

Original Research Article

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## Macro Level Changes in Livestock System of Tamil Nadu due to Climate Change

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### ABSTRACT

#### Keywords

Climate change,  
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Climate sensitive sectors such as agriculture and livestock are highly vulnerable to climate change than other systems. Livestock sector provides employment to 22.45 million, and also provides food, fuel, manure and draught power and is the stable source of income in the rainfed regions. Districts of Tamil Nadu classified into low, medium and high category based on livestock population and two median districts were selected. From selected districts taluks were selected and from each taluk 10 respondents were selected. Thus a total of 120 farmers constituted the respondents for study. Pre tested interview schedule was used to collect the information. Average age of the respondents was 55.43 years, with range of 47 to 80 years. 62.5% were male, 70.83% were in backward community and in nuclear family (60%). Livestock rearing was the primary occupation for 72.5%, average land holding was 4.5 acres which ranged from landless to 50 acres. Nearly half (42.5%) were marginal farmers followed by small farmers (35.83%). Cattle and goat population increased by 32.20% and 60% of the respondents increased; buffalo and sheep population decreased by 80% and 52.94%. Extensive system of rearing was reduced and shifted to semi-intensive (42% to 85.59%) and very few followed intensive system of rearing (up to 6.78%). Grazing at roadside/ ridges/ bunds and common property resources had increased to 35.83% and 32.5%.

### Introduction

Climate change is a global phenomenon which affects all livelihood sectors either directly or indirectly. Intergovernmental Panel on Climate Change (IPCC, 2014) defined climate change is any change in climate over a period of time which comes out as the result of both human and natural actions. Climate sensitive

sectors such as agriculture and livestock are highly vulnerable than other systems. Climate change is already negatively affecting agriculture and allied sectors in the developing countries and it is likely to worsen (IPCC, 2007). Globally, livestock sector, among agricultural sub-sectors is growing faster by providing livelihood for about 1.3 billion with 40% of agricultural output (Steinfeld *et al.*,

2006). In India, livestock sector provides employment to 22.45 million people, and also provides food, fuel, manure and draught power and is the most stable source of income for people in the rainfed regions (Kumar *et al.*, 2015).

Tamil Nadu is one of the water starved states in India. Depletion of natural resources coupled with degradation of land, alteration in water resources, poor productivity, low level of technology adoption, fodder scarcity are posing serious challenges to development and food security of Tamil Nadu. Hence it is necessary to assess the macro level changes in livestock system of Tamil Nadu.

### **Materials and Methods**

An *ex-post-facto* research design was adopted in the study. The districts of Tamil Nadu were classified into low, medium and high category based on livestock population and from each category, two median districts were selected. From the six selected districts, taluks with low and high livestock population were selected for the study.

Livestock farmers with 30 years of livestock farming experience constituted the sample frame and 10 farmers from each selected taluks were selected. Thus a total of 120 farmers constituted the respondents for study. Pre tested interview schedule was used to collect the information.

### **Results and Discussion**

The average age of the respondents was 55.43 years, which ranged from 47 to 80 years. It could be inferred from Table 1 that nearly two-third (63.33%) of the overall respondents were in the age group of 47 to 58 years followed by 59 to 69 years (29.17%) and more than 69 years (7.5%). Three-fifth (62.5%) of the respondents were male and the remaining

37.5% were female. Majority of the respondents belonged to backward community (70.83%) followed by schedule caste (15.83%) and most backward community (13.33%). None of the respondents were from forward community and schedule tribe.

Majority of the respondents (60%) belonged to nuclear family and 40% of the respondents were in joint family in overall districts.

Family size of the respondents ranged from 1 to 8 members with an average family size of 4.1 members. Majority of the respondents (87.5%) had up to five members in their family and the remaining 12.5% of the respondents had more than five members in their family.

About one-third (32.5%) of the overall respondents were illiterate since the respondents are aged. Among the literate respondents, equal percentage (18.33% each) had primary and high school education followed by middle school education (16.67%), collegiate (8.33%) and higher secondary school education (5.83%). Implementation of state educational policy might have improved the literacy per cent.

Livestock rearing was the primary occupation for 72.5% of the respondents followed by agriculture (10.83%), agricultural labour (9.17%) and non-farm sector (7.5%). The average livestock farming experience of the respondents was 34.3 years with the range of 30 to 60 years.

The average land holding was 4.5 acres which ranged from landless to 50 acres. Nearly half (42.5%) of the respondents were marginal farmers followed by small farmers (35.83%), large farmers (9.17%), medium farmers (8.33%) and landless (4.17%). Among all categories of farmers, small farmers and marginal farmers dominated.

**Table.1** Demographic profile of the respondents  
(n=120)

S. No	Category	f (%)
<b>Age</b>		
1.	47 to 58 years	76 (63.33)
2.	59 to 69 years	35 (29.17)
3.	Above 69 years	9 (7.5)
<b>Gender</b>		
1.	Male	75 (62.5)
2.	Female	45 (37.5)
<b>Community</b>		
1.	Forward community	0 (00)
2.	Backward community	85 (70.83)
3.	Most backward community	16 (13.33)
4.	Schedule caste	19 (15.83)
5.	Schedule tribe	0 (00)
<b>Family type</b>		
1.	Joint	48 (40)
2.	Nuclear	72 (60)
<b>Family size</b>		
1.	Up to 5 members	105 (87.5)
2.	More than 5 members	15 (12.5)
<b>Educational status</b>		
1.	Illiterate	39 (32.5)
2.	Primary school	22 (18.33)
3.	Middle school	20 (16.67)
4.	High school	22 (18.33)
5.	Higher secondary school	7 (5.83)
6.	Collegiate	10 (8.33)
<b>Primary occupation</b>		
1.	Livestock rearing	87 (72.5)
2.	Agriculture	13 (10.83)
3.	Agricultural labour	11 (9.17)
4.	Non-farm	9 (7.5)
<b>Secondary occupation</b>		
1.	Livestock rearing	29 (24.17)
2.	Agriculture	83 (69.17)
3.	Agricultural labour	5 (4.17)
4.	Non-farm	3 (2.5)
<b>Experience in livestock farming</b>		
1.	30 to 40 years	106 (88.33)
2.	41 to 50 years	12 (10)
3.	More than 50 years	2 (1.67)
<b>Land holding</b>		
1.	Landless	5 (4.17)
2.	Marginal farmers	51 (42.5)
3.	Small farmers	43 (35.83)
4.	Medium farmers	10 (8.33)
5.	Large farmers	11 (9.17)

**Table.2** Livestock possession

S. No	Category	Before 30 years f (%)	At present f (%)
1	Below average SLU	86 (71.67)	83 (69.17)
2	Above average SLU	34 (28.33)	37 (30.83)

**Table.3** Change in livestock possession

Category	Increased		Decreased		No change	
	f	%	f	%	f	%
<b>Overall districts</b>						
<b>Cattle</b>	38	32.20	29	24.58	51	43.22
<b>Buffalo</b>	5	20.00	20	80.00	0	00.00
<b>Sheep</b>	8	47.06	9	52.94	0	00.00
<b>Goat</b>	36	60.00	21	33.30	4	6.70

**Table.4** System of rearing

S. No	System of rearing	Before 30 years	At present
<b>Cattle</b>			
1	Extensive	34 (28.81)	9 (7.63)
2	Semi- intensive	84 (71.19)	101 (85.59)
3	Intensive	0 (00)	8 (6.78)
<b>Buffalo</b>			
1	Extensive	17 (77.27)	4 (36.36)
2	Semi- intensive	5 (22.73)	7 (63.64)
3	Intensive	0 (00)	0 (00)
<b>Sheep</b>			
1	Extensive	8 (66.67)	4 (36.36)
2	Semi- intensive	4 (33.33)	6 (54.55)
3	Intensive	0 (00)	1 (9.09)
<b>Goat</b>			
1	Extensive	27 (93.1)	28 (56)
2	Semi- intensive	2 (6.9)	21 (42)
3	Intensive	0 (00)	1 (2)

**Table.5** Source of grazing

S. No	Category	Overall	
		Before 30 years	At present
1.	Own land	17 (14.17)	20 (16.67)
2.	Common property resources	33 (27.50)	39 (32.5)
3.	Common property resources and own land	7 (5.83)	6 (5)
4.	Roadside/Ridges/Bunds	32 (26.67)	43 (35.83)
5.	Forest	31 (25.83)	12 (10)

It could be inferred from Table 2 that negligible change was noticed in livestock possession. But perusal of district wise result, considerable change was observed between before 30 years and at present.

It is evident from Table 3 that cattle population was increased by 32.20% of the respondents and 43.22% did not have any change in cattle population at present when compared to 30 years before. Whereas, 80% of the respondents decreased buffalo population; 52.94% and 47.06% decreased and increased sheep population over 30 years respectively. But 60% of the respondents increased goat population. The researcher also recorded that Jersey cross and Holstein Friesian cross, Kangayam (indigenous) and non-descriptive were the cattle breeds maintained by the respondents in the study area. The 20<sup>th</sup> Quinquennial Livestock Census also supported that 81.15% of cattle are crossbred and 18.85% indigenous cattle in Tamil Nadu. Murrah cross was the common breed of buffalo in the study area. Recognised goats breeds Kanni Adu, Kodi Adu Salem Black were the goat breeds maintained. Non-descriptive and Mecheri were the sheep breed maintained.

Extensive system of rearing was practiced before 30 years by the respondents for all the species and in all districts with the range of 28.81 to 93.1% (Table 4). But at present, the extensive system of rearing was reduced and shifted to semi-intensive (42% to 85.59%) and very few followed intensive system of rearing (up to 6.78%).

Majority of the respondents used common property resources (27.5%) followed by roadside/ ridges/ bunds (26.67%) and forest (25.83%) for grazing before 30 years. But, at present, grazing at roadside/ ridges/ bunds had increased to 35.83%; common property resources had increased to 32.5%; and meager

increase was noticed in grazing at own land (16.67%). But grazing in the forest area was reduced from 25.83% to 10% over 30 years (Table 5). It is in line with findings of Kumar (2013) that common property resources, roadside and forest areas were the sources of grazing. It contradicts with the report of Sharma and Bhaduri (2007) stated that cent per cent of the farmers used common grazing land and own land.

Grazing lands were affected by drought and lower rainfall and it was directly affected by temperature and solar radiation; and indirectly by pasture growth (Nardone *et al.*, 2010). The invasive plants were the major cause for decline in grazing land was also reported by Shashidhra and Reddy (2012).

It could be concluded from the results that alteration in livestock species was noticed over years. Drastic decrease of buffalo population might be due to increase in temperature causes heat stress, silent heat and other reproductive problems, lack of natural wallowing facility and decreased grazing land due to shortfall of rainfall with increased temperature might have influenced the buffalo population over the years. Goat is a climate resilient, hardy and highly adaptive to semi-intensive system of rearing when compared to sheep, hence the respondents shifted to goat enterprise.

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