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Economic sustainability of Gaushalas in Southern Karnataka

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Abstract

Gaushalas are considered to be the best alternative to manage the increasing stray cattle population. Since Gaushalas have to take care of mostly unproductive animals and supported largely by charity, they need to be economically self-sustainable. In this paper an attempt has been to study the economic sustainability of Gaushalas in southern Karnataka state. A sample of 18 Gaushalas drawn from 13 districts of Southern Karnataka was considered for the study. Both the primary and secondary data were collected for the period 2015 to 2019 and analysed. The primary source of income for Gaushalas was donations (64%) followed by government grants (23%) and sales (11%). The major expenditure was towards feed and fodder (68%) followed by labour expenses (18%). The operating ratio for all the Gaushalas was found to be 0.69 indicating that 69% of gross income was used to cover the working expenses. But on long term basis some Gaushalas were not able to cover their total expenses as they had negative net income. Economic Sustainability Index (*ESI*) was computed using net income per animal, returns over variable cost, self-sufficiency, dependency and percentage of productive animals. About 39% of Gaushalas were less sustainable (*ESI*< 0.33), 55% moderately sustainable (0.33 <*ESI* < 0.66) and only 6% were under high sustainable category (*ESI* > 0.66). It was observed that Gaushalas were largely dependent on public donations and Government grants which makes them less sustainable. So, there is a need to diversify income sources such as income from sale of milk, milk products and other by-products besides exploring efficient marketing channels.

Keywords: Stray cattle, dairying, indigenous breed, income diversification, self-sufficiency

Introduction

Animals normally become less productive and uneconomical once they complete 6th to 8th lactation (Bijila and Singh, 2019) [1]. With the rising shortages of feed and fodder and their prices, the individual farmers face difficulty in maintaining the unproductive and old cattle. All these uneconomical animals are either found on the roads or end up in the slaughterhouses. The ban on cow slaughter in many states of the country has further added to stray cattle population. Currently there are 50.22 lakh stray cattle in the country, of which 77,000 stray cattle are found in Karnataka (DAHD&F, 2019).

Gaushala's primary aim is to provide shelter for stray cattle, improving the health and life of infirm, unproductive, diseased and abandoned cattle. Gaushalas assist to preserve the Indian germplasm (Yadav and Vij, 2010) [9] and cow offspring. Some Gaushalas are engaged in upgrading the local breeds and using them to supply pure milk and other by-products made from cow dung and cow urine and supply to the villagers with good female calves for dairying and bullocks for agricultural purposes.

There are 160 registered Gaushalas in Karnataka state (Mandi *et al.* 2018) [4]. Out of this, 22 Gaushalas are recognized by the Animal Welfare Board of India (AWBI).

The Department of Animal Husbandry and Fisheries, Karnataka provides necessary financial assistance for select registered Gaushalas and AWBI provides necessary grants and fund only for charitable, non-profit organization to meet the minimum expenditure for running the Gaushalas. Most of the Gaushalas in the State are registered under different acts and legislations like Karnataka Goseva Ayog, 2013, Societies Registration Act, 1860 and Karnataka Societies Act, 1960. Karnataka State Goseva Ayog, 2013 was constituted by the Government of Karnataka to coordinate and advice different laws implementing departments to save valuable livestock resources of the State (Mandi *et al.* 2018) [4]. An apex body called Karnataka Gaushala Federation has been formed which represents all the Gaushalas for the protection of animals in legal affairs and to strengthen animal welfare in the State (Mandi *et al.* 2018) [4]. Apart from these, various State government organizations like Mysore Pinjrapole Society and Karnataka State Animal Husbandry and Fisheries Department grant some financial aids and extend veterinary services to the Gaushalas. However, These Gaushalas face numerous problems on the financial front owing to absence of public assistance, inadequate government support, delay in financing and insufficient space and feed shortage. Though there are a few

studies on constraints faced by Gaushalas (Ponnusamy *et al.* 2017 and Mandi *et al.* 2018) [7, 4] there is only one systematic study which was conducted in Haryana on economic aspects of Gaushalas (Bijila and Singh, 2019) [1]. This paper attempts to study economic sustainability of Gaushalas in southern Karnataka state.

Materials and Methods
Study area and sampling
Karnataka state is located in southern part of India and has 31 administrative districts in Karnataka. A sample of 18 Gaushalas spread over 13 districts of Southern Karnataka was considered for the study. The official records and meeting with the responsible persons of the management using a pretested interview schedule were the data collection methods. The data were tabulated at district level for five consecutive years from 2015 to 2019 and average value was taken for analysis.

Analytical techniques
Ratio analysis
Ratio analysis was attempted to study the economics of Gaushalas. The following ratios were worked out.

$$\text{Operating Ratio} = \frac{\text{Total operating expenses}}{\text{Gross Income}}$$

$$\text{Fixed Ratio} = \frac{\text{Total fixed expenses}}{\text{Gross Income}}$$

$$\text{Gross Ratio} = \frac{\text{Total expenses}}{\text{Gross Income}}$$

Income diversification index
Herfindahl-Hirschman Index (*HHI*) was computed to know the extent of income diversification of Gaushalas. The degree of diversification can be measured using *HHI* as follows.

$$HHI = C^2_1 + C^2_2 + C^2_3 + C^2_4 + C^2_5 + C^2_6 + C^2_7 + C^2_8 + C^2_9$$

Where
$C_1, C_2, C_3. C_9$ = Proportion of different sources of income to total income of Gaushalas
After calculation of *HHI*, Herfindahl Diversification Index (*HDI*) was calculated as:

$$HDI = 1 - HHI$$

Higher the *HDI* value indicates higher the income diversification of the Gaushalas. Higher the income diversification of Gaushalas indicates higher the sustainability.

Economic sustainability of Gaushalas
The following economic indicators were worked out to arrive at Economic Sustainability Index (*ESI*).

Net income per animal
Net income has a positive effect on sustainability of Gaushalas.

$$\text{Net Income} = \frac{\text{Gross Returns} - \text{Total cost}}{\text{Standard Animal Units}}$$

Returns over variable cost
If this indicator comes out to be positive, then it shows that particular Gaushala is able to meet its variable cost.

$$\text{Returns over variable cost} = \frac{\text{Gross Returns} - \text{Variable Cost}}{\text{Standard Animal Units}}$$

Self-sufficiency/ Autonomy
Proportion of income obtained from the sales of Gaushala products to the total income. It includes the income sources other than obtained from government grants and donations.

Dependency
Dependency is calculated by computing the proportion of contribution of donations and government grants to total income. For a Gaushala to be sustainable, this indicator should be less.

Percentage of productive animals
The productive animals include in-milk and pregnant cows, in-milk and non-pregnant cows, pregnant heifers and service bulls. It has a positive effect on sustainability of Gaushalas. The data normalization was done to bring all the indicators to a common scale using Min-max technique.

$$I_i = \frac{X_i - MinX_i}{MaxX_i - MinX_i} \qquad (1)$$

$$I_i = \frac{MaxX_i - X_i}{MaxX_i - MinX_i} \qquad (2)$$

Where
X_i = Value of ith indicator
$i = 1, 2, 3 \ldots \ldots n$ indicators

Differential weights were assigned to indicators following Bijila and Singh (2019) [1] which was worked out based on expert opinions. The aggregate *ESI* was calculated as follows

$$ESI = \frac{\sum W_i I_i}{\sum W_i}$$

Where
I_i = Normalized value of ith indicator
W_i = Weight given to each indicator from experts
n = Number of indicators

ESI values varies from 0 to 1. The Gaushalas were grouped into three categories based on their value of *ESI*, *i.e.,* Gaushalas with *ESI* < 0.33 were considered as less sustainable, 0.33 < *ESI* < 0.66 were considered as moderately sustainable, while Gaushala with *ESI* > 0.66 were considered as highly sustainable.

Results and Discussion
Cattle population trends in Gaushalas
The herd composition of 18 Gaushalas studied is presented in Table 1. The Gaushalas considered in this study had a total of 7526 cattle. The range of cattle population in Gaushalas varied from maximum of 3328 in Mysore Gaushala to 42 animals in Tumkur-1 Gaushala. Of the total cattle 86 per cent were indigenous cattle, 13 per cent buffaloes followed by a meagre 1 per cent of crossbred. Among the indigenous cattle in the Gaushalas, most of them were old and unproductive cattle. Similar findings were also reported by Mandi *et al*. (2020) [6] that more than 95 per cent of the herd composition of 40 Gaushalas studied in Karnataka State was indigenous cattle followed by 5 percent of crossbred. The age-sex composition of cattle population is shown in Figure 1. The adult females constituted major portion of the total cattle population (39.03 per cent) followed by male adults (21.04 per cent). Figure 2 shows that there was an increasing trend in inflow of cattle population from 2016 to 2019 which included cattle abandoned by the farmers, the cattle rescued by the police officials from slaughter houses, cattle born in Gaushalas and the cattle purchased by the Gaushala management for having high genetic merit for breeding purposes. The outflow of cattle from Gaushalas was slightly decreasing which included cattle death in Gaushalas due to diseases, donation of heifers and male calves to progressive farmers for adoption and cattle sold.

Income and expenditure pattern of Gaushalas
The annual income and expenditure of the Gaushalas are presented in Table 2. The donation was the largest share (64.98%) to the overall revenue of the Gaushalas. The different sources of donations were charitable organisations, Gauseva Trusts, donation box, donation of temples, donation in festivals and cultural events, contribution of monthly donation by volunteer members, donation for feed and fodder and building sheds etc. The Government grants constituted 23.20% of the total revenue. In addition to these, Gaushalas also sell products such as milk, cow dung, manure, urine, arka, scrap sales, cattle sales, heifers, grain sales etc. The revenue from such sales contribute to the extent of 10.71%. The miscellaneous income included the discount received, interest on deposits and cow awards which accounts 3.16%.
The major expenditure in the Gaushalas was on feed and fodder (68.03%) followed by labour expenses (18.22 per cent), fixed expenses (7.81%) of total expenses which included permanent employee wages (6.16%) and depreciation of inventory of Gaushalas contributed to the extent of 1.65 per cent. Similar findings were reported by Bijla and Singh (2018) [10] who stated that the feed and fodder cost accounted for 50 per cent followed by labour expenses of 10 per cent. Miscellaneous expenditure (5.94%) includes expenditure on repair and maintenance, office and stationary products, fuel, transport, utility and other expenses, kitchen, agricultural, cultural expenditure and sundry item expenditure. The expenses do not include land as these are donated. Gaushala's inventory includes cattle sheds, store of fodder, chaff cutters, office buildings, vehicles, machinery, and equipment.

Financial ratio analysis of Gaushalas
Ratio analysis is an important tool for understanding the profitability of the Gaushalas and other financial consequences. It consists of three ratios such as fixed, operating and gross ratio. The overall operating ratio of the Gaushalas was found to be 0.68, which means that 68 per cent of gross income was used to cover working expenses (Table 3). The Gaushalas were able to cover their working expenses, but on long term basis they were not able to cover their total expenses as some of the Gaushalas had a negative net income (Table 4), but return over variable cost was positive. The overall gross ratio was found to be 0.79. This means that these Gaushalas were spending about 79% of their income in covering their total expenses. The Gaushalas in Chickmagalur, Hassan and Bengaluru urban-1 were completely at loss which can be seen with a gross ratio more than one.

Income diversification of Gaushalas
Income diversification holds close relation with economic sustainability. More the diversification of the activities of a Gaushala, higher will be its sustainability. The income diversification was computed using *HDI*. Higher the *HDI* higher will be the income diversification. Table 4 shows that Chitradurga-2 (0.77), Mysore Gaushala (0.73), Bengaluru rural-1 (0.68) and Mandya Gaushala (0.66) were highly diversified Gaushalas. The reasons for their high diversification were less dependence on just one source of funds. These Gaushalas were involved in selling milk, dung, medicines and other by-products. Such income sources in these Gaushalas contributed about 47% to gross income. The reason behind the diversification of these Gaushalas is increasing market demand for their products and better utilization of cow dung, urine and other usable wastes.

Economic sustainability of Gaushalas
ESI was calculated using five economic indicators *viz*. net income per animal, returns over variable cost per animal, self-sufficiency/ autonomy, dependency and proportion of productive cows (Table 4).

Net income
The annual net income was found negative for Chickmagalur, Hassan, Mysore and Bengaluru urban-1 Gaushalas. Gaushalas were able to cover only variable expenses from their revenue. Chiradurga-2 Gaushala was found to have the highest annual net income (₹15,436.74 per animal) followed by Chitradurga-1 Gaushala (₹8,962.74 per animal).

Returns over variable cost
The return over variable cost per animal per annum was found positive for most of the Gaushalas. This indicates that it was possible to cover the operating expenses. The returns over variable cost were highest for Chiradurga-2 (₹16,740 per animal). The returns were lowest for Hassan Gaushala (₹ 3.33 per animal).

Autonomy
The autonomy indicator shows that the income earned by the Gaushalas through sale of products such as milk, cow dung, compost, cow urine, medicines and other products.

Ramanagara Gaushala was found to be the most autonomous (87.42%) followed by Davangere Gaushala (68.87%).

Dependency

Dependency shows the extent of dependence of Gaushalas on outside sources to run the Gaushalas. It has negative effect on sustainability. The dependency was highest for Tumkur-1 Gaushala (75.00%) followed by Mandya Gaushalas (74.49%). The least dependent Gaushala was Ramanagara Gaushala.

Proportion of productive cows

Ramanagara Gaushala had the highest proportion of productive animals (80.17%) followed by Bengaluru urban-3 (49.12%). Chitradurga-1 Gaushala had the least productive animals (4.14%).

Economic sustainability index

The *ESI* value of Gaushalas varied from 0.19 to 0.68 (Table 4). About 39 per cent of Gaushalas were less sustainable, 55 per cent moderately sustainable and only 6 per cent were under high sustainable category. Gaushalas under low sustainable category are Bengaluru urban-2, Bangalore urban-3, Chamarajanagar, Mandya, Mysore and Tumkur-1, Tumkur-2. Gaushalas under moderate sustainable category are moderate sustainability are Bengaluru urban-1, Bengaluru urban-2, Bengaluru rural, Chickmagalur, Chitradurga-1, Davangere, Hassan, Kolar, Ramanagara and Shimogha. Chitradurga-2 was only Gaushala under high sustainable category.

Table 1: Distribution of cattle population across Gaushalas

S. No	District	Indigenous cattle (%)	Crossbred Cattle (%)	Buffalo (%)	Total
1	Bengaluru urban-1	49	0	0	49
2	Bengaluru urban-2	55	2	0	57
3	Bengaluru urban-3	57	0	0	57
4	Bengaluru rural-1	652	0	0	652
5	Bengaluru rural-2	159	27	15	201
6	Chamarajanagar	180	0	0	180
7	Chickmagalur	180	0	0	180
8	Chitradurga-1	240	0	50	290
9	Chitradurga-2	224	0	0	224
10	Davangere	413	0	10	423
11	Hassan	234	0	58	292
12	Kolar	200	0	0	200
13	Mandya	170	20	50	240
14	Mysore	2022	0	1306	3328
15	Ramanagara	116	0	0	116
16	Tumkur-1	42	0	0	42
17	Tumkur-2	250	0	400	650
18	Shimogha	314	0	31	345
	Total	5557	49	1920	7526

Table 2: Annual income and expenditure of Gaushalas (Rs lakh/year)

Income sources	Income	Expenditure items	Expenditure
Donations	349.9 (32.32)	Total fixed cost	72.75 (7.82)
Govt. grants	125.15 (11.56)	Green fodder	59.64 (6.40)
Milk	211.10 (19.49)	Dry fodder	531.48 (57.06)
Milk products	3.6 (0.33)	Concentrates	42.48 (4.56)
Dung	322.04 (29.74)	Total feed cost	633.60 (68.03)
Compost	1.6 (0.15)	Cost of depreciation	15.39 (1.65)
Cow urine	2.5 (0.23)	Salaries of permanent staff	57.36 (6.16)
Phenyl	61.84 (5.72)	Labour expenses	169,68 (18.22)
Panchagavya	1.2 (0.11)	Veterinary expenses	123.90 (1.33)
Vermicompost	2.00 (0.19)	Miscellaneous expenditure	42.90 (4.61)
Gross income	1080.89 (100)	Total expenditure	931.36 (100)
		Net income	-1495.30

Table 3: Financial ratio analysis of Gaushalas

S. No	District	Fixed ratio	Operating ratio	Gross ratio
1	Bengaluru urban-1	0.09	1.00	1.08
2	Bengaluru urban-2	0.12	0.54	0.66
3	Bengaluru urban-3	0.26	0.72	0.98
4	Bengaluru rural-1	0.24	0.70	0.95
5	Bengaluru rural-2	0.06	0.53	0.59
6	Chamarajanagar	0.09	0.71	0.80
7	Chickmagalur	0.23	1.00	1.08
8	Chitradurga 1	0.09	0.41	0.50
9	Chitradurga 2	0.05	0.32	0.37
10	Davangere	0.06	0.75	0.82
11	Hassan	0.08	1.00	1.08
12	Kolar	0.23	0.48	0.72
13	Mandya	0.07	0.42	0.50
14	Mysore	0.02	0.99	1.00
15	Ramanagara	0.04	0.95	1.00
16	Tumkur 1	0.02	0.53	0.56
17	Tumkur 2	0.08	0.53	0.61
18	Shimogha	0.06	0.66	0.73
	Overall	0.11	0.68	0.79

Table 4: Income diversification index and economic sustainability index of Gaushalas

District	HDI	Annual net income (Rs/ animal)	Returns over variable cost (Rs/ animal)	Autonomy (%)	Dependency (%)	Productive animals (%)	ESI
Bengaluru urban- 1	0.56	-4030.45	161.22	100.00	0.00	44.90	0.51
Bengaluru urban-2	0.36	8477.95	11491.23	23.73	76.27	36.36	0.36
Bengaluru urban- 3	0.41	381.00	4912.28	28.57	71.43	49.12	0.25
Bengaluru rural-1	0.68	702.65	3845.09	79.41	20.59	13.80	0.42
Bengaluru rural-2	0.40	6624.86	7552.24	27.78	72.22	18.41	0.27
Chamarajnagar	0.47	2110.82	3100.00	37.50	62.50	5.56	0.19
Chickmagalur	0.27	-1536.14	27.78	35.48	64.52	33.89	0.43
Chitradurga-1	0.67	8962.74	10506.02	34.69	65.31	4.14	0.34
Chitradurga-2	0.77	15436.74	16740.91	49.64	50.36	39.73	0.68
Davangere	0.66	1993.41	2683.22	68.87	31.13	19.14	0.38
Hassan	0.67	-711.20	3.33	68.65	31.35	36.64	0.36
Kolar	0.54	4867.03	8891.00	47.60	52.40	27.00	0.39
Mandya	0.66	7376.15	8464.58	25.51	74.49	8.00	0.23
Mysore	0.73	-62.70	186.15	54.28	45.72	18.99	0.25
Ramanagara	0.45	126.04	1275.86	87.42	12.58	80.17	0.59
Tumkur-1	0.38	7619.78	8047.62	25.00	75.00	23.81	0.28
Tumkur- 2	0.54	3499.27	4257.69	61.25	38.75	6.78	0.32
Shimogha	0.62	2124.76	2064.06	68.95	31.05	27.54	0.40
Overall Mean	0.55	3553.48	94750.28	54.04	45.96	26.62	0.37
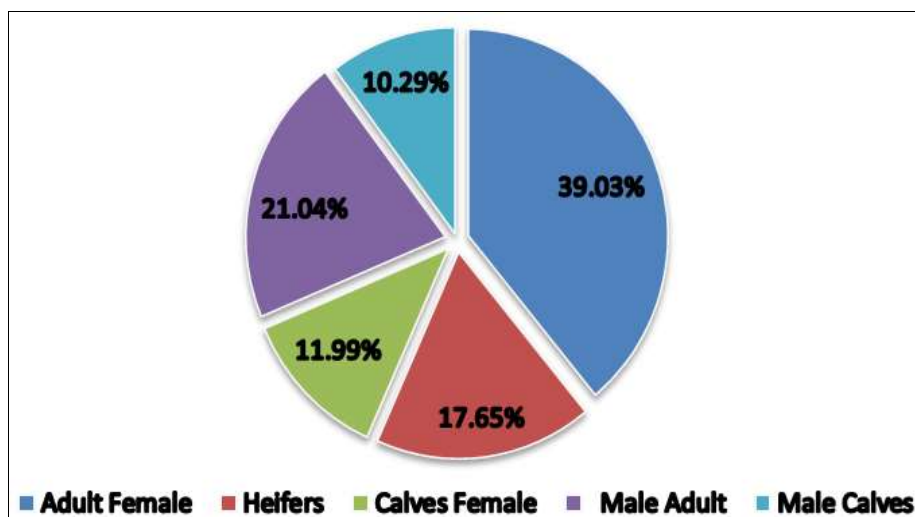
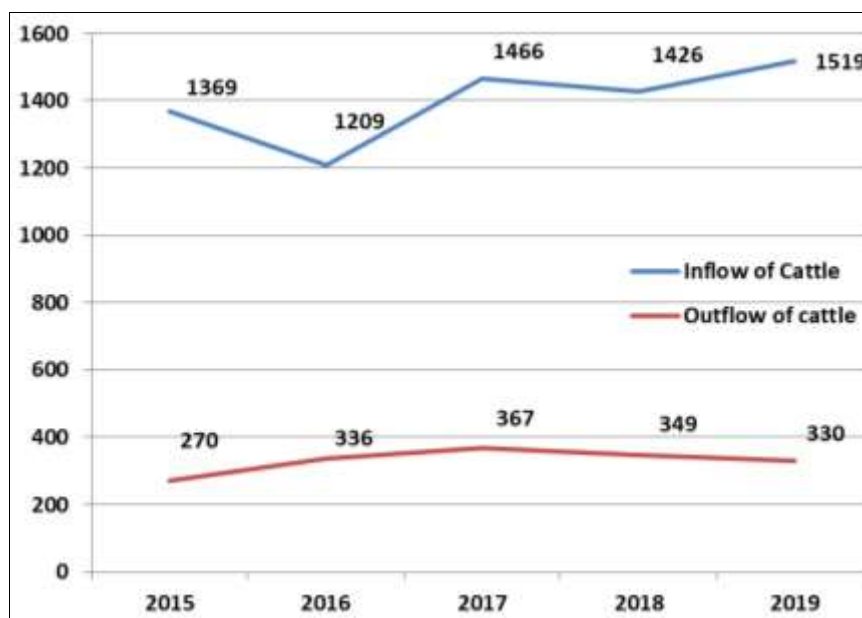**Fig 1:** The age-sex composition of cattle population

Fig 2: Trends in inflow and outflow of cattle in selected Gaushalas

Conclusions

Of 18 Gaushalas considered for the study about 39% of Gaushalas were less sustainable, 55% moderately sustainable and only 6 per cent were under high sustainable category. The Gaushalas are run mostly with donations and Government grants. Government grants are inadequate and irregular. Most of the Gaushalas were able to cover their operating expenses. The net income was found to be negative for some Gaushalas due to higher expenditure on feed and fodder. Hence, providing good quality feed and fodder at reasonable prices will help lowering the variable expenses of Gaushalas. A positive relationship was found between income diversification and sustainability of the Gaushalas. The income from sale of milk, cow urine, cow dung, manure etc. have great potentials to make the Gaushalas self-sustainable. Gaushalas located outside the cities are better performing due to sufficient space and availability of grazing land, which lowers the feeding expenses. Hence, the Government should encourage these Gaushalas and should restrict the number of Gaushalas in the cities. Gaushalas can start charging nominal fee from those farmers who leave their animals in Gaushalas to generate some income. Even though some Gaushalas were preparing organic manures like Panchagavya, Jeevamritham, Goark, incense sticks, soaps, pain relievers, perfumes and other cow dung and urine-based products but lacks in marketing. In order to market the products efficiently there should be a joint commercial venture among the Gaushalas. Gaushalas should follow Good Dairy Management Practices (GDMPs) and increase milk production as it is being an important source of income to the Gaushalas.

Acknowledgements

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