

Note

Bangladesh Development Studies
Vol. XLIII, March-June 2020, Nos. 1&2

Cattle Population in India: Do Institutions Matter?

KAZI IQBAL*
KAZI ALI TOUFIQUE**
MD. WAHID FERDOUS IBON***

We use Indian livestock census data to show that states with more stringent slaughter laws perform better in terms of cattle population growth than states where slaughter acts are more enabling. We also show that the growth in cattle population is caused by an increase in female crossbred cattle and more so in the states where slaughter rules are very restrictive. Despite a complete ban on cow slaughter in some states, they do not show any balance between male and female cows. These results are non-intuitive and have strong political and policy implications but require further investigation.

Keywords: Cattle Population, Institutions, India

JEL Classification: E02, O13, O43

I. INTRODUCTION

Cows in India continue to have an enigmatic existence despite that India has the largest cattle and buffalo population in the world, and it is the largest exporter of milk (Teltumbde 2015). The debate on cows exploded to many dimensions involving issues like whether beef consumption was actually forbidden in the Hindu religion (Jha 2009), or whether India had too many of them (Ford Foundation 1959, Raj 1967). Very recently, an interesting debate over the profitability of raising livestock in India appeared in the pages of *Economic Development and Cultural Change*, EDCC (Anagol *et al.* 2017, Attanasio and Augsburg 2018, and Gehrke and Grimm 2018). The "puzzle" originated from the findings, based on the household surveys in Uttar Pradesh and Andhra Pradesh, that a very large proportion of Indian cattle had negative returns. To be exact, 51

* Bangladesh Institute of Development Studies, Bangladesh.

** Bangladesh Institute of Development Studies, Bangladesh.

*** Department of Economics, University of Dhaka, Bangladesh.

per cent of the households in the study area in Uttar Pradesh had negative returns!¹ These finding questions the fundamental rationality assumption of economics: an activity generating negative returns should not exist! A similar debate over returns from dairy production in four regions in India (Bihar, West Bengal, Uttar Pradesh, and Delhi) appeared recently in the pages of *Economic and Political Weekly* of India (Ghosh et al. 2017 and Kumar and Singh 2017). Ghosh *et al.* (2017) found milk production “not always profitable.”

Unfortunately, most of these debates are carried out almost in an institutional vacuum or are “non-embedded” - without considering the state rules and social norms adopted by different Indian states that may have impacted returns from cattle farming. In the absence of any constitutional rule on cow slaughter, different states in India put different restrictions on slaughtering based on Article 48 of the Indian constitution. Garg (2017) has clearly argued how scientifically formulated Article 48 provided religious fervour to these formal rules of the state. Besides, informal institutions (*Gao Rakshak* or *Gao Shala* and the like) and social and political histories of individual states play a strong role, which is likely to have strong implications on investment in cattle. The role of state rules and informal institutions in livestock development, as they relate to various aspects of cow slaughter, has not been adequately studied in Indian development literature, although their political and distributional fallouts are widely and justifiably discussed in Indian media. In this context, we raise three interrelated questions:

- i. *Do slaughter bans and related restrictions hinder the growth of the Indian cattle population?*
- ii. *Does a strong slaughter ban change the sex ratio in the cattle population?*
- iii. *Does a strict ban on slaughter result in a higher proportion of stray cattle?*

This paper attempts to shed light on these three questions taking into account various restrictions on cow slaughter that are in place in Indian states. We have divided the Indian states into three types based on the degree of restrictions on cow slaughtering: We have classified the states into those where slaughtering is completely banned, those where it is partially banned and those where there are no restrictions on slaughtering (Table I). We will mainly use livestock censuses of India for the years 2003 and 2012, i.e., a period stretching over 10 years. We have chosen these years because (i) 2012 is the latest livestock census year, and (ii) we wanted to look at change over a period of 10 years. We also briefly compared census data of 2007 with 2012, when the cattle population in India actually declined. The cattle population of India increased during the period 2003-2012.

¹ This was based on very conservative assumptions that labour costs nothing and fodder costs are very low (Anagol *et al.* 2017).

We have done this to show that our findings are fairly robust. In fact, we found that the results derived from the analysis of the data for the years 2003 and 2012 carryover also to this period (2007 and 2012). Livestock censuses are often used in India to depict patterns in livestock population growth at the national and regional levels (Rath 2015). In this paper, we put ourselves in uncharted waters.

We have found the livestock population increasing most in the states with a complete restriction on slaughtering and, actually, declining in states with no ban. This increase in cattle population is brought about by the increase in the number of female cattle, particularly in the crossbred type. The male to female sex ratio, as a result, has worsened. Contrary to the common belief, it has worsened more in the states where there is no restriction on cow slaughter. Finally, we have found that the extent of stray cattle is the highest in the states where slaughtering is completely banned.

II. WHY RESTRICTIONS ON SLAUGHTER MAY AFFECT CATTLE POPULATION?

Any popular book on institutional economics would predict cattle population decline in states with a total or partial ban on slaughtering and other stringent restrictions on cattle trading or beef storing/consumption (Acemoglu and Robinson 2013, North 1991). In general, trading of any commodity will be constrained, and its growth hampered if it is subjected to undue restrictions. A good analogy would be to consider the period of Hindu rate of growth when the License Raj reduced Indian annual growth to far less than 2 per cent. However, liberalisation of the Indian economy in the 1990s accelerated growth to 6-9 per cent.

Ramdas (2018, 2017b) has convincingly outlined how slaughter bans and related restrictions may inhibit the growth of livestock in India. Slaughter ban makes replacement of current herd by younger ones extremely difficult and costly. Ramdas (2018) cites a finding of the National Dairy Board of India that upon the seventh lactation, the value of a cow reduces to a third of its value during the first lactation. Without permission to slaughter, the herd gets populated with older cows, and those abandoned join the crowd of stray cattle, increasing the social cost of maintaining them. Inability to sell cattle for slaughter deprives the farmers to part-exchange their older cattle for younger ones. The proceeds from selling older cows could always be used to buy young ones; however, this opportunity is ruled out by the slaughter ban. These factors are likely to limit investment in cattle.

Finally, if there is an effective ban on slaughter, the sex ratio in the cattle population is least likely to be adverse. If the ban is fully enforced, the probability of having a male calf is half and as a consequence male and female populations

should be evenly balanced. On the other hand, in states with no ban on slaughtering, the male to female ratio can be affected by the number of slaughter or illegal exports. Reasons for having stray cattle are obvious and already highlighted by Ramdas (2017a). When cattle cannot be slaughtered, it has no economic value at the time they reach a particular age and some of them eventually get abandoned by the owners and the costs of caring for them are borne by society. All these effects are summarised by Subrahmanian (2018: 242) in the context of the recent beef ban in India: “In simpler terms, reducing the terminal values of livestock as assets means that bans on internal trading and exports of livestock would reduce the income from such activity, not only directly but also indirectly, because additional costs would have to be incurred from having to maintain unproductive livestock. They could also affect social returns. Stray cattle, and a lot of it, will have to be looked after; otherwise, diseases (foot and mouth) could spread, leading to health hazards. All of this would mean a smaller dairy and livestock sector with serious consequences for livelihoods.”

III. CLASSIFICATION OF STATES

In this paper, we have considered completely banned Indian states as those where cattle slaughtering is banned irrespective of the sex of the cattle - both male and female cattle cannot be slaughtered. On the other hand, partially banned states allow the slaughter of bulls or bullocks upon some conditions that typically involve the use of certificates from competent authorities. For example, in Andhra Pradesh, a "fit-for-slaughter" certificate certifies that the bull or bullock is not economic or is not likely to become economical for the purpose of breeding, draught, or agricultural operations. States with slaughter bans usually have other stricter restrictions on transporting cattle, beef storing/consumption, etc. and higher penalties for breaking the rules.² Gujarat, for example, now has the strictest penalty of 7 to life-term prison for cow slaughter. In some states, the offence is cognisable, and in some states, it is non-bailable. For cognisable offences, the police can arrest any person without a warrant. Arrest for a non-cognisable offence requires a warrant.

² We have collected information on slaughter acts mainly from the following sources: Cow Slaughter Prevention Laws in India (<https://cjp.org.in/cow-slaughter-prevention-laws-in-india/>), Cattle Slaughter In India (https://www.reddit.com/r/MapPorn/comments/6n7b2e/cattle_slaughter_in_india_2500_x_2917/), States Where Cow Slaughter is Banned So Far, and States Where it Isn't (<https://www.news18.com/news/india/states-where-cow-slaughter-is-banned-so-far-and-states-where-it-isnt-1413425.html>) and Cattle slaughter in India (https://en.wikipedia.org/wiki/Cattle_slaughter_in_India). We also looked into the state Acts when required and available online.

TABLE I
SLAUGHTER STATUS BY STATES

Complete-ban (12 states)	Partial-ban (13 states)	No-ban (10 states)
Chandigarh (33)	Andaman & Nicobar Islands (30)	Arunachal Pradesh (23)
Chhattisgarh (10)	Andhra Pradesh (11)	Kerala (20)
Delhi (27)	Assam (8)	Lakshadweep (34)
Gujarat (9)	Bihar (6)	Manipur (24)
Haryana (19)	Dadra & Nagar Haveli (31)	Meghalaya (22)
Himachal Pradesh (17)	Daman & Diu (35)	Mizoram (32)
Jammu & Kashmir (15)	Goa (29)	Nagaland (25)
Madhya Pradesh (1)	Jharkhand (14)	Sikkim (26)
Punjab (16)	Karnataka (12)	Tripura (21)
Rajasthan (5)	Maharashtra (4)	West Bengal (3)
Uttar Pradesh (2)	Odisha (7)	
Uttarakhand (18)	Puducherry (28)	
	Tamil Nadu (13)	

Note: Number in parentheses represent rank in terms of cattle population in 2012.

IV. THE STYLISED FACTS

We mainly look at the cattle population and its composition in terms of gender and type (indigenous and crossbred) to derive some stylised facts.

(i) Livestock population in India has increased most in the states with a complete ban on cow slaughtering and declined most in the states where there is no ban.

Table II shows the distribution of the Indian cattle population by slaughter status. Most Indian cattle can be found in the limited-ban states. However, there is a slight decline in the proportion of cattle in the limited-ban states, from 46 per cent in 2003 to 45 per cent in 2012. There is also a proportionate decline in cattle population in no-ban states, from 13 per cent in 2003 to 11 per cent in 2012. There is a proportionate increase in cattle population in complete-ban states (from 41 per cent to 44 per cent). In the aggregate, 87 per cent of Indian cattle recorded in the states where there are restrictions on slaughter (complete or limited) in 2003. It increased to 89 per cent in 2012. It has happened due to the growth of the cattle population in these states.

TABLE II
DISTRIBUTION OF INDIAN CATTLE POPULATION BY SLAUGHTER STATUS, 2003 AND 2012 (% OF TOTAL CATTLE)

	2003	2012
Complete-ban	41.0	44.0
Limited-ban	46.0	45.0
No-ban	13.0	11.0

Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2005, 2014).

The total livestock population in India has increased by 3 per cent between the census years 2003 and 2012 (Table III). The highest growth of 10.2 per cent recorded in the states where cow slaughter is completely banned. A massive drop of 13.6 per cent in the cattle population took place in the states where there is no ban on slaughtering. The cattle population in the limited-ban states has, however, increased modestly by 1.4 per cent.

TABLE III
PERCENTAGE CHANGE IN CATTLE POPULATION 2003-2012

	Total Cattle	Cattle (Male)	Cattle (Female)
Complete ban	10.2	-17.3	31.8
Limited Ban	1.4	-14.5	15.1
No Ban	-13.6	-31.7	-1.4
All India	3.0	-17.6	19.7

Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2005, 2014).

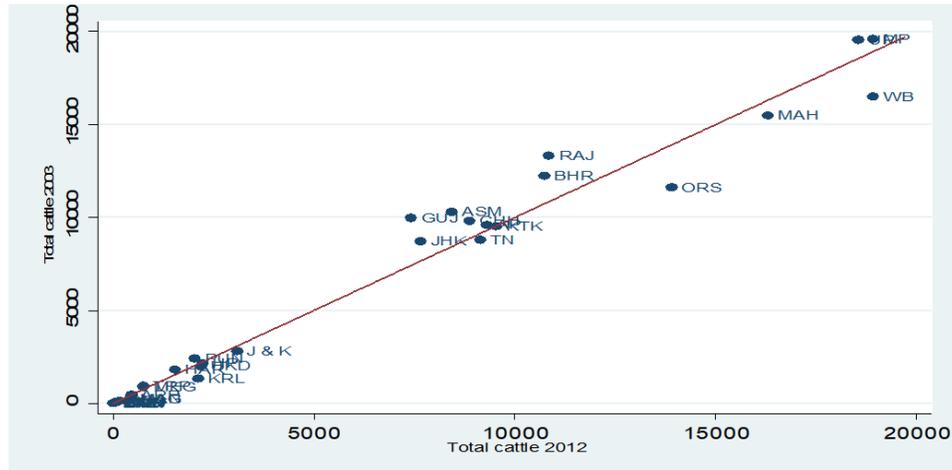
In the complete-ban states, Chandigarh recorded the highest growth in livestock (49.4 per cent),³ followed by Gujarat (34.5 per cent) and Rajasthan (22.8 per cent). In the limited-ban states, Assam recorded the highest growth in livestock population (22.1 per cent). Tripura witnessed the highest growth among the no-ban states (25 per cent), followed by Meghalaya (16.8 per cent). Only three out of 10 no-ban states witnessed positive growth in livestock population (Arunachal Pradesh, Meghalaya, and Tripura). Kerala and Manipur witnessed the highest decline in cattle population (about -37 per cent). The negative growth states in the complete-ban category are Delhi, Himachal Pradesh, Jammu and Kashmir, and Uttarakhand.

Figure 1 shows the cattle population in 2012 on the vertical axis and 2003 on the horizontal axis. The straight line represents a 45-degree line. By construction, states above the 45-degree line witnessed a positive growth rate in cattle population, and those below the 45-degree line witnessed a negative growth rate between the census years. We notice a large concentration of states (and Union Territories) with very low cattle populations. Change in cattle population in these states individually hardly has any impact at the aggregated level. We also notice four states occupying top positions, Madhya Pradesh, Uttar Pradesh (both complete-ban states), West Bengal (no-ban) and Maharashtra (limited-ban). Changes in cattle population in these states have a significant impact on the total cattle population of India. There are several states that are clustered at an average level of cattle population. These include Gujarat, Orissa, Bihar, Rajasthan, etc.

³ Chandigarh has a very low cattle population base. It ranked 33 in terms of total cattle population in 2012 (see Table I).

Three states with large cattle populations performed very poorly: West Bengal (no-ban), Maharashtra (limited-ban), and Odisha (limited-ban). On the other hand, some states with very large cattle populations, such as Uttar Pradesh and Madhya Pradesh, had an increase in cattle population.

Figure 1: Change in Cattle Population in Indian States (2003-2012)



Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2005, 2014).

Thus, from the perspective of growth in cattle population over a period of 10 years, the ban on slaughter per se appears to have no negative impact. The cattle population has increased most in states where institutional constraints are most unconducive to livestock rearing and exchange and in states where heavy penalties for breaking slaughter rules. However, the growth of the cattle population depends on many factors, including the availability of grazing grounds, state policy towards livestock development, quality of veterinary services, investment in milk collection and, above all, political, cultural and economic history of the respective states. Cattle population growth may also depend on demand-side factors, such as consumer preferences for milk and milk products, size of populations, and urbanisation. The formal restrictions on slaughter could have also weakened due to the development of alternative mechanisms for disposing of cattle in illegal slaughterhouses, neighbouring states (transport of the cattle from Andhra Pradesh to Kerala, for example) or countries (from West Bengal and Orissa to Bangladesh, for example). Still, the extent of these activities is not reliably known. A more robust conclusion can be derived by controlling for these factors as much as possible, which is beyond the scope of this paper.

(ii) Livestock population has increased mainly due to increase in the number of female cattle

In all the regions and irrespective of slaughter status, the male cattle population had declined (Table IV). In India, the male cattle population has declined by 18 per cent during this period. The extent of the decline is the highest in no-ban states (-31.7 per cent). On the other hand, the female cattle population has increased in all the regions except in the no-ban states, where it actually declined slightly by -1.4 per cent. The increase in female cattle population is the highest in complete-ban states (31.9 per cent). Thus, the growth in the Indian cattle population is caused by the growth of the female cattle population, and it happened most in those states where slaughtering is completely banned.

TABLE IV
CHANGES IN CATTLE BREEDS (% CHANGE BETWEEN 2003 AND 2012)

	Crossbred Female	Indigenous Female	Crossbred Male	Indigenous Male	Female	Male
Complete ban	104.6	20.1	26.1	-19.7	31.9	-17.2
Limited Ban	63.5	-0.03	8.5	-16.2	15.2	-14.6
No Ban	30.6	-9.2	65.7	-36.9	-1.4	-31.7
All India	71.0	7.5	20.6	-20.1	19.8	-17.7

Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2005, 2014).

The number of cross-bred female cattle increased everywhere. In the states where slaughtering is completely banned, the cross-bred female cattle population increased by 105 per cent. Indigenous female cattle increased slightly (7.5 per cent) nationally, but the highest increase was recorded in the complete-ban states (20.1 per cent). Indigenous female cattle declined in no-ban states (-9.2 per cent), whereas indigenous male cattle declined everywhere, with the highest decline in no-ban states (-36.9 per cent). Indigenous male cattle declined by one-fifth between the survey years. It is interesting to observe that the highest growth of crossbred male (66 per cent) cattle happened in the no-ban states. This likely reflects the demand for cross-bred male cattle for slaughter, either inside India or for exports to neighbouring Bangladesh. Thus, there is a female cattle-led “crossbredization” of the cattle population of India, which has taken place conspicuously in the states with a complete ban on slaughter. Thus, existing rules on cow slaughter in complete-ban states are not disincentivising the households to purchase cows, particularly crossbred types. The finding of widespread negative returns from livestock rearing in the studies mentioned at the beginning of this paper is also inconsistent with these findings. It is difficult to explain the growth of the cattle population in a situation of widespread negative returns.

The cross-bred female population increased more than twice in Gujarat (233 per cent) and almost twice in Madhya Pradesh (191 per cent). It also increased by a significant percentage in Bihar (183 per cent) and West Bengal (153 per cent).

Growth in crossbred female cattle population has strong implications. Gehrke and Grimm (2018) have found returns from crossbred cattle in Andhra Pradesh positive and higher than the returns from indigenous cattle. Similar results are also found for the crossbred cattle transferred to the extremely poor households under the Char Livelihoods Programme or CLP in Bangladesh (Gisby 2010). As discussed by Gehrke and Grimm (2018) and Anagol *et al.* (2017), the puzzle over negative returns will become irrelevant if the current trend of increase in crossbred cattle continues.⁴

With the increase in the numbers of female cattle, the sex ratio (number of males to female cattle) has become more adverse in India.

TABLE V

MALE TO FEMALE RATIO (MALE AS PERCENTAGE OF FEMALE CATTLE)

	2003 (%)	2012 (%)
Complete ban	78.0	49.0
Limited Ban	86.0	64.0
No Ban	67.0	47.0
All India	80.0	55.0

Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2005, GoI 2014).

In India, there were 80 male cattle corresponding to 100 female cattle in 2003. It dropped to 55 in 2012. The adverse male ratio was the worst in limited-ban states (67 male per 100 female) in 2003, where it further worsened in 2012 (47 male per 100 female). In complete-ban states, the sex ratio declined from 78 to 49. One would expect a more balanced cattle population (in terms of sex composition) in these states because of the restrictions on cattle slaughter. However, this does not seem to be the case. In Bangladesh, with no ban on cattle slaughter whatsoever, the sex ratio continues to be fairly balanced between 2011 and 2015. Livestock

⁴ Female crossbred cattle increased by 151 per cent in Uttar Pradesh (studied by Anagol *et al.* 2017) and by 138 per cent in Andhra Pradesh (studied by Gehrke and Grimm 2018). Though cross-bred cows are profitable, they cost more to buy and rear, and small farmers have been found to continue with the local breed as they cost less and are less expensive to maintain (Shankari 1989).

census data in Bangladesh do not provide information on the sex of cattle. BIHS (Bangladesh Integrated Household Survey) data provided information on the sex of cattle. BIHS is a panel data (2011 and 2015) produced by IFPRI (International Food Policy Research Institute) representing rural Bangladesh. In 2011, there were 92 males per 100 female cows, and in 2015, there were 104 males, which means the male population of cattle has slightly increased during the two-panel years. However, in India, this ratio has been most adverse and continues to be so in the states with no ban on slaughter. It may have happened partly due to the smuggling of cattle to Bangladesh. Cow smuggling to Bangladesh has significantly dropped since the Modi government took over.⁵ A study conducted by the Bangladesh Institute of Development Studies (BIDS) on cattle markets in Dhaka in 2018 found Indian cattle representing less than 1 per cent of the cattle brought for sale.⁶ This slowing down of illegal imports from India led to a growth of commercial farms that raised cattle only for sale during the Holy Eid. The cattle markets included in the survey were officially set up for selling cattle for the Eid festival. It is mainly during this Eid festival as most of the cattle were smuggled in from India. Adverse sex ratio may also be due to slaughtering—male's cattle are usually preferred for slaughter.

(iii) The incidence of stray cattle is the highest in complete-ban states

Livestock census of 2012 provided information on the number of stray cattle. Table VI presents the extent of stray cattle as a percentage of total cattle. The extent of stray cattle is the highest in complete-ban states, 3.7 per cent followed by those in the limited ban states (2.1 per cent). It is the lowest in no-ban states (1.8 per cent). This pattern in the extent of stray cattle is expected because the more restrictive the ban on slaughter is, the higher is the extent of stray cattle. It is interesting to observe some stray cattle in states where there is no ban on slaughter. The extent of stray cattle is very high in Tripura (2.3 per cent) and West Bengal (1.8 per cent).

⁵ See Bengal's cow smuggling business is drying up, Sunday Guardian Live, 11 June 2017, <https://www.sundayguardianlive.com/investigation/9751-bengal-s-cow-smuggling-business-drying>, (last accessed 9 December, 2018).

⁶ No report has been published yet.

TABLE VI
STRAY CATTLE AS A PERCENTAGE OF CATTLE

	2012 (%)
Complete ban	3.7
Limited Ban	2.1
No Ban	1.8
All India	2.7

Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2014).

V. ROBUSTNESS OF THE PATTERN OF GROWTH IN CATTLE POPULATION

The cattle population in India fluctuated from one census year to another during 1992-2012. This fluctuation is determined mainly by the decline in the male cattle population. It happened due to the increased mechanisation of agriculture and improvement in rural transportation in India. The data analysed in this paper so far relates to the period when the cattle population in India increased. It would be important to check if the general pattern found in this paper is already carried over to a period when the cattle population actually declined. For this, we compared cattle population for the period 2007 (18th livestock census) and 2012. During this period cattle population declined by -4.1 per cent (Table VII). The main pattern did not change much. In the same period, the cattle population declined most in the states where there was either no ban on cattle slaughter or only a limited ban. Cattle population actually increased in complete-ban states but only by 2 per cent. It happened primarily due to the decline in cattle population in Madhya Pradesh which had the largest number of cattle in India (Figure 2). Cattle population decreased the most in no-ban states, by -14 per cent.

TABLE VII
PERCENTAGE CHANGE IN CATTLE POPULATION, 2007-2012

	Total Cattle	Cattle (Male)	Cattle (Female)
Complete ban	2.0	-17.9	16.3
Limited Ban	-7.0	-19.0	2.0
No Ban	-14.0	-22.0	-10.0
All India	-4.10	-18.77	6.53

Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2010, 2014).

Table VIII provides information on the percentage of states with positive growth in cattle population between 2003 and 2012 and between 2007 and 2012. Two-third of states where slaughter is completely banned had positive growth in the cattle population during 2003 and 2012. The corresponding figures for partial and no-ban states are 30.8 per cent and 30 per cent, respectively. We observe that the extent of positive growth states declined in all types of states, but this happened the most in the limited-ban states (reducing to 7.7 per cent). In complete-ban states, this happened the least (reducing to 58.3 per cent only).

TABLE VIII
**PERCENTAGE OF STATES WHERE CATTLE POPULATION INCREASED
 BETWEEN 2003-2012 AND 2007-2012**

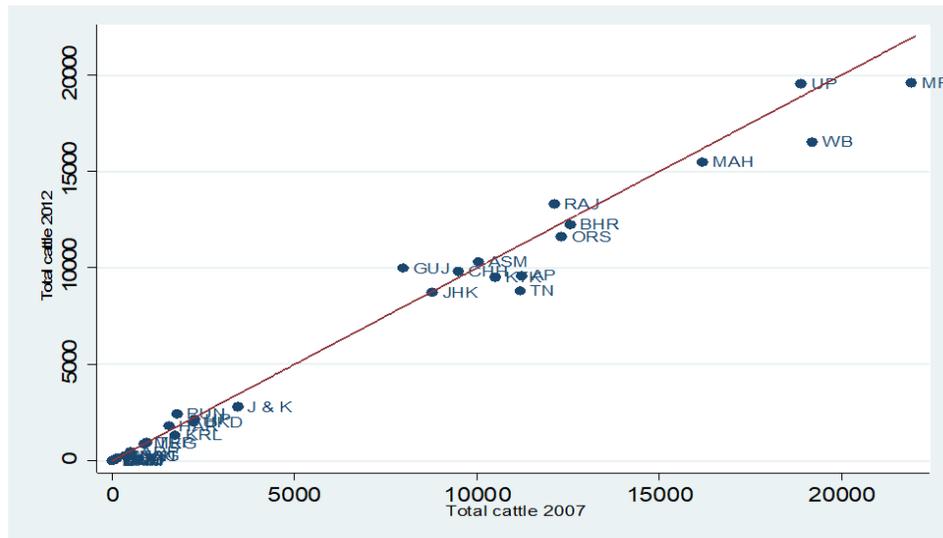
	Percentage of states where cattle population increased between 2003 and 2012	Percentage of states where cattle population increased between 2007 and 2012
Complete ban	66.7	58.3
Limited Ban	30.8	7.7
No Ban	30.0	20.0

Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2005, 2010, 2014).

Other patterns, not elaborated here, include continuation of adverse male ratio, increase in crossbred female cattle and decline in the population of indigenous male cattle. The main result that cattle population increased most in states with complete ban continues to hold in a situation when cattle population actually declined.

Figure 2 is constructed the same way as Figure 1 but now puts the cattle population of 2007 on the horizontal axis. It clearly identifies Madhya Pradesh as the state mainly responsible for the slowdown of cattle population in complete-ban states. Figure 2 also identifies some problematic states (in terms of cattle population) like West Bengal, Maharashtra, and Orissa. All these states have large cattle populations but witnessed a decline in cattle populations in both periods considered in this paper.

Figure 2: Change in Cattle Population in Indian States, 2007-2012



Source: Livestock Census, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India (GoI 2010, 2014).

VI. CONCLUSIONS

The purpose of this paper is not to argue that institutions do not matter or to casually and rigorously establish that unfavourable slaughter rules, as found in many states of India, are not constraining the growth of the cattle population. As discussed earlier, there are a priori reasons to believe that existing institutions, as reflected in the slaughter rules in various states of India, can constrain the growth of the cattle population (Ramdas 2018, 2017b). We also hesitate to subscribe to the view that the Indian cattle population is determined by religious attitudes that uphold the sanctity of cows. However, our findings do not corroborate these views. States with stringent slaughter rules have generally experienced positive growth in cattle population, while states with liberal slaughter rules witnessed lower or negative growth. These patterns are derived from analysing census data of several years, not from any survey data that can be subject to various limitations. The findings of this paper solicit careful scrutiny of the factors that might have generated this outcome. If this is not done, there will remain no convincing economic evidence against the activities that have adverse impacts on the livelihoods of the marginalised population in India. Also, the presence of religious fervour to Article 48 can be denied and its scientific basis upheld by referring to the absence of any economic argument (Garg 2017).

It may well be the case that institutional constraints are affecting the rates of return from raising livestock more than it constrains the growth of the cattle population. The puzzle of negative returns as debated in the pages of EDCC or EPW mentioned above is very consistent with poor institutions but not with the experience of growth in the cattle population. A decade is a long enough time for these returns to eventually show their impact and result in a declining cattle population, but this did not happen so far in India. It has to be explained. One line of approach could be to compare and explain the rate of returns from livestock by slaughter status of Indian states. The gradual decline in the number of male cattle in India indicates that possibly profits from dairying, particularly from crossbred cows, keeps the livestock sector alive. If there is a complete slaughter ban, the cows are subsidising for the bulls/bullocks as the latter is generally less profitable to rear (Gisby 2010), but there is a limit to it.

Ban or severe restrictions on cattle slaughter may further deteriorate the sex ratio as increased subsidy may not be feasible and may lead to an eventual decline in cattle population. It can be another reason for declining male cattle on top of the mechanisation of Indian agriculture⁷. We also have to add to this the social costs of sustaining the stray cattle. This eventual crisis can be delayed by increasing the number of crossbred female cattle (which is already happening in India) or improving the stocks of indigenous cattle (not happening much in India). Milk production may not be affected as indigenous male-female cows would replace more productive crossbred cows. To what extent the smaller, poorer households can participate in this change remains to be seen, or India may slowly slide away from smallholder-based dairy production and move to a more enterprise-based livestock farming system as found in many developed countries. It may also be the case that the institutional constraints associated with various slaughter rules could not affect much because of the growth in the number of crossbred cows - a case tantamount to technological change neutralising the institutional barriers. One can also look at the extent of strict slaughter rules are avoided by various states of India by nesting informal or illegal institutions. If this is done extensively, the impact of the slaughter related rule is likely to be less.

It must be emphasised that we have not done any econometric exercise to establish causality. Therefore, we are not able to directly attribute the observed patterns to the institutional setup per se. We have only highlighted the associations or stylised facts with the hope that they may generate some interest for future research, and more rigorous studies are designed to better link between state-level institutional setups developed around cow slaughter and the growth of livestock in

⁷Binswanger (1986) showed that draft power, particularly bullocks, were replaced by tractors and power tillers even in the 1980s.

India. We think Indian development literature should now take up these issues with new data (combination of census and household data), tools (quasi-experimental such as difference-in-difference) or perhaps, vision.

REFERENCES

- Acemoglu, D. and J. Robinson. 2013. *Why Nations Fail: The Origins of Power, Prosperity and Poverty*, Crown Publishers, New York.
- Anagol, Santosh, Alvin Etang, and Dean Karlan. 2017. "Continued Existence of Cows Disproves Central Tenets of Capitalism?" *Economic Development and Cultural Change*, 65(4): 583-618.
- Attanasio, Orazio, and Britta Augsburg. 2018. "Holy Cows or Cash Cows? The Economic Return to Livestock in Rural India," *Economic Development and Cultural Change*, 66.2: 307-330.
- Binswanger, Hans. 1986. "Agricultural Mechanization: A Comparative Historical Perspective", *The World Bank Economic Observer*, 1(1): 27-56.
- Ford Foundation. 1959. "Report on India's Food Crisis and Steps to Meet it", Ministry of Food and Agriculture, Government of India.
- Garg, L. 2017. "Examining the Constituent Assembly Debates on Cow Protection." *The Wire*, 15 October, 2017, <https://thewire.in/law/unveiling-indias-long-history-of-hypocrisy-on-cow-slaughter-laws> (last accessed on 11 December, 2018).
- Gehrke, Esther, and Michael Grimm. 2018. "Do cows have negative returns? The evidence revisited," *Economic Development and Cultural Change*, 66(4): 673-707.
- Ghosh, Nilabja, Amarnath Tripathi, M Rajeshwor and Roopal Singh. 2017. "Do Producers Gain from Selling Milk? An Economic Assessment of Dairy Farming in Contemporary India," *Economic & Political Weekly*, 52(25-26):88-96.
- Gisby, L. 2010. "Relative Profitability of Crossbred versus Local Cattle Rearing Under ATP Chars Livelihoods Programme." Government of Bangladesh.
- GoI. 2005. "17th Livestock Census All India Summary Report 2003," Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, New Delhi, India, <http://dahd.nic.in/documents/statistics/livestock-census>.
- _____. 2010. *18th Livestock Census All India Report 2007.*, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, New Delhi, India, <http://dahd.nic.in/documents/statistics/livestock-census>.
- _____. 2014. *19th Livestock Census All India Report 2012.*, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, New Delhi, India, <http://dahd.nic.in/documents/statistics/livestock-census>

- Jha, D.N. 2009. *"The Myth of The Holy Cow."* New Delhi: Navayana Publishing.
- Kumar, Dinesh and O. P. Singh. 2017. "Economics of Dairy Farming in India," *Economic & Political Weekly*, 52(41):77-79.
- North, Douglass. 1991. *Institutions, Institutional Change and Economic Performance (Political Economy of Institutions and Decisions)*. Cambridge University Press.
- Ramdas, S. 2018.: "Bovine Politics and Climate Justice." *Economic & Political Weekly*, 50(28):12 - 14.
- _____. 2017a. "Modi Government's Stance on Slaughter Proves It Doesn't Really Care About Cows." *The Wire*, 26 September, 2017, <https://thewire.in/politics/modi-government-cow-slaughter-stray-cattle> (last accessed on 11 December, 2018).
- _____. 2017b. "Bovine Politics", *Azim Premji University Colloquium Series*, September 15, 2017, <https://www.youtube.com/watch?v=tsJKbUpoIYs> (last accessed 24 December 2018).
- Raj, K. N. 1967. "Investment in Livestock in Agrarian Economies: An Analysis of Some Issues Concerning, "Sacred Cows" and "Surplus Cattle," *Indian Economic Review*, 4(1): 53-85.
- Rath, N. 2015. "Declining cattle population will the sacred cow finally rest in the temple," *Economic & Political Weekly*, 50(28):12-14.
- Shankari, U. 1989. "What Is Happening to Cows and Bulls of Sundarapalle?," *Economic & Political Weekly*, 24(21):1164-1170.
- Subrahmanian, A. 2018. *Of Counsel: The Challenges of the Modi-Jaitley Economy*, Viking.
- Teltumbde, A. 2015. "The Holy Cow." *Economic & Political Weekly*, 50(14):10-11.)