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“Shrinking Pasture for Rajasthani Pastoralists”

Phillip Carl Salzman

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## SHRINKING PASTURE FOR RAJASTHANI PASTORALISTS

by Philip Carl Salzman

In the Great Thar Desert of northwest India, and throughout Rajasthan State as a whole, pastoralists are being squeezed by a paucity of essential resources. Pasture and water, necessities of pastoral production, are less and less available. The combined pressure of increased and increasing human population, agricultural cultivation, forest reserve, and livestock numbers, is reaching a bursting point, and it is the pastoral livestock industry that is at the point of bursting.

The costs, to the herders themselves and to the economy of the State, of the intensifying crisis in pastoral resources, will be monumental, commensurate with the importance of the livestock industry in Rajasthan. Among the negative consequences already clearly evident are increasing costs per livestock unit and concomitant reduction in return, social conflict resulting from competition over scarce resources, and environmental degradation as the limited resources available are over-exploited.

### Who Are the Rajasthani Pastoralists?

Breeders and herders of livestock who depend largely upon natural pasture for nourishing their animals can be labeled "pastoralists." In Rajasthan, as in most of India, such pastoralists are integrated into a wider, complex society, are part of an elaborate division of labour, are subject and have been subject to state authority for many centuries. As primary producers living by consuming part of what they produce and exchanging another part, and with the remainder going to agents of the State, Rajasthani livestock breeders and herders can be labeled "peasants," and thus "peasant pastoralists."

The peasant pastoralists of Rajasthan are based in villages, and share the villages and village lands with agriculturalists and with craft and service specialists. Unlike the tribally organized pastoralists of Africa and the Middle East, those in Rajasthan have no "territory" of their own, no region over which they have primary claim or control. Unlike the market oriented ranchers of the North American West and Latin America, the pastoralists of Rajasthan do not own large areas of pasture land upon which their livestock can graze uncontested. The social, occupational, and productive environment of specialist pastoralists is thus a mixed one, with multiple distinct and sometimes conflicting claims upon local resources; agricultural production, craft activities, pastoral exploitation, and general household maintenance co-exist in close proximity.

Occupational specialization in pastoralism is neither compulsory by inheritance or group membership, nor is it a matter of absolute commitment and orientation, but rather of degree of commitment to livestock and

relative emphasis upon pastoral production. The fifty million livestock<sup>2</sup> in Rajasthan are spread widely if unevenly among the five million rural families. The pastoralists of Rajasthan, those whose primary occupation is breeding and herding livestock, are a small portion of the population. In the village of Gongani in Jodhpur District, the pastoral specialists comprised less than 50 families in a total population of 600 families. In Kaparada village of Jodhpur District, there were 27 families of pastoral specialists out of a total of 540 households. In Magera-Kalan, also in Jodhpur District, 30 of 395 families were pastoral specialists. The magnitude of pastoral specialization illustrated by these cases is supported by a systematic survey of 60 villages in the Upper Luni Basin, including portions of five districts in western Rajasthan, which shows that 4% of the households had animal husbandry as the primary occupation, and that 8% of all workers were in livestock rearing (Bharara et al 1985: 5 and Table 3). However, it is equally noteworthy that 48% of the households claim animal husbandry as their subsidiary occupation (Bharara et al 1985: 5, Table 3).

While occupation is not compulsory, and while the raising of livestock is widespread, there are groups, castes, which traditionally specialize in pastoralism. The Reika (also known as Rubari or Rabari) and Sindhi-Muslim castes continue to be heavily committed (in a statistical sense) to pastoralism. These specialist castes make up a small portion of the total population, just 8% in the Upper Luni Basin (Bharara et al 1985:3, Table 1), while owning 47% of the livestock, an average holding of 87 animals per household (Bharara et al 1985: 10, Table 8). And there are, among the (statistically and politically) dominant, traditionally agricultural castes, the Rajputs, Jats, and Bishnoi, families specializing in livestock production, as well as the large number raising livestock as a subsidiary occupation. (Cp. Sopher 1975: 194-204.) In Gongani village, Reika and Jat pastoralists cooperate in various pastoral activities, such as shearing sheep, and in Barmer District, Rajput and other herders combine with Reika to form migratory groups.

In sum, the peasant pastoralists of Rajasthan make up something less than 5% of the village population, are in large portion members of traditional herding castes, and own about 50% of the livestock.

#### How Are the Livestock Supported?

Livestock are grazed on village pasture and harvested fields, and on fallow land and waste land, and they are grazed on pasture and fields, fallow and waste, away from their home area. Few pastoralists own much land, and of that which is owned, as much as possible is cultivated with subsistence crops, especially cereals, such as millet, and pulses. Reika from the Jodhpur District villages of Gongani, Kaparada, and Magera-Kalan own small patches of land for cultivation, and depend upon permission from members of agricultural castes for access to grazing land, although a few individuals are beginning to purchase pasture land. In the Luni Basin, livestock specialists hold on average 3 hectares of land, about half of that held by agriculturalists (Bharara et al 1985: 7, Table 5). The practice of grazing on harvested fields is well established, because of the soil enrichment benefits from the animal droppings, and there is a standard payment to the herd or flock owner for quartering animals on a harvested field.

Most indicative of the pasture and water available in the home villages of western Rajasthan is the fact that the livestock owners dare not keep their animals at the home village year 'round lest they expire from thirst and starvation. For the greater part of the year, the animals are taken away, far away, often to other states, in search of pasture and water. Even if one does not wish to designate these peasant pastoralists "nomads," it is difficult to deny them the label "migratory." The most general pattern is to return to the village after the rains begin in July and August, to stay in the village and send the animals out day by day, until October, when the migration takes the herders and the herd away once again. On this schedule, it is four months in the village and home area, eight months on migration. And what happens if the rains do not come in July and August? The herders and herd do not return to the village, but continue on a migratory loop in those more rain rich regions where they can find pasturage and water. The converse also holds: if there are very good rains in Rajasthan, and the landscape turns green with grass for grazing and bushes for browsing, and the rivers and pools and tanks overflow with fresh water, the pastoralists and their herds and flocks will stay the year 'round in their home villages. Unfortunately, this idyllic, verdant scene seldom appears, for the average rainfall of Jodhpur District is a bit less than 32 cms., with a cline from 40 cms. in the southeast of the District to 20 cms. in the northwest, a further decline in Jaisalmir District to the west, and a similar situation in Barmer District to the southwest. Most years, too little rain generates too little pasturage on the available pasture land and too little available fresh water, and so the migration year is the typical and usual one. Even in the somewhat moister Luni Basin, around 40 cms., in the 22 years between 1958 and 1980, drought induced migration took place during 12 years, and one additional year people migrated because of floods, for a total of 13 migration years against 9 non-migration years (Bharara et al 1985: 11, Table 10).

The spatial dimension of migration varies from region to region, with relative distance and potential benefit influencing traditional trajectories and alternative strategies. The Sindhi-Muslims of Bhap in northern Jodhpur District truck their sheep and goats to the Punjab. The sheep and goat herding Reika of Barmer District migrate south to northern Gujarat, or, if necessary, farther south in Gujarat, or southeast to Madhya Pradesh and even Maharashtra. The cattle herders of Barmer also head south to Gujarat, usually pushing down toward the south of the state. The Reika sheep and goat herders of Gongani in Jodhpur District migrate east, via Jaipur, into Uttar Pradesh, to the Yamuna River. The Reika of Kaparada in Jodhpur District also head east, but on a more southerly route, through Kota, into Uttar Pradesh to Kanpur and the Ganga River, follow the river north through Agra and then swing back west through Jaipur. Whether to the south, east, or north, all of these herders migrate out of Rajasthan, usually on circuits of considerably more than a thousand kilometers, to the moister climes of Gujarat, Madhya Pradesh, Uttar Pradesh, and Punjab.

Adaptational strategies and production systems are of course species variable, and this is seen in the sedentary or restricted migration of some herds. Buffalo, small in numbers in western Rajasthan, are not great travellers, and are usually maintained on fodder crops and gathered fodder. Camels, more content in the Thar Desert, needing less water and making do with desertic vegetation, more often than not remain in the villages, as in the case of the Reika herd in Magera-Kalan (except for those burden camels accompanying the sheep and goat flocks), or will be taken on short

migrations to southern districts of Rajasthan, as in the case of the Bishnoi camel herder of Dalana in northern Jodhpur District who migrates south to Pali and Sirohi Districts from December through June, finding desirable pasture on the higher ground.

### How Do Rajasthani Pastoralists Make a Living?

Most of the people keeping livestock as a subsidiary occupation draw upon their animals primarily for subsistence purposes; animal products, such as milk, ghee, wool, and hair, which are directly consumed, and others, such as manure, and animal services, as in traction used for agricultural production and transportation, are mainstays of village life. Each villager benefits from having a few animals to supply the family's needs.

The specialized pastoralists too draw on their animals for subsistence purposes, but are also deeply enmeshed in market transactions, and depend upon the income from exchange to provide essential agricultural products and other necessities. The main income from camel herding is male camels for traction; camel herds of about 100, such as those belonging to the Magera-Kalan Reika and to the Dalana Bishnoi, produce for sale from 10 to 15 two year old males each year, at 4000 rupees each, a total income of 40,000 to 60,000 rupees a year. Camel milk is not processed, but rather drunk raw in the household. Wool and hair from camels are processed into rugs and travel and storage bags, for use by family members. Income from sheep is mainly from four products: rams, wool, ghee, and dung. A flock of 100 sheep will produce 20 to 25 rams a year, sold young for 150 rupees each or in their third year for 300 rupees each, an income of 3000 to 7500 rupees. Each year each sheep produces around 2 kgs. of washed wool, which sells for 18 rupees a kg., an income of 3600 rupees for a flock of 100. Ghee is processed from milk and sold, especially during the green pasture season in July and August, payment being around 35 rupees a kg. Dung collected from animal pens in the village is sold to local farmers, usually 1000 rupees for the four months of droppings of a herd. While on migration, stationing the collective flock (several thousand sheep and goats) on agricultural fields brings a customary daily payment of 20 to 30 kgs. of wheat or corn, 1 kg. gur (raw sugar), and 200 grams tea. Milk, 1/2 liter from each goat and 1/4 liter or less from each sheep every milking, is consumed fresh, as curd, and as ghee. Wool and hair are woven into articles for household use. In all, gross income from a flock of 100 sheep is around 10,000 to 15,000 rupees a year, not counting products directly consumed. Cattle produce 4 to 5 liters of milk each milking, and buffalo a bit less; whether the milk is sold fresh or processed into ghee and sold depends upon access to markets, either directly or through dairy procurement networks (including cooling stations). The male offspring are sold as bullocks for traction. Cattle dung is also much in demand, as construction and refinishing material, as fuel, and as fertilizer.

Flock and herd sizes of the pastoral specialists vary considerably from owner to owner. The Muslim small stock breeders of Jod in northern Jodhpur District average between 100 and 200, 90% sheep and 10% goats, although a few have flocks of 300 and one owner's flock is 600. The Muslim sheep breeders of Bhap have 1500 sheep among the 10 families, an average of 150. The Reika of Kaparada have family herds of around 60, ranging

from 30 to 80 for the most part. The Reika of Gongani are somewhat better off, with family herds averaging around 150, including 5% goats. The 30 households of the Magera-Kalan Reika own all together only 300 small stock, about 30% goats, supplemented by a herd of 100 camels. The pastoral specialists of the Upper Luni Basin average 87 livestock per household (Bharara et al 1985: 10, Table 8).

### Is There a Pastoral Crisis?

Rajasthani pastoralists, especially those in the Thar Desert region of western Rajasthan, concur that pasture and water are scarce, that it is difficult to build and maintain herds, that they face resistance from various sources in pursuing their pastoral activities, and that these conditions are worsening. They point out that in previous generations family herds were much larger, from 400 to 600 small stock. Furthermore, they continue, previously pasture was more readily available, both in the home area and on migration. And they point to the opposition from agriculturalists and from the Forest Department to the movement and grazing of flocks. Confrontations have increased, and conflicts become more frequent. In the home village area, the pastoralists often have no land of their own, and must rely on permission from others to graze their animals. Access to water is also a problem. The Gongani Reika must take their animals 16 kms. for water. In Jod, the water is so saline that drinking water is trucked in; the animals do not have access to fresh water.

On migration, the pastoralists are often confronted with solid agricultural fields, with no way through, never mind available pasturage for their animals. Some groups are putting off migration until after the harvest, so that passage of the flocks is less problematical. Even so, the opposition from local peoples, on the migration route, many of whom have their own livestock, is great.<sup>3</sup> Three years ago the migratory group of the Kaparada Reika ran into trouble when their animals were grazed on a harvested field without the owner's permission. This led to a stick fight with local villagers, which escalated into conflict with firearms, leading to the death of six Reika and two villagers. Now the migratory groups, dhung, are formed in larger and larger size, to intimidate local people into giving access to pasture, and to protect the livestock and the herders in case of extortionate demands or direct attack by villagers on the migration route.

The dhung that the Kaparada Reika form (along with pastoralists from other villages) consists of 25 family flocks, around 2000 animals, accompanied by 200 to 250 men. (In this group, some women also migrate, at least one with each family flock, some 25 women in all.) The Gongani Reika join an even larger dhung (also: dhunga), consisting of 50 families and up to 10,000 sheep. These large dhung divide into smaller joint flocks of 500 head, each going its own way during the day and returning to join the others at night. The scarcity of pasture had made the annual migration a risky enterprise, with each passage and each grazing area a source of potential conflict.<sup>4</sup>

Some of the pastoral specialists, especially those without land who depend entirely upon their livestock for their economic well being, are saying that pastoralism is no longer a good way to make a living, that conditions have gotten worse and worse, and that there seem to be no prospects for

improvement. Now, they say, it is better to turn to agriculture, or to education and jobs, for there is no future for pastoralists.

### What Are the Causes of the Pastoral Crisis?

In many pastoral areas, the spiraling crisis of loss of range, increased livestock density, overgrazing, and deterioration of range, has been brought about largely through political processes, primarily the expropriation of pastoral territory by governments, directly through administrative mechanisms, or indirectly, by tacit agreement with non-pastoral groups. The British colonial authorities expropriated Maasai land for colonial agriculturalists, the Kenyan government expropriated Maasai land for vast game reserves, and the authorities look on without concern as waves of Kikuyu cultivators encroach on Maasai territory. The Bedouin of the Negev Desert lost almost all of their pastoral territories to the Israeli military, which expropriated huge tracts for army and air force bases. However, such loss of pasture areas to political expropriation has not been a major factor in the squeeze on Rajasthani pastoralists, the military bases on the India/Pakistan border notwithstanding. The peasant pastoralists of Rajasthan controlled no "territory," and no political forces exclude them from pasture land. (Cp. George 1985:278-281.)

Another important political source of pastoral squeeze is the closing of borders, cutting off pastoralists from wet season or dry season pastures, or from reserve areas important during periods of drought or flood. The closing of the Iran/USSR border thus increased the precariousness of the Turkmen pastoralists. This factor is also of importance in Rajasthan, for the closing of the India/Pakistan border cut off access to the water rich Sind and Punjab, leaving pastoralists of the Great Thar Desert, of Barmer and Jaisalmer Districts, without traditional dry season pastures, forcing them to turn in other directions and take up migrations of much greater distance.

However, the most important factors by far in the squeeze on Rajasthani pastoralism are demographic ones: the increase in human and animal population and density, and the increase in agricultural cultivation. Let us briefly examine each of these elements.

The human population of Rajasthan increased 33% between 1971 and 1981, and this is a continuation of an ongoing expansion (Tables I to III). The desert Districts of Barmer, Jodhpur, and Jaisalmer increased in population over the last decade 44%, 45% and 45% respectively. Taking a longer view, in Jodhpur District, the population increased fourfold between 1901 and 1981, from 400,000 to 1,700,000. The overall population density in Rajasthan is 100 persons per square kilometer, Jodhpur District having a density of 73 persons per sq. km. The rural population density of Jodhpur District jumped from 34 per sq. km. in 1971 to 48 per sq. km. in 1981.

Table I. DECADAL VARIATION IN TOTAL POPULATION OF RAJASTHAN AND THREE WESTERN DESERT DISTRICTS\*

<u>Rajasthan</u>						
Year	Persons	Percentage decade variation	<u>Jaisalmer</u>	<u>Jodhpur</u>	<u>Barmer</u>	
1901	10,294,090	-	75,551	424,461	313,102	-
1911	10,983,509	+ 6.70	87,162	434,954	299,518	- 4.34
1921	10,292,648	- 6.29	69,224	382,545	281,438	- 6.04
1931	11,747,974	+ 14.14	78,646	443,654	308,264	- 9.53
1941	13,863,859	+ 18.01	96,958	558,389	394,529	+27.98
1951	15,970,774	+ 15.20	109,658	672,109	477,282	+20.98
1961	20,155,602	+ 26.20	141,242	884,759	649,794	+36.14
1971	25,765,806	+ 27.83	167,824	1,151,649	774,805	+19.24
1981	34,261,862	+ 32.97	243,082	1,667,791	1,118,892	+44.41

\* Adapted from CENSUS OF INDIA 1981, Series 18, RAJASTHAN, Part II-A, General Population

Tables, Jaipur, 1983, pp. 166, 168.



Table II. DECADAL VARIATION IN RURAL POPULATION  
OF RAJASTHAN AND THREE WESTERN DESERT DISTRICTS\*

State/District	1981	1971	1961	1951	1941	1931	1921	1911	1901
RAJASTHAN - - -	27,051,354	21,222,045	16,874,124	13,015,499	11,746,758	10,018,769	8,817,313	9,507,680	8,743,434
Jaisalmer - - - -	210,155	143,477	127,596	96,515	85,290	67,010	59,956	73,928	61,289
Jodhpur - - - -	1,087,946	783,411	619,549	448,839	390,050	313,513	278,743	320,397	310,620
Barmer - - - -	1,020,663	718,580	610,084	444,515	327,535	292,009	267,476	285,572	298,720

\* Adapted from CENSUS OF INDIA 1981, Series 18, RAJASTHAN, Part II-A, General Population Tables, Jaipur, 1983, p. 90.

Table III. PERCENTAGE OF POPULATION INCREASE BY STATE IN 1961-71 AND 1971-81\*

	1961-71	1971-81
Gujarat	29.3	27.21
Maharashtra	27.3	24.36
Madhya Pradesh	28.7	25.15
Karnataka	24.1	26.43
*Rajasthan	rank no. 3 27.6	rank no. 1 32.36
Orissa	25.0	19.72
Uttar Pradesh	19.8	25.49
Punjab	21.0	23.01
Bihar	21.2	23.90
Andhra Pradesh	20.6	22.76
Tamil Nadu	22.0	17.23

\* Adapted from INDIA's CHANGING RURAL SCENE 1963-1979, Gilbert Etienne, Delhi: O.U.P., 1982, p. 147.

A similar pattern is found with the livestock population. In Rajasthan as a whole, the livestock population (mixed species) rose from 34 million in 1957 to almost 50 million in 1983, and there was an increase in livestock density from 99 per sq. km. to 145 per sq. km. In the desert districts, where sheep and goats predominate (over 70% of the total), the livestock numbers just about doubled between 1956 and 1983, from 800,000 to 1,500,000 in Jaisalmir, from 1,600,000 to 3,000,000 in Barmer, and from 1,500,000 to 3,500,000 in Jodhpur. Livestock density approaches 150 per sq. km. In the Luni Basin,

Increase in the livestock population has led to the overstocking of permanent pastures and other grazing lands in the Basin. Density of adult cattle units per 100 ha of permanent pastures and other grazing lands was, on an average, 1,297, whereas per 100 ha of total cultivated area and net sown area was 133 and 146, respectively. Density of the livestock was high as compared to an optimum desirable pressure of 20 adult cattle units under existing conditions. (Bharara et al 1985: 11)

As regards land use, the area sown in Rajasthan as a whole increased from 32% in 1954 to 44% in 1981, as did the protected forest land, up from 4% to 6%, while fallow land decreased from 18% to 9%. In Jodhpur District, the net area sown in 1981 was 50%, and Barmer District was likewise. In the surveyed villages of the Luni Basin, the sown area was 49%, with permanent pastures and grazing lands 7% of the total and other uncultivated land 28% (Bharara et al 1985: 7, Table 4).

In sum, the human population of Rajasthan has increased greatly, and even more so in the desert districts. Concomitantly, the agricultural area sown has increased substantially (assisted by improved technology), as has the protected forest land, and the uncultivated land available for grazing has diminished appreciably. Livestock numbers have also increased greatly. The result is much higher livestock density on the land, and a decrease of pasture and water available per animal, and an inevitable decline in the condition of the livestock and a degradation of the pasture.<sup>5</sup>

### Is the Crisis in Pastoralism an Unalloyed Misfortune?

Crises might undermine current patterns and bring misfortune in the present, but they also provide stimulus to innovation and development. A squeeze on resources and pressure on current practice can lead to intensification of production and the replacement of land extensive activities, such as pastoralism, by land intensive activities, such as fodder based livestock production.

In Rajasthan, some modest movement in the direction of intensification has taken place. The husbanding of fodder trees, such as the khejri (*Prosopis spicigera* and *Prosopis juliflora*) and the ber (*Zizyphus jujuba*), has increased and the trees have become an important source of sustenance for livestock, especially during drought periods. Similarly, fodder crops, such as jowar (sorghum), play a modest but significant part in maintaining livestock.

Unfortunately, the resources needed for agricultural intensification, especially water, are not available in Rajasthan, even less in the Thar Desert, the Indira Gandhi (Rajasthan) Canal notwithstanding. At the current levels of intensity of land use, the water table is dropping, salination is increasing, and the prospects for substantial increases in water for agricultural use are not good. Much of the canal water will go for direct household consumption, for drinking and similar purposes. And in any scheme of priorities, how much of agricultural potential can be devoted to fodder rather than food crops?

The livestock industry of Rajasthan, so dependent upon pastoral exploitation, so important in the subsistence of specialists and subsidiary husbanders alike, is currently undergoing a phase of severe involution, a downward spiral reflected in the declining resources and declining productivity. Alternatives, other than limited, stop gap measures, are not apparent. The squeeze is on.

### Notes

1. The fact that there are 50 million livestock and 34 million people is a rough indication of the magnitude of the industry. Rajasthan ranks first among all Indian States in number of sheep and goats, and ranks fifth in number of cattle. With 25% of India's sheep, it provides over 40% of the wool produced in India, with an annual value of over 18 million rupees. Rajasthan is second in rank (to Uttar Pradesh) in milk

production, with with 12% of the all India production, an annual value of over 500 million rupees. (These figures are based upon the STATISTICAL ABSTRACT OF INDIA 1980, New Series No. 25, Government of India, New Delhi, 1982, Table 21 on livestock numbers, Table 23 on milk production, and table 24 on raw wool production, and the NATIONAL ACCOUNTS STATISTICS 1970-71--79-80, Government of India, New Delhi, 1982, Statement 36.2 on the value of livestock output.)

2. The species breakdown figures for all Rajasthan (1983) are buffalo 12%, cattle 27%, goats 30%, sheep 27%, and camels 1 1/2%. In the desert of western Rajasthan, there are fewer cattle, many fewer buffalo, more sheep and goats, and more camels. For example, in Jodhpur District, the breakdown (for 1977) is buffalo 3%, cattle 22%, goats 31%, sheep 42%, camels 2 1/2%, and the profile is comparable in cattle/small stock ratio for Barmer and Jaisalmir Districts; however, Barmer, being hillier, has more goats than sheep, and Jaisalmir, being flatter and sandier, has twice as many sheep as goats, and both have many fewer buffalo.
3. According to A.B. Bose (1975: 10), ". . . the settled population now does not react favorably to the visit of pastoral nomads through their villages. A recent study of the relationship between the nomadic and settled population in the Luni Basin reported that about nine-tenths of the sampled respondents do not want the pastoral nomads to visit their villages as the local water and grazing resources get exhausted thus imposing hardships on the livestock of the settled population. Also, standing crops are sometimes destroyed and the village livestock are exposed to diseases carried by the livestock of the breeders. Folding of livestock of breeders on the cultivated lands is now regarded by the villages as the benefit of a few at the cost of many. . . ." CAZRI (1985: 140) reports that "(s)hrinkage of grazing lands in same area due to extension of cultivation has created difficulties for cattle breeder nomads. . . . The sedentary population in general do not welcome the nomads to visit their area. The feelings run strongest against the visit of Raikas, Sindhi cattle breeders, . . ."
4. Among the pastoralists of the Upper Luni Basin, "(t)he routes followed by the forefathers were still being followed though they express increase in difficulties" (Bharara et al 1985: 12, emphasis added).
5. As Bose (1975: 9-10) puts it: "the extent of the area available for grazing has gone down tremendously with the extension of area under cultivation. This increasingly unfavourable grazing land to livestock ratio has disturbed the balance and breeders find it difficult to raise large herds. Their earnings have gone down and the quality of their livestock has deteriorated." The statistics for the decade since Bose wrote, and his reference was based upon research done a decade earlier yet, indicate substantial worsening of the grazing land/livestock ratio and increase of the pressures on the pastoralists.

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Philip Carl Salzman  
Department of Anthropology  
McGill University  
855 Sherbrooke Street West  
Montreal, Quebec  
Canada H3A 2T7