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AGRICULTURAL LAND AND BOVINE POPULATION IN INDIA- A CRITICAL REVIEW OF AGRICULTURAL CENSUS DATA

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ABSTRACT

To understand the changes in ownership of agricultural land and bovine holding in India, analyses of agricultural census data were carried out with a view to primarily providing some valuable inputs for the prospective policymakers in the field of agro-livestock sector. The said analyses are mainly motivated towards providing insights into the structure of rural ownership of agricultural lands and associated structural changes that follow in bovine asset.

The study reveals that though the operational area remained constant, the operational landholding increased by 8.5 million during 2005-06 to 2010-11 with 1.7 million holdings getting added every year, mostly as marginal holdings and to a limited extent as small holdings. With an increase of about 7 per cent in number of landholdings, the average holding per farm reduced to 1.16 hectare in 2010-11 from 1.23 hectare in 2005-06. In India, about 83 per cent of the operational holdings are either marginal holdings (<1 hectare) or small holdings (<2 hectare) and they collectively own only 40 per cent of the agricultural land. Only seventeen per cent of the operational holdings have a holding size of more than 2 hectare but owning 60 per cent of the agricultural land. About 90 per cent of the operational land in the country is cultivated and 47 per cent of the net sown area is irrigated. The small and marginal holdings together constituting about 83 per cent own 70 per cent of bovines, 76 per cent of goat and 70 per cent of sheep and this reinforces the complementary relationship between agricultural land size and animal holding size. About 43 and 28 per cent of the rural holdings were found to be keeping adult cattle and buffalo, respectively. The combined incidence of adult bovine is found to be in excess of 43 per cent. The State-wise analysis further confirms that the marginalisation of agricultural holding is also a State phenomenon as is a national phenomenon. However, there are some States that stand out conspicuously where reverse trend is observed.

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Introduction

The consistent growth in the livestock sector during last three decades and further has been a great milestone that has put India into the league of largest milk producing country in the World. There are numerous ways such achievements have been showcased. The proponents of the technological school would attribute growth and development from the standpoint of qualitative improvements in genetics that affect production favourably. The social scientists would look out for factors of production that affect production considerably as also reasons that could deter production. There are some who would argue that market led growth has been the critical point that has been influencing livestock production.

While there are considerable merits in the ways the planners and policymakers examined livestock production, it is important that the fundamental issues in the structure of distribution of livestock population among the different socio-economic milieu as embodied from the agricultural censuses be examined. It may be mentioned that though number of operational holdings and area operated under each holding are the two critical inputs that are available through the agricultural census, the livestock ownership and their distribution across different types of operational holdings have rarely been noticed and analysed. Given the population pressure on finite land resource as also increase in nuclear family structure in rural areas, fragmentation of operational holding is a sociological change that could have influence in livestock owning. Alternatively, a reverse trend in operational holding wherein land consolidation takes place and marginal and smaller holdings integrate into larger holding, then there is a possibility of consolidation of livestock population on per holding basis.

The present analysis is primarily motivated towards providing insights into the structure of rural ownership of agricultural lands and associated structural changes that follow in bovine asset. It is this gap that the present analysis seeks to provide for appreciating future challenges and how that challenges could be overcome for sustainable livestock production.

Data Source

The GoI has been conducting quinquennial (five-yearly) Agricultural Census to generate information on structure and characteristics of agricultural holdings in India and devise strategies for agricultural development. So far, eight Agricultural Censuses have been conducted and the preliminary results of the ninth one with reference year of 2010-11 are available. Information from agricultural census relate to number of operational holdings and area operated by them.

Under agricultural census, Input Surveys are also conducted. The objective of the survey is to generate data on consumption of various agricultural inputs, according to major size-groups of operational holdings, viz., marginal (below 1 hectare), small (1- 1.99 hectare), semi-medium (2- 3.99 hectare), medium (4- 9.99 hectare) and large (10 hectare and above). The inputs covered in the survey include, inter alia, livestock ownership. It may be mentioned that in 2005-06, census was not conducted in States of Bihar, Jharkhand and

Maharashtra and in 2000-01, Bihar, Jharkhand and Meghalaya did not conduct the same. The Agricultural Census database is available at the district and taluka/sub-district level.

Caveat

The agricultural census does not cover landless families. This is because the focus here is to enumerate operational holdings and area operated under each operational holding. The landless families do not possess any operational holding and not covered under the census. Therefore, it would not be possible to estimate the structure of distribution of livestock asset in totality and more so in case of livestock that is owned in specialised units with no operational holdings. There are many who would argue that in India many specialised units/farms have emerged especially during 1990s and 2000s who are not operational land owners but they maintain herds of larger sizes.

Operational Holdings and Size of Holding

As per agricultural census of 2010-11, there are 137 million operational holdings in India, a rise of 8.5 million over 2005-06. In other words, about 1.7 million operational holdings are getting added ever year, mostly as marginal holdings and to a limited extent as small holdings. The semi-medium, medium and large holdings are in effect reducing in number. About 159 million hectares of operational land is managed by 137 million holders, and over the years, the operational land is constant. The average holding per farm has therefore, reduced to only 1.16 hectare in 2010-11 compared to 1.23 hectare of 2005-06. If historical trend is any indication, the average size of holding is expected to go down further (Tables 1 & 2 and Graph 1).

Table 1 : Changes in the Number of Operational Holdings

Landholding type	Number of operational holdings (in million)								
	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11
Marginal	36.20	44.52	50.12	56.15	63.39	71.18	75.41	83.69	92.36
Small	13.43	14.73	16.07	17.92	20.09	21.64	22.70	23.93	24.71
Semi-medium	10.68	11.67	12.46	13.25	13.92	14.26	14.02	14.13	13.84
Medium	7.93	8.21	8.07	7.92	7.58	7.09	6.58	6.38	5.86
Large	2.77	2.44	2.17	1.92	1.65	1.40	1.23	1.10	1.00
All size	71.01	81.57	88.88	97.16	106.64	115.58	119.93	129.22	137.76

Source: Agricultural Census 2010-11, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

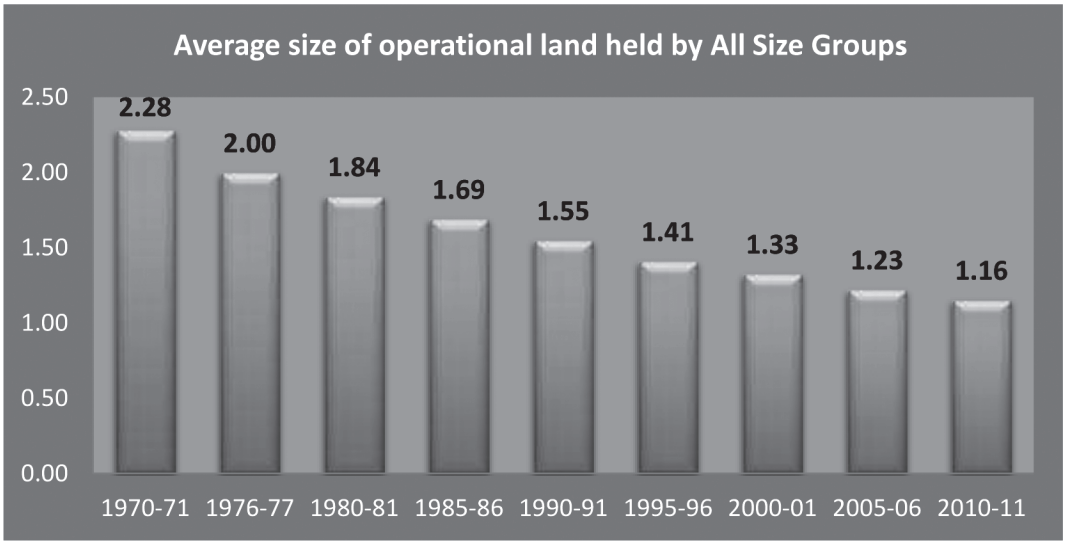
Table 2 : Changes in Area Operated by Size Class of Operational Holdings

Landholding type	Area operated by operational holdings (million hectare)								
	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11
Marginal	14.60	17.51	19.74	22.04	24.89	28.12	29.81	32.03	35.41
Small	19.28	20.91	23.17	25.71	28.83	30.72	32.14	33.10	35.14
Semi-medium	30.00	32.43	34.65	36.67	38.38	38.95	38.19	37.90	37.55
Medium	48.23	49.63	48.54	47.14	44.75	41.40	38.22	36.58	33.71
Large	50.06	42.87	37.71	33.00	28.66	24.16	21.07	18.72	17.38
All size	162.18	163.34	163.80	164.56	165.51	163.35	159.44	158.32	159.18

Source: Agricultural Census 2010-11, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Graph 1 : Average Size of Operational Holdings

(Hectare)



Source: Agricultural Census 2010-11, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Operational Holdings and Size of Holding

In India, 83 per cent of the operational holdings are either marginal holdings (<1 hectare) or small holdings (<2 hectare) and they cover only 40 per cent of the agricultural land. Only 17 per cent of the operational holdings have a holding size in excess of 2 hectare, but they cover 60 per cent of the agricultural land. This group of holding could be considered as relatively bigger holding wherein ownership of land asset is highly skewed (Table 3).

Table 3 : Relative Distribution of Operational Holding and Operated Area

Landholding type	Operational Holdings		Operated Area	
	(Million No.)	(%)	(Million No.)	(%)
Marginal (Below 1.0 ha.)	64.32	64%	27.17	21%
Small (1.0 - 1.99 ha.)	18.78	19%	26.69	20%
S Medium (2.0 - 3.99 ha.)	11.22	11%	30.53	23%
Medium (4.0 - 9.99 ha.)	5.34	5%	30.86	24%
Large (10 ha. & above)	1.00	1%	15.63	12%
All groups	100.65	100%	130.88	100%

Source: Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

In India, about 90 per cent of the operational lands are cultivated and 47 per cent of the net area sown is irrigated. Significantly, in small and marginal holdings relatively larger proportion of operational lands are cultivated as also relatively higher proportion on them is irrigated. These two inputs bring to fore that marginal holdings manage relatively superior quality of agricultural lands for higher productivity per acre. This is established through higher cropping intensity in the smaller group of operational holdings in relation to large size holdings (Graph 2).

Table 4 : Operational Area Cultivated and Area Irrigated

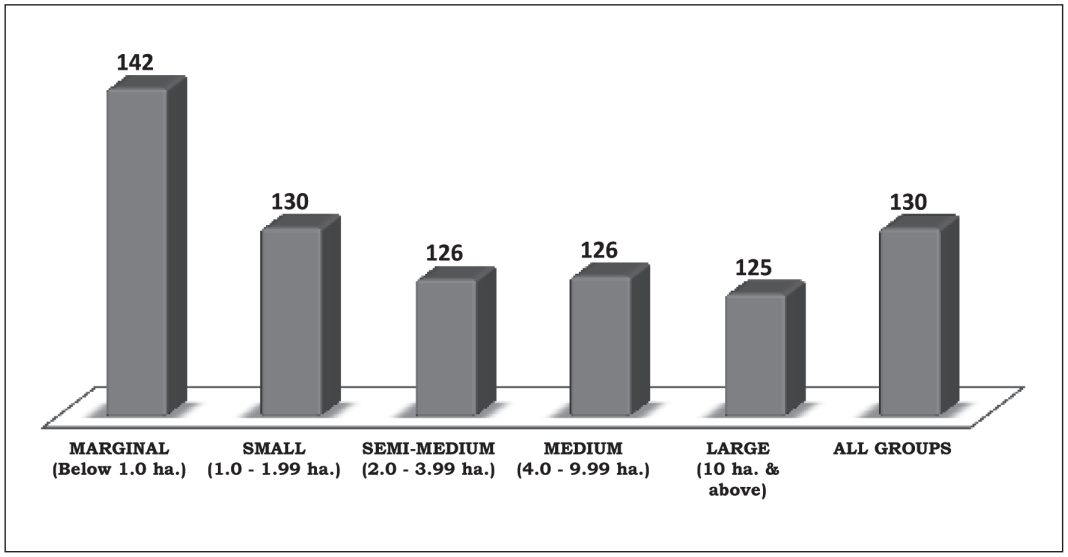
Landholding type	NSA as % of Operational Area	Irrigated area as % of NSA	Irrigated area as % of GCA
Marginal (Below 1.0 ha.)	92%	52%	50%
Small (1.0 - 1.99 ha.)	91%	47%	48%
S Medium (2.0 - 3.99 ha.)	91%	46%	47%
Medium (4.0 - 9.99 ha.)	87%	46%	48%
Large (10 ha. & above)	80%	38%	43%
All groups	89%	47%	48%

NSA- Net Sown Area GCA- Gross Cropped Area

Source: Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Graph 2 : Cropping Intensity

(per cent)



Source: Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Distribution of Livestock Asset

Analysis reveals that the small and marginal holdings constitute 83 per cent of the operational holdings and own 70 per cent of the bovines, 76 per cent of the goat and 70 per cent of the sheep. That majority of the livestock (bovine, goat and sheep) are held by the marginal and smallholders is also substantiated from the analysis of agricultural census data. High disparity in the number of operational holdings and their share in operated lands are however not manifested in the livestock ownership. It is found that these 17 per cent of the relatively large operational holdings (more than 2 hectare) account for about 30 per cent livestock including bovines.

In a recent livestock sector study of the World Bank (2011), it has been shown that the share of the marginal farm households increased from 41 per cent in 1981-82 to 48 per cent in 2003. At the same time, their share of rural land increased from 12 to 24 per cent and their share of livestock population increased by average 20 per cent across various livestock categories. Between 1992 and 2003, their share in land area increased by 9 per cent in different livestock species by 15-27 per cent (with exception of cattle), while their share in households remained essentially unchanged. The above observations reinforce the already established hypothesis that there is a larger equity in the ownership of livestock asset compared to agricultural land.

The average bovine per operational landholding is estimated at 2.48. With the increase in operational land size, average bovine per holding tends to increase- from 1.88 bovine per marginal holding to 6.04 bovine per large holding. This also signifies the close association between agricultural land size and number of animals per holding, reinforcing the complementary relationship between agriculture and livestock (Tables 5 & 6).

Table 5 : Operational Holding, Area Operated and Livestock Holding by Major Size Group

Landholding type	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal	64%	21%	48%	57%	46%
Small	19%	20%	22%	19%	24%
S Medium	11%	23%	17%	13%	17%
Medium	5%	24%	10%	8%	9%
Large 1%	12%	2%	3%	4%	
All Groups	100%	100%	100%	100%	100%

Source: Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Table 6 : Average Size of Livestock by Size Class

Landholding type	Cattle-F	Cattle-M	Buffalo-M	Buffalo-F	Bovine	Goat	Sheep
Marginal	0.52	0.73	0.20	0.43	1.88	0.85	0.43
Small	0.89	1.00	0.29	0.75	2.92	1.00	0.79
Semi-medium	1.08	1.20	0.38	1.10	3.76	1.15	0.90
Medium	1.23	1.49	0.52	1.62	4.86	1.41	1.05
Large	1.29	2.17	0.61	1.98	6.04	2.73	2.38
All Groups	0.70	0.89	0.26	0.64	2.48	0.96	0.60

Source: Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Incidence of Livestock Holding

There is not adequate knowledge and information in India on the incidence of livestock holding in India. The decadal Land and Livestock surveys of the NSSO however, provide some insights into this area at the national level in the sense that proportion of bovine ownership is estimated among the rural households. No estimate on this is available at the State level. It is to be noted that the coverage in the Land and Livestock survey is inclusive, which means that all sections of the society including the landless group are covered under NSSO survey. From this consideration, NSSO estimate on incidence of bovine ownership would have greater acceptability. The 59th Round Land and Livestock Survey (2003) estimated about 48 per cent of the rural incidence in terms of bovine ownership- 36 per cent in case of cattle and 21 per cent for buffalo. However, the incidence in terms of owning of adult females is not estimated separately.

The agricultural census on the other hand, estimates the incidence by different categories of animals e.g., adult males, adult females and young stock, but as mentioned earlier, does not cover the landless category. Given this limitation, it is found that 43 and 28 per cent of the rural holdings keep adult cattle and adult buffaloes, respectively. If one were to get a combined incidence of adult bovine, then the estimate would somewhere be in excess of 43 per cent. As operational holding increases from marginal holding to above, the incidence of owning of adult female buffalo and cow also increases alongside, suggesting a phenomenon that size of agricultural holding possibly influences higher incidence among the rural population. Birthal et al (2006) have also found that incidence of cattle and buffalo ownership have a direct relationship with increase in average landholdings- in the marginal holding category 25.8 and 45.9 per cent of the rural households owned buffalo and cattle, respectively. This increases to 55.6 and 76.4 per cent for cattle and buffalo respectively, in case of large farmers with operational land in excess of 4 hectares. Arguably, this is a more likely situation as higher the agricultural holding, higher is the likelihood of feed and fodder availability for supporting dairy animals. It is only the working animals category which does not show a direct association between the above two variables as large land owners would have a tendency to replace draught power by mechanical power. In addition, it is found that the incidence of stocking of young stock also tends to rise with the increase in operational holding, which again is related to greater availability of crop residues for sustenance of the animals (Tables 7 & 8).

Table 7 : Incidence of Ownership by Functional Category of Cattle

Landholding type	% Operational holding with different types of cattle ownership			
	Males > 2 ½ years	Females > 2 ½ years	Young Stock	At least one or more categories
Marginal (Below 1.0 ha)	24%	39%	22%	49%
Small (1.0 - 1.99 ha.)	39%	46%	30%	61%
S Medium (2.0 - 3.99 ha.)	44%	49%	36%	65%
Medium (4.0 - 9.99 ha.)	43%	53%	41%	67%
Large (10 ha. & above)	35%	61%	51%	71%
All groups	30%	43%	26%	54%

Source: Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Table 8 : Incidence of Ownership by Functional Category of Buffalo

Landholding type	% Operational holding with different types of buffalo ownership			
	Males over 3 Years	Females Over 3 Years	Young stock up to 3 years	At least one or more categories
Marginal (Below 1.0 ha)	10%	22%	14%	28%
Small (1.0 - 1.99 ha.)	12%	32%	23%	39%
S Medium (2.0 - 3.99 ha.)	13%	40%	31%	47%
Medium (4.0 - 9.99 ha.)	14%	49%	41%	55%
Large (10 ha. & above)	13%	53%	47%	58%
All groups	11%	28%	19%	34%

Source: Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Distribution of Operational Area and Livestock Holding

It is worthwhile to understand the level (equality/inequality) of ownership of operational land and livestock holding among different landholding groups. This is done using a statistical tool called Gini coefficient which measures the inequality among values of a frequency distribution of operational land, bovine, sheep and goat. The Gini coefficients for these parameters are given below:

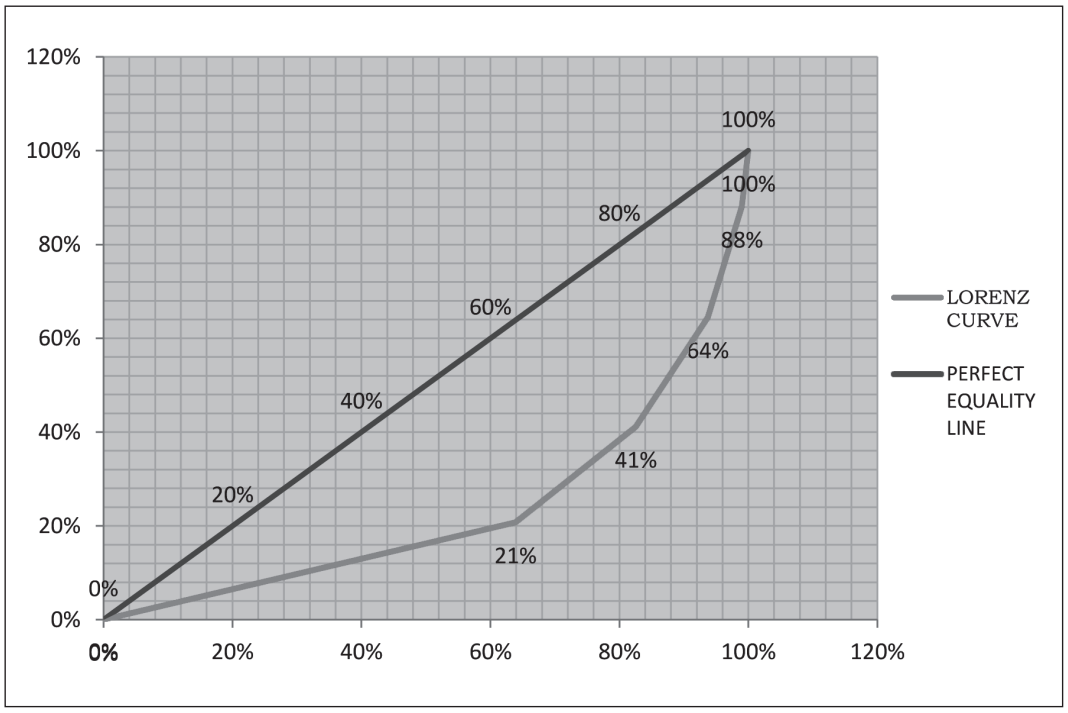
Table 9 : Gini Coefficient of Land and Livestock Assets

Particulars	Gini coefficient of operational holding
Operated Area	0.45
Bovine	0.16
Sheep	0.18
Goat	0.08

Source: Estimates based on Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

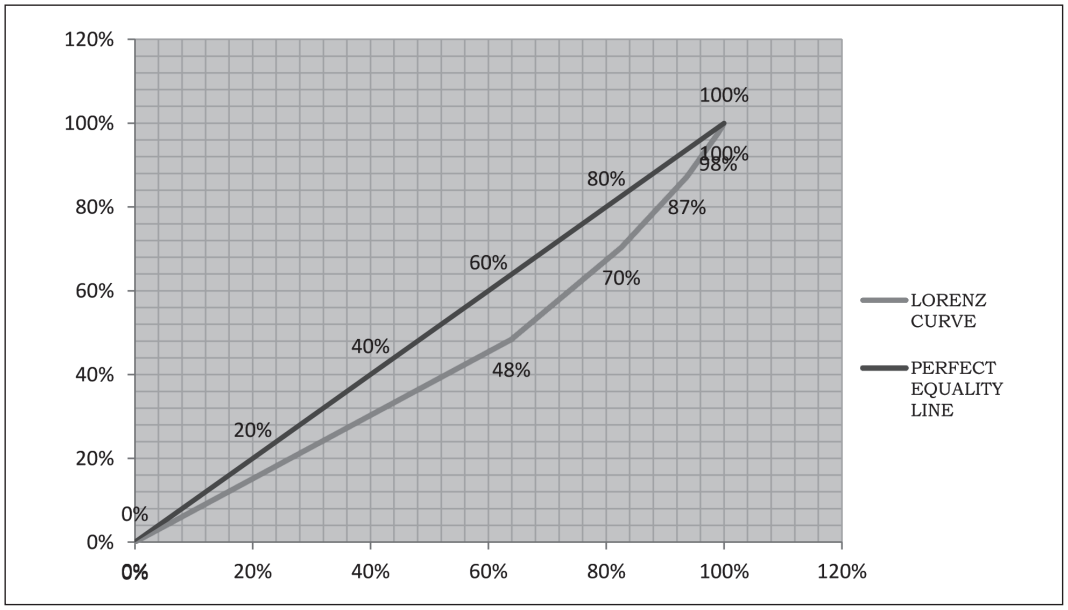
The values of above Gini coefficients reinforce the already established hypothesis that there is a larger equity in the ownership of livestock assets especially goat, bovine and sheep as compared to agricultural land.

Graph 3 : Lorenz Curve for Operational Landholding and Operated Area



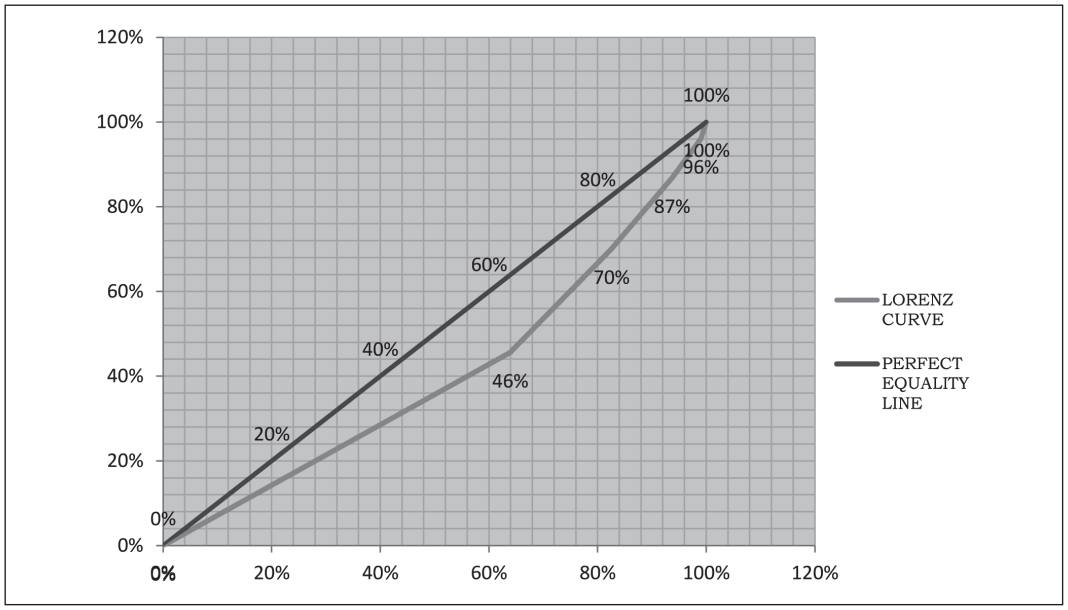
Source: Estimates based on Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Graph 4 : Lorenz Curve for Operational Landholding and Bovine



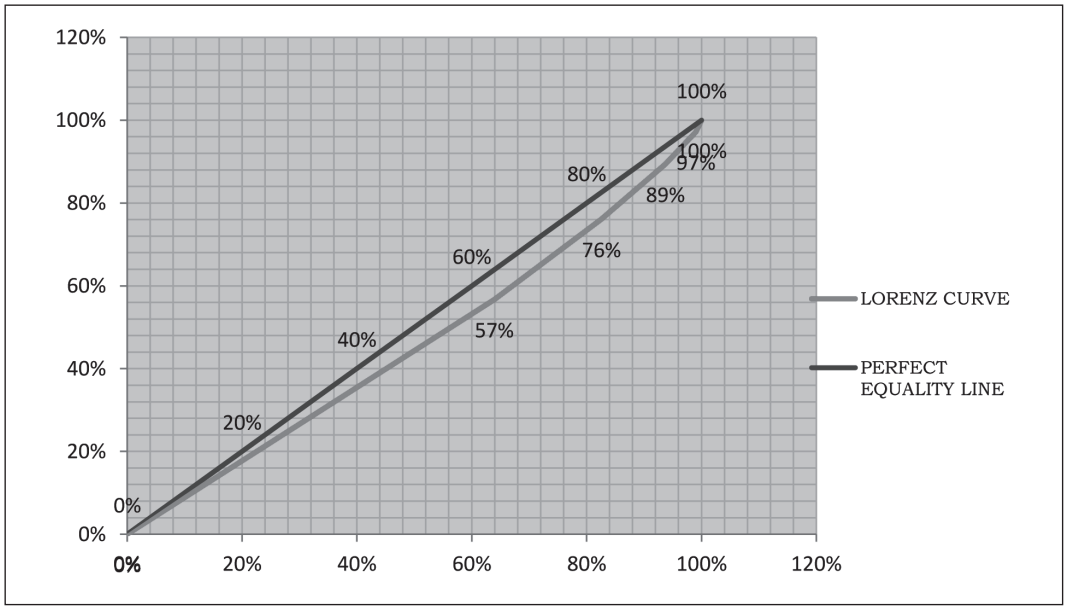
Source: Estimates based on Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Graph 5 : Lorenz Curve for Operational Landholding and Sheep



Source: Estimates based on Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Graph 6 : Lorenz Curve for Operational Landholding and Goat



Source: Estimates based on Agricultural Census 2006-07, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Distribution of Operational Area and Livestock Holding

The details of operational holdings, area and bovine holdings are provided at Annex. The analysis of the State data confirm that marginalisation of agricultural holdings is also a State phenomenon in sync with national phenomenon, there are some States which stand out conspicuously wherein a reverse trend is observed. To illustrate, the State of Punjab certainly does not go along with the national trend in number of holdings and their distribution according to different sizes as also in relation to distribution of bovine. The small and marginal holdings constitute only 30 per cent of all holdings in the State, make up for only 8 per cent of area and only 14 per cent of bovine. In other words, the State has shown a tendency towards consolidation of operational holdings and lands- - more than 90 per cent of the operated area held by the size group in excess of 2 hectare accounting for 87 per cent of the bovines. The State of Rajasthan and to some extent the State of Haryana also have shown a mild tendency towards relatively bigger agricultural holdings and proportionately more bovines in them.

At the other extreme, States such as Kerala, West Bengal, Tamil Nadu, Uttar Pradesh, etc., exhibit absolute marginalisation of operational holdings and land owned by them as also bovine. Among others, high growth in human population, high population density and moderate to high urbanisation could possibly cause such phenomenon. It can therefore, be argued that our agro-livestock production structure is somehow connected with the behavioural changes that are

observed in the macro space. The production strategy for the bovine sector would thus have to take leads from the observed changes in the macro environment.

Determinants of Bovine Holding in India

Besides operational holding, there are many other factors that determine the ownership of livestock holding in the country. It is widely acknowledged that common property resources like grazing and pasture land, wasteland, riverine lands, hilly and mountainous areas provide vegetation for sustenance of bovines and small ruminants. The dependence of the landless and marginal holders on the common property resources is significant. This is all the more important since hardly 5 per cent of the total 190 million hectares of the total cropped area is put to green fodder crops.

Common grazing lands are limited (10.4 million ha.) and have been deteriorating both quantitatively and qualitatively. In the rainfed areas, given limited agriculture income, the support from livestock income is significant. Large majority of the rural population resorts to livestock keeping for income and employment support, harnessing natural resources to sustain their animals. The available biomass from pasture and grazing land, public land, forest, etc., are used for survival of the animals without incurring any cost.

Among other important determinants of bovine keeping, it has been proven that access to market, fair price to their produces, veterinary care, breeding and extension services are some of the considerations for which milk and livestock production is organised in India. These have been adequately demonstrated through the experiences of Operational Flood programme.

Conclusions

One of the significant observations from inter-temporal changes in the number of operational holdings and the total operated area under these holdings indicate that the average size of operational holdings is perpetually reducing in India. Going by this trend it is inferred that future size of farm holding would be further reduced. Within this probable reduction in the average farm holdings, the incidence of marginalisation of holding would be further accentuated.

Significantly, the small holder farms are relatively more intensively cultivated compared to the large farms and also the small holders receive better irrigation coverage compared to the bigger size farms. These attributes of the Indian small size farms are generally touted as more efficient in farm productivity and therefore, form the core of agricultural production.

The average bovine per operational landholding is estimated at 2.48. With the increase in operational land size, average bovine per holding tends to increase-- from 1.88 bovine per marginal holding to 6.04 bovine per large holding. This also signifies the close association between agricultural land size and number of animals per holding, reinforcing the complementary relationship between agriculture and livestock.

Following agricultural farm size structure, the livestock ownership is also localised mostly in the marginal and small holder group-though it is commonly observed that the marginal and small holders in the livestock farms also depend on

common property resources for the sustenance of livestock asset. This is particularly found in the arid zone, where large majority of the farming population manage their sustenance through livestock rearing using common lands.

The inequality index (gini coefficient) is high in case of operated lands by different categories of operational holdings, but the same is low in case of livestock assets (bovine, sheep and goat), which suggests that improvement in the quality of the livestock asset and institutional framework should be focused towards nurturing the welfare of the marginal and small holders.

Policy Implications and Recommendations

1. The small and marginal farmers accounting 83 per cent of the operational holdings and 40 per cent of the agricultural land in the country contribute significantly to the economy and to food security. However, the contribution of small farmers to agricultural GDP of the country will depend upon the nature of crops grown by them. It has been observed that given the irrigation facilities, small agricultural holdings tend to adopt intensive cultivation, having high cropping intensity and optimise land use to improve their household food security or to augment their income from agricultural activity. This special characteristic of agriculture holdings in the country calls for special attention to be given to the small farmers in policies relating to the management of the food and agriculture sector, particularly those relating to supply of agricultural inputs, technology dissemination, marketing arrangements and credit.

2. For upholding the interests of the small farmers through appropriate institutional mechanism into a sustainable business enterprise initiation of collective action groups is necessary. These collective action groups could be like organising Small Farmer Agri Business Consortium, Farmers' Producers organisations, Producer Companies, Commodity Cooperatives, Self-Help Groups etc. While there are good lessons to learn from the famous Amul model of organising the small and footloose producers into viable business enterprises, there are alternative options too which need to be explored. These become significant since development of modern retail format has taken a firm route in Indian eco-system for marketing of agricultural produces and the small and marginal producers might become uneconomic unless appropriate linkages with the markets are established, reducing transaction costs. Therefore, marginalisation of Indian farms in terms of size as also small livestock production need not be considered as adverse economic outcome. Rather, their strength could appropriately be harnessed to enhance profitability and improving farm returns through institutional reforms and innovations in processing and marketing.

3. Fodder production and preservation have not received adequate attention in livestock development programmes

and the share of fodder development programmes in the public sector spending on livestock has been low at 1 per cent. Besides this, land allocation for fodder production is shrinking, which is another issue. Under this situation, output of green fodder per unit of land needs to be improved, for which use of truthfully labelled certified seeds in the existing land under fodder production is necessary. Seed production for improving productivity of green fodder therefore, requires greater consideration for sustaining small holder production.

4. Productivity of the smallholder livestock production has to improve given the constraints in area expansion of farm land. This is possible through provision of appropriate breeding, feeding and animal health care facilities to the smallholder producers. Additionally, providing market access to the small producers through establishment of producer organisation, collective action groups that deliver value to the producers would provide those incomes in their hands at the point of production, as found in the western and southern parts of the country.

5. There are plethora of government programmes undertaken by various departments of the State and union government, NGOs, cooperative institutions, institutional credit dispensing agencies, producer organisations that are involved to look after the interests of the smallholder producers. These institutions implement programmes that are complimentary to each other. Sometimes, they suffer in terms of effectiveness due to non-convergence, both on account of geographical coverage and programme asymmetry. Therefore, convergence of inputs from various associated institutions in a given location maximises programme effectiveness under limited land based production condition.

6. Marginal and small operational land holders pursuing dairy farming are generally devoid of better input facilities and stability. Apathy on part of government, further adds to their misery. In such circumstances, Public–Private-Partnership (PPP) may be envisaged. This concept can be promoted specially in breeding, biotechnology, production and supply of fodder seeds, etc. In agriculture sector, advantage of this model is that the farmer can obtain an assured up front price & market outlet for his produce. While farmers get access to better & latest technologies, hybrid seeds, etc., private sector gets requisite quality material regularly at predetermined prices, creating a win-win situation for both the parties.

Annex- I

Distribution of Land and Livestock Holding: Northern Region

Haryana	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	48%	13%	24%	53%	56%
Small (1.0 - 1.99 ha.)	19%	14%	15%	21%	21%
S Medium (2.0 - 3.99 ha.)	18%	23%	22%	14%	13%
Medium (4.0 - 9.99 ha.)	12%	33%	26%	10%	9%
Large (10 ha. & above)	3%	17%	13%	2%	1%
All groups	100%	100%	100%	100%	100%

Punjab	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	13%	2%	5%	20%	6%
Small (1.0 - 1.99 ha.)	18%	6%	9%	29%	2%
S Medium (2.0 - 3.99 ha.)	32%	22%	24%	15%	6%
Medium (4.0 - 9.99 ha.)	29%	43%	40%	34%	78%
Large (10 ha. & above)	7%	27%	23%	3%	8%
All groups	100%	100%	100%	100%	100%

Rajasthan	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	34%	5%	12%	28%	15%
Small (1.0 - 1.99 ha.)	21%	9%	12%	19%	14%
S Medium (2.0 - 3.99 ha.)	20%	17%	18%	21%	20%
Medium (4.0 - 9.99 ha.)	18%	33%	30%	21%	30%
Large (10 ha. & above)	7%	35%	28%	11%	20%
All groups	100%	100%	100%	100%	100%

Uttar Pradesh	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	78%	40%	61%	80%	83%
Small (1.0 - 1.99 ha.)	14%	25%	19%	13%	12%
S Medium (2.0 - 3.99 ha.)	6%	21%	13%	5%	4%
Medium (4.0 - 9.99 ha.)	2%	13%	7%	2%	1%
Large (10 ha. & above)	0%	2%	1%	0%	0%
All groups	100%	100%	100%	100%	100%

Annex-II

Distribution of Land and Livestock Holding: Eastern Region

Odisha	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	60%	27%	42%	56%	49%
Small (1.0 - 1.99 ha.)	27%	32%	29%	27%	30%
S Medium (2.0 - 3.99 ha.)	11%	25%	18%	12%	15%
Medium (4.0 - 9.99 ha.)	3%	13%	8%	3%	6%
Large (10 ha. & above)	0%	3%	2%	0%	1%
All groups	100%	100%	100%	100%	100%

West Bengal	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	81%	54%	70%	82%	74%
Small (1.0 - 1.99 ha.)	14%	29%	21%	12%	17%
S Medium (2.0 - 3.99 ha.)	4%	14%	8%	5%	7%
Medium (4.0 - 9.99 ha.)	0%	3%	1%	1%	1%
Large (10 ha. & above)	0%	0%	0%	0%	0%
All groups	100%	100%	100%	100%	100%

Annex-III

Distribution of Land and Livestock Holding: Western Region

Gujarat	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	34%	9%	17%	20%	15%
Small (1.0 - 1.99 ha.)	29%	19%	22%	31%	35%
S Medium (2.0 - 3.99 ha.)	23%	30%	28%	33%	38%
Medium (4.0 - 9.99 ha.)	12%	33%	27%	16%	10%
Large (10 ha. & above)	1%	9%	7%	1%	2%
All groups	100%	100%	100%	100%	100%

Madhya Pradesh	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	40%	10%	20%	37%	47%
Small (1.0 - 1.99 ha.)	27%	19%	22%	29%	22%
S Medium (2.0 - 3.99 ha.)	20%	27%	24%	21%	22%
Medium (4.0 - 9.99 ha.)	11%	32%	25%	11%	7%
Large (10 ha. & above)	2%	13%	9%	2%	2%
All groups	100%	100%	100%	100%	100%

Annex- IV

Distribution of Land and Livestock Holding: Southern Region

Andhra Pradesh	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	62%	24%	41%	53%	47%
Small (1.0 - 1.99 ha.)	22%	26%	24%	25%	29%
S Medium (2.0 - 3.99 ha.)	12%	26%	20%	16%	17%
Medium (4.0 - 9.99 ha.)	4%	19%	12%	6%	6%
Large (10 ha. & above)	0%	5%	3%	1%	1%
All groups	100%	100%	100%	100%	100%

Karnataka	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	48%	14%	27%	45%	43%
Small (1.0 - 1.99 ha.)	27%	23%	25%	31%	32%
S Medium (2.0 - 3.99 ha.)	17%	28%	24%	20%	22%
Medium (4.0 - 9.99 ha.)	7%	26%	19%	4%	3%
Large (10 ha. & above)	1%	9%	6%	0%	0%
All groups	100%	100%	100%	100%	100%

Kerala	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	96%	64%	90%	93%	88%
Small (1.0 - 1.99 ha.)	3%	19%	6%	5%	11%
S Medium (2.0 - 3.99 ha.)	1%	11%	3%	2%	1%
Medium (4.0 - 9.99 ha.)	0%	5%	1%	0%	0%
Large (10 ha. & above)	0%	2%	0%	0%	0%
All groups	100%	100%	100%	100%	100%

Tamil Nadu	Operational landholding	Operated area	Livestock holding		
			Bovine	Goat	Sheep
Marginal (Below 1.0 ha.)	76%	36%	58%	73%	64%
Small (1.0 - 1.99 ha.)	15%	25%	20%	16%	20%
S Medium (2.0 - 3.99 ha.)	7%	21%	13%	7%	11%
Medium (4.0 - 9.99 ha.)	2%	14%	7%	3%	4%
Large (10 ha. & above)	0%	4%	2%	0%	1%
All groups	100%	100%	100%	100%	100%

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