtropical, as is typical of north-central India. Stratified two-stage sampling design (Sukhatme and Sukhatme, 1970; Cochran, 1977; Sud *et al.*, 2013) has been adopted to record the desired information from the farmers of Mahakoshal region of Madhya Pradesh. The survey was based on appropriate formats and questionnaires (recommended by NBAGR, Karnal) to collect all the relevant information. The survey included the socioeconomic status of the framers as well as the concentration of non-descript cattle and buffalo populations. Through in-person interviews and questionnaires, this study gathers information on the demographic distribution, livestock population, socioeconomic status of farmers, livestock management practices, *etc.* The data was analyzed using Microsoft Excel's Analysis ToolPak.

## Results and Discussion

### ***Breeding Tract of Mahakaushali Cattle and Mahakaushali Buffaloes***

The breeding tract of non-descript Mahakaushali cattle and Mahakaushali buffalo under the present study is almost entire Mahakaushal region of the Madhya Pradesh (Figure 01). The non-descript cattle and Buffalo population is

mainly distributed in Jabalpur, Mandla, Dindori, Seoni districts and in parts of adjoining districts including Narsinghpur, Balaghat, Chhindwada, Katni and Umariya (Sharma *et al.*, 2021 and Vandrey *et al.*, 2021). The non-descript animals of cattle and buffalo were mostly found in the interior of villages and districts, close to the forest, where there were either few facilities for artificial insemination or livestock farmers were unwilling to use it. During the survey, non-descript cattle and buffalo populations were seen in their pure form, as farmers preferred selective mating or natural service of the animals.

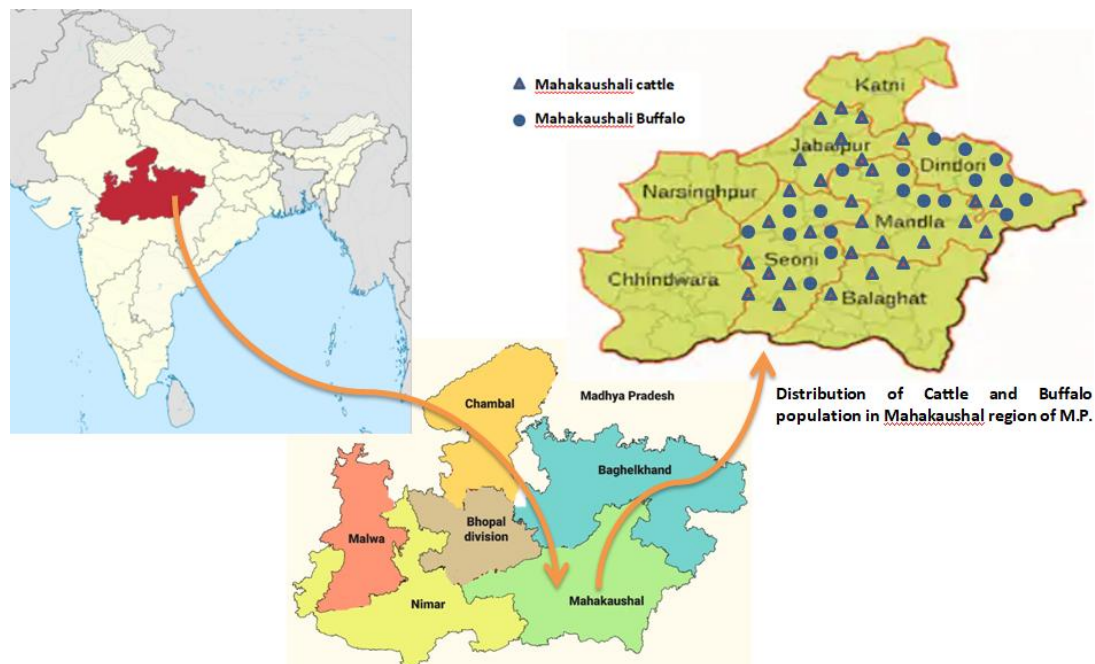


Fig. 1: Distribution of cattle and buffalo population in Mahakaushal region of M.P.

### ***Geographical and Climatic Description of Mahakaushal Region of M.P.***

The geographical and climatic descriptions of Mahakaushal region of M.P. have been presented in Table 01.

### ***Status of Cattle and Buffalo in the Mahakaushal Region of Madhya Pradesh***

The status of livestock and poultry in Mahakaushal region of Madhya Pradesh (20<sup>th</sup> Livestock census) has been presented in table 02. Majority of the cattle population found in different districts of Mahakaushal region of Madhya Pradesh is non-descript type. During the survey, it was observed that the population of non-descript cattle and buffalo is uniform and distinct from the registered breed cattle and buffalo, and the populations of Mahakaushali cattle and buffalo were concentrated in the Jabalpur, Mandla, Dindori, and Seoni districts and their nearby areas.

### ***Estimated Population Size of Mahakaushali Cattle and Mahakaushali Buffalo in Mahakaushal Region of Madhya Pradesh***

The majority of cattle and buffalo population in the Mahakaushal region of Madhya Pradesh is non-descript type. It was noted during the survey that the population of cattle and buffalo reared by farmers or cattle keepers in the Mahakaushal region is uniform and distinctive. Based on the study and published data of the 20<sup>th</sup> Livestock Census, it was estimated that about 1.5-3.0 lakh non-descript cattle (Mahakaushali cattle) and 0.75-1.25 lakh non-descript buffalo (Mahakaushali buffalo) population spread across the Mahakaushal region of Madhya Pradesh. Since the non-descript cattle population is uniform and unique, it can be registered as a new breed of cattle from this region as "Mahakaushali cattle". Similarly, the non-descript buffalo population from this region of Madhya Pradesh can be registered as "Mahakaushali buffalo".

**Table 1:** Geographical and climatic description of Mahakaushal region of M.P.

Attribute	Jabalpur	Mandla	Dindori	Seoni	Narsinghpur	Balaghat	Chindwada	Katni
<b>Topography</b>	a long, narrow plain surrounded by highland. Narmada and Son River basins	hilly and forested, with a plateau in the north and a plateau of hills in the south	plateaus, pediment pediplains, hills, and valleys	hills, plateaus, and valley	Vindhyachal and Satpura mountain ranges, and the Narmada river	South eastern portion of the Satpura Range and the upper valley of the Wainganga River	a plateau region with a hilly northern region and plains near Nagpur	hilly to undulating terrain
<b>Geographical location</b>	23°17' N & 79°94 E	22° 35' 52.5156" N & 80° 22' 16.9824" E	22.17–23.22N & 80.35–80.58E	21° 36' - 22° 57' N & 79° 19'- 80° 17' E	22°.45- 23°.15N & 78°.38-79°.38 E	21°19' - 22°24' N & 79°31'- 81°3' E	21.28 - 22.49 N & 78.40 - 79.24 E	23° 84' N & 80° 40' E
<b>Soil types</b>	black cotton soil, a rich alluvial deposit	clayey loam, with some sandy loam	mixed soil, red, yellow, and black soil	black cotton soil, sandy loam, moland soils	Black, Rocky, Sandy	Mix, Sandy loam, light black	black soil, clay soil, and laterite soil	Palaydlow, reddish brown & black soil
<b>Climate</b>	humid subtropical	subtropical	subtropical	subtropical	Subtropical	Subtropical	Subtropical	Subtropical
<b>Crops</b>	Paddy, pea, Soybean, Maize, Wheat, Gram, Mustard	Paddy, wheat and oil seeds	Rice, Kodo-kutki, Maize, til, Arhar	Maize, Soybean, Arhar, wheat, Linseed	Wheat, Gram, Pulses, Peas, Soybean, Sugarcane	Paddy, Chinnor rice, Maize, Wheat, Arhar, millets	Maiz, oranges, Gram, Cotton, Paddy	Paddy, Wheat, Gram
<b>Average rain fall (mm)</b>	1358	1427	1450	1324	1218	1295	1183	1172
<b>Temp.(°C)</b>	Aug-47	13-41	8-43.6	14-40	Sep-46	Dec-44	Apr-42	Sep-42
<b>Avg. Humidity</b>	59%	61%	58%	51%	61%	58%	57%	53%
<b>Height (MSL)</b>	411 m	624 m	640 m	612 m	359 m	288 m	675M	434 m
<b>Area (Sq. Km.)</b>	10160	8771	7470	8758	5125	9245	11815	4949

Source: NIC (2023-24) and Weather Report (2023-24)

**Table 2:** Status of livestock and poultry in the Mahakaushal region of Madhya Pradesh

District	Non-descript cattle	Crossbred cattle	Total cattle	Buffalo	Sheep	Goat	Pigs	Total livestock	Total Poultry
Jabalpur	335150 (91.73%)	50986	365345	101598	1013	124914	4991	527419	2658848
Mandla	385324 (79.25%)	14427	486197	82098	102	109482	17160	695103	362429
Dindori	374012 (83.47%)	2458	448069	62845	309	75530	4457	591357	219140
Seoni	482102 (94.03%)	40635	512686	113909	91	214473	1540	755786	273245
Narainpur	279670 (87.09%)	33704	321113	116684	591	122180	1654	496439	44586
Balaghat	396382 (65.42%)	21556	605928	186805	35	328851	5683	1127416	657195
Chhindwada	526003 (73.86%)	57904	712157	167074	323	368710	1199	1250046	723936
Katni	425865 (97.82%)	5920	435361	97825	1730	148375	5722	635287	88380
Madhya Pradesh	16323199 (87.05%)	1696163	18752013	10307131	324148	11064524	164572	40638079	16660317

(DAHD, 2023-24)

### ***Age, Gender, Family Type, Land Holding, Herd Size, And Annual Income of Farmer/Livestock Keepers***

Most of the farmers in different areas of the Mahakaushal region of Madhya Pradesh were below 50 years of age. Most of the livestock owners/farmers involved in animal husbandry were males and on average each family had 4 to 10 animals. It was observed that more than 70% of the farmers were married, literate, and on average, a family had 4 to 7 members. The main occupation of the farmers of this region was agriculture. They reared cows and buffaloes as a subsidiary occupation. About 60 percent of the farmers involved in animal husbandry had marginal or small holdings.

The landing holdings of majority of the farmers were between 0 to 8 acre. Most of the farmers reared cattle and buffalo as an extra source of income. The herd size of cattle and buffalo varied from 5-20 and 4-12, respectively. The majority of the farmers had poor economic status particularly in Dindori and Mandla district of Mahakaushal region of Madhya Pradesh.

### ***Soil, Feed and Fodder***

The different types of soil were found in the Mahakaushal region of Madhya Pradesh. However, the common type of soil is black. It was observed that wheat, paddy, maize, jowar, etc. cereals were grown. The farmers mainly depend upon the pasture grazing for their livestock. There were only few farmers that grow fodders (Barseem, Lucerne etc.) for their animals. The grass was available mainly during the rainy season and also in winter season. It was observed that grasses such as samai, gunhari, kandhia etc. were given to livestock as per availability in the area. The wheat straw and dry grasses were fed to animals during summer season.

### Age Wise and Sex Wise Distribution of Buffalo Population in Mahakaushal Region

The age and sex wise population distribution of buffalo population surveyed in Mahakaushal region has been presented in table 03. In the present survey, total 22010 cattle and 13378 buffalo were covered under demographic survey in the Mahakaushal region of Madhya Pradesh. It was observed that in the whole breeding tract farmers were maintaining good number of cattle and buffalo animals. In all the age groups, the population of female was larger than that of male. It could be due to the fact that cattle and buffaloes female animals are mainly reared for milking purpose and buffalo bulls are not preferred for draught purpose. A total of 22010 cows and 13378 buffaloes were included in this study from the Mahakaushal region of Madhya Pradesh. Out of total, 10.53 % of males and 15.90 % of females in cattle and 11.18 % of males and 17.92 % of females in buffaloes were less than one year of age. Similarly, 10.09 % males and 18.20 % females in cattle and 10.23 % and 21.43 % females in buffaloes were one to three years of age. In total population, 2.76 % of bulls and 1.76 % of bullocks in cattle and 2.00 % of buffalo bulls and 0.82 % of buffalo bullocks were more than three years of age. The percent of cows and buffalo in milk were 14.79 and 22.99, respectively. On average, per day milk yield was found to be 1.5 kg in Mahakaushali cows and 3.37 kg in Mahakaushali buffaloes.

**Table 3:** Age wise and sex wise distribution of cattle and buffalo population in Mahakaushal region

Districts		Up to 1 year		1-3 year		Above 3 years				Total
		Male	Female	Male	Female	Male		Female		
						Bull	Bullock	Milk	Dry	
Jabalpur	Cattle	487	815	736	1127	180	120	945	2280	6690
	Buffalo	310	548	352	617	85	34	986	554	3486
Mandla	Cattle	432	642	327	765	95	65	805	1020	4151
	Buffalo	387	625	276	821	43	18	710	423	3303
Dindori	Cattle	422	682	496	828	104	78	786	1286	4682
	Buffalo	280	538	405	687	62	14	834	425	3245
Seoni	Cattle	210	576	172	718	118	34	472	814	3114
	Buffalo	162	463	186	554	37	15	482	338	2237
Narsinghpur	Cattle	153	235	115	242	32	14	142	110	1043
	Buffalo	65	83	68	112	18	10	30	14	400
Balaghat	Cattle	156	124	85	95	14	18	42	32	566
	Buffalo	85	42	25	22	8	4	16	13	215
Chhindwada	Cattle	215	112	72	114	42	24	36	126	741
	Buffalo	110	25	15	37	9	7	8	18	229
Katni	Cattle	242	314	217	116	23	35	28	48	1023
	Buffalo	96	74	41	17	5	8	10	12	263
Total Cattle		2317	3500	2220	4005	608	388	3256	5716	22010
Total Buffalo		1495	2398	1368	2867	267	110	3076	1797	13378
Cattle (%)		10.53	15.90	10.09	18.20	2.76	1.76	14.79	25.97	100
Buffalo (%)		11.18	17.92	10.23	21.43	2.00	0.82	22.99	13.43	100
Total cattle and Buffalo		3812	5898	3588	6872	875	498	6332	7513	35388
Cattle and Buffalo (%)		10.77	16.67	10.14	19.42	2.47	1.41	17.89	21.23	100

## Agriculture Status of Farmers

The information regarding the socioeconomic status and agricultural status of farmers of Mahakaushal region of Madhya Pradesh have been presented in Table 4. The overall socioeconomic status of farmers was poor in all the districts. The annual income of farmers of Jabalpur and Narsingpur districts was slightly higher than the farmers of others districts of Mahakaushal region; it might be due to slightly higher irrigated lands and literate family members. Agricultural Status of farmers of Mandla, Dindori and Katni districts was lower as compare to other two districts.

**Table 4:** Agricultural status of farmers

Attribute	Jabalpur	Mandla	Dindori	Seoni	Narsingpur	Balaghat	Chindwada	Katni
Agriculture holding (Acre)	1-5	1 – 3.5	1 – 3.5	1-4	1-8	1-4	1-4	1-3
Irrigated land (Acre)	1-3	1 - 2.5	1 – 2	1-2	1-3	1-3	1-4	1-3
Annual Income (Rs in thousands)	25-95	15-75	10-65	11-70	18-120	15-65	15-75	12-68
Family members (No.)	4 – 6	5-6	6-7	5-6	3-5	3-6	4-6	3-5
Male family members (No.)	2 – 4	2-3	3-5	2-3	2-3	2-4	2-3	2-3
Female family members (No.)	1-3	2-3	2-3	2-3	1-2	1-2	1-2	1-2
Literate members (No.)	3-5	2-4	2-4	2-5	2-4	2-3	3-4	2-4
Family Members engaged in Animal husbandry (No.)	1-3	1-3	2-4	2-3	1-2	1-3	1-2	1-2
No of houses covered (No.)	425	315	265	198	65	72	64	56

## Housing, Feeding, and Management Practices

During the survey, it was found that most of the farmers tied their animals or kept them in the houses only at night, while very few farmers tied their animals during day and night. This common practice was more or less prevalent in all the districts of Mahakaushal region. Most of the houses for keeping animals were kutchha houses, whose walls and floors were half-height. These cattle sheds were outside the houses of about 70 to 85 percent of the farmers and a few percent of the farmers had separate cattle sheds. Most of the cattle sheds did not have any drainage system. The source of water for the animals was rivers, streams, canals, wells, ponds and tanks. The availability of water for the animals was sufficient except during the summer season. Generally, farmers preferred to graze their animals in the pasture. In this region, cows and buffaloes were usually left to graze in the morning (7-8 am) and brought back home from the pasture in the evening (4:30-6 pm). The animals were dependent on grazing in the forest area practically the whole day and nominal concentrates were fed once a day at the time of milking. The area where the animals assembled during grazing was known as Khirka which was 2-3 km away from the villages. The animals were fed local grass, concentrates like, flour, bran and sometimes khali-chuni, etc. depending upon the availability. Natural mating or breeding was commonly practiced by the farmers in these areas. It was observed that there was no facility of artificial insemination in the interior areas; hence the farmers were dependent on natural breeding with the common males/bulls available in Khirka. Similar findings of free grazing system as a major practice were also reported in local buffaloes (Kalyankar *et al.*, 2008), Galao cattle and Nagpuri buffalo (Gubbawar *et al.* 2012) of Maharashtra state. Chandran *et al.* (2019) reported that 75.4% of the animals were bred with Diyara buffalo bulls available in the breeding tract. Similar to present study Kumar *et al.* (2017) reported that majority (58.3%) of the respondents preferred grazing and stall feeding in Rathi, Tharparkar and Sahiwal cattle in Bikaner, Jodhpur and Sriganganagar districts of Rajasthan.

## Constraints Faced By Indigenous Cattle and Buffalo Owners

The livestock keepers in Mahakaushal areas of Madhya Pradesh encountered many challenges in cattle and buffalo rearing. However, the main constraints included lack of knowledge about breeding, feeding and management of animals. From the present study, it was observed that most of the livestock rearers or farmers did not have much knowledge about milk processing and were unaware of the market value of produced from native cattle and buffalo. They lacked information about scientific management of cows and buffaloes. Low market pricing for their goods

were a concern for cattle and buffalo rearers because the majority of native cattle owners were from rural areas, and milk costs are lower there than in cities. The lack of improved fodder seeds was an issue for the majority of farmers. Additionally, they also faced problems of reproduction in their cattle and buffaloes. In certain regions, they encountered the issues of grazing scarcity. They didn't know about scientific selection and breeding. Thus, due to indiscriminate breeding, improper selection and random natural service, the genetic potential and productivity of animals were so low.

## Conclusion

The population of cows and buffaloes found in the Mahakaushal region of Madhya Pradesh is a non-descript type. Based on the survey, it was estimated that about 1.5-2.0 lakh non-descript cattle (Mahakaushali cattle) and 0.75-1.25 lakh non-descript Buffalo (Mahakaushali buffalo) population are present in the different areas of Mahakaushal region of Madhya Pradesh. The non-descript population of cattle and buffaloes is distinct and unique and can be registered as a new breed from this region.

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## Contribution by Authors

All the authors contributed equally to writing the manuscript. The final manuscript was read by all authors and consented to publication.

## Conflict of Interests

There is no conflict of interest.

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