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Ranking of constraints faced by Kulli cattle rearers using garrett's ranking method in Thanjavur district

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Abstract

The study aimed to identify the key constraints faced by the Thanjavur kulli cattle rearers in Thanjavur District. Thanjavur kulli cattle is a miniature type of cattle found to be very less in numbers and scattered in and around Thanjavur districts. Compared with cross bred population, Native cattle population is decreasing in numbers and slowly getting vanished from its breeding tracts. The major problems faced by the farmers rearing Thanjavur kulli cattle were analyzed by Garrett Ranking Method to assess their satisfaction levels. The findings revealed that the most significant challenges included the production and reproduction risks - non-availability of breeding bulls and cows for breeding, non-availability of breeders society as the most concern and Management practices such as finance and land space for rearing cattle was the least concern.

Keywords: Thanjavur Miniature cattle, Garret ranking, Livelihood security. Constraints in native cattle

1. Introduction

Agriculture is one of the major source of income for the rural sectors in India but risky professions with many uncertainties (Kumar. *et al.*, 2021) ^[1]. Livestock is the key pillar, sub sector and integral part of agriculture in India. During natural calamities livestock sector supports for many farmers and landless labours and ensures their livelihood security. Since livestock rearing is one of the major sources of income for the farmers in India. Livestock sector contributes directly to the national growth from the rural poor. Growth rate in livestock sector is always keeping the same pace and without adequate investment. Among rural households, ownership of the livestock is more evenly distributed than land and other assets. (Abhay Kumar *et al.* 2012) ^[2]. The progress in the livestock sector resulted in balanced development of the rural economy particularly in reducing the poverty amongst the weaker section of the country as well providing better protein diet with minimal price. More over the rural women plays a significant role in Animal Husbandry and are directly involved in most of the routine operations relating to feeding, breeding, management and healthcare of the livestock which in turn supports and ensures better livelihood. Since ancient times, Indigenous cattle populations are diverse, and they have unique genetic features including the capacity to resist diseases, adapt to heat and drought, and feed on forages of poor nutritional value and low maintenance cost. (Prabex S *et al.* 2025) ^[3] The various indigenous breeds of agricultural animals are mostly the consequences of evolutionary processes. Due to haphazard breeding and the introduction of exotic germplasm through cross-breeding, many of the native germ plasm and local breeds are now vulnerable to rapid genetic dilution (Mursyidin *et al.*, 2022). ^[4] Another reason for the decline in the number of indigenous cattle breeds is a drop in the extent of land holdings (Soumya *et al.*, 2022) ^[5]. The number of indigenous cattle has decreased for a variety of reasons, including low productivity, short lactation periods and a lack of progeny tested bulls. Agriculture's mechanisation has made the things even worse. As cultivable land holdings are decreasing day by day the interest among the farmers in rearing of livestock's in rural areas for livelihood also getting decreased and as a result farmers are moving to urban cities for finding the job. To meet the necessity of better animal protein like ghee, cow milk and other protein rich milk by -products for future generations, intensive efforts are needed to

safe guard and grow indigenous cattle for better conservation. When a breed's population is on the verge of extinction or is considered to be endangered, it must be preserved. One among the native cattle reared in Thanjavur district is Thanjavur kulli or a miniature type of cattle. (Kulli means short in local language) Since the adult Thanjavur kulli animal looks like a calf these cattle was called as kulli cattle and more numbers of animals can be well managed in a less space particularly by women. But in the recent past the total numbers of Thanjavur kulli cattle numbers are getting decreased and hence this study was undertaken to identify the problems faced by the farmers or Thanjavur kulli cattle owners in the field by garrett ranking method.

2. Materials and Methods

2.1. Study area: This study was conducted in three districts and in each district two blocks were selected where the kulli cattle population is dense and farmer's reared these cattle generation after generation.

Budalur and Orathanadu blocks in Thanjavur district, Thiruvermbur and Lalgudi blocks in Trichy districts, kandharvakottai and karambakudi blocks in pudukottai districts were selected. Since these cattle numbers are very minimal in numbers wherever the interested farmers rearing these cattle in groups were identified and one adult member of the household actively managing the animal was selected as respondents.

2.2. Data collection: Semi-structured questionnaires were prepared and translated into local language. It was pre tested and adjusted based on respondent's feedback to ensure that it met our research goals and can be comprehensible for further analysis. From each district 15 to 20 numbers of cattle owners rearing Thanjavur kulli cattle were identified and a sub total of 50 animal owners were included in the study. In the survey schedule, five major risks associated with cattle rearing were included and 10 factors were included for ranking. All the 10

factors were ranked by the respondents in the range of 1 to 10 in which rank 1 indicates the most significant risk and rank 10 indicates the least significant risk faced by the animal rearers.

2.3. Garrett ranking method: Garrett ranking method was used to identify the order of constraints faced by the farmers. Garrett ranking provides the change of orders of constraints into numerical scores. The constraints are arranged in order to its severity from the respondent's data. (Zalkuwi *et al.*, 2015).^[6] by calculating the respondent's data as a factor of the percentage position value using the following formula.

$$\text{Percentage position} = 100(R_{ij} - 0.5) / N_j$$

Where, R_{ij} = Rank has been given for the i^{th} risk statement by the j^{th} respondent.

N_j = Number of risk statements ranked by the j^{th} respondent.

The percentage position of each rank was converted to scores by referring to the Garrett ranking tables given by Garrett and Woodworth (1969)^[7]. The total score was then calculated for each factor by adding the scores of each respondent. This total score was then divided by the total number of respondents whose scores were collected. The mean scores for all the constraints were arranged from high to low order according to the rank allotted.

3. Results and Discussion

3.1. Ranking of major constraints faced by the livestock keepers of Thanjavur kulli cattle

The constraints faced by the livestock keepers or farmers rearing thanjavur kulli cattle were identified from the research point by survey method and the numbers were given from 1 to 10 as F1 to F10 which indicates the major ten constraints identified in the field which was presented in Table 1.

3.2. Type of risk and risk statement

Table 1: Ranking of the constraints faced by the Farmers and animal owners in Thanjavur Kulli Cattle rearing.

Factors	Type of risk / Constraints	Category
F1	Lack of Space for sheltering the animals.	a. Management practices
F2	Lack of Finance/ capital for Own land.	
F3	Lack of grazing land	b. Constraints in feeding practices
F4	High cost of concentrate feed and Lack of feeding knowledge about balanced ration.	
F5	Lower market value of cattle while selling.	c. Economic Risk
F6	Non availability of health care for animals.	
F7	Low milk production and less income return when compared to cross bred cattle.	d. Production / Reproduction Risk
F8	Non availability of pure bred Thanjavur kulli cattle for breeding due to mechanisation in agriculture and non availability of registered breeders society.	
F9	Constraints in Obtaining bank loan.	e. Personal risk
F10	Labour issues and Not willing to raise cattle due to shifting to urbanisation.	

In the prepared survey schedule a total of five major categories of constraints or risks were identified and in each category two major constraints or factors were ranked by the farmers (respondent) in the range 1 to 10 by following the thumb rule that a unique rank was allotted to each risk. Rank 1 provides to most significant risk sources while rank 10 assigned to least significant risk source from all selected risk sources.

Table 2 indicates the total respondents overall view about each factor for the ranks. A total of 10 factors were taken and analyzed for the severity, and we asked the respondent to give 1st rank for the most constraint factor and asked to give 10th rank for the least one.

Table 3 provides the percent position for each factor which

was calculated as per henry Garrett ranking conversion table. As per the table value the first one got 5 percent and the corresponding Garrett value was 82.

$$\text{Formula for percent position} = 100(R_{ji} - 0.5) / N_j$$

Where R_{ji} = 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th and 10th Ranks

N_j = Total rank given by 100 respondents.

As per Table 3, the first factor having 5 percent position, second factor having 15 percent position and so on upto tenth factor having 95 percent position. Table 4 indicates the garrett value calculation from the percent position.

Table 2: Respondents rank for each factor.

Factors/ Rank	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th
F1	3	2	5	2	6	5	5	8	7	7
F2	10	6	6	5	6	5	4	3	3	2
F3	5	7	8	3	8	8	4	2	3	2
F4	13	11	5	4	2	3	4	2	3	3
F5	18	12	5	4	2	3	1	2	2	1
F6	20	11	3	5	2	1	3	2	1	2
F7	15	11	5	3	4	2	1	4	2	3
F8	21	10	6	4	2	1	2	1	2	1
F9	18	8	3	5	2	3	5	2	2	2
F10	13	10	6	4	5	2	3	4	2	1

Table 3: Percent position calculation for each factor.

Rank	$100(R_{ji}-0.5)/N_j$	Percent Position
1	$100(1-0.5)/10$	5
2	$100(2-0.5)/10$	15
3	$100(3-0.5)/10$	25
4	$100(4-0.5)/10$	35
5	$100(5-0.5)/10$	45
6	$100(6-0.5)/10$	55
7	$100(7-0.5)/10$	65
8	$100(8-0.5)/10$	75
9	$100(9-0.5)/10$	85
10	$100(10-0.5)/10$	95

Table 4: Garrett Value calculation.

Rank	Percent Position value	Garrett value
1	5	82
2	15	70
3	25	63
4	35	58
5	45	52
6	55	48
7	65	42
8	75	36
9	85	29
10	95	18

Table. 5. Depicts that each rank multiplied by garrett value. Table. 6. indicates the total garrett score, mean garrett score and the final rank after garrett ranking method.

Table 5: Each rank multiplied by the Garrett value.

Factors/ RANK	1*82	2*70	3*63	4*58	5*52	6*48	7*42	8*36	9*29	10*18
F1	246	140	315	116	312	240	210	288	203	126
F2	820	420	378	290	312	240	168	108	87	36
F3	410	490	504	174	416	384	168	72	87	36
F4	1066	770	315	232	104	144	168	72	87	54
F5	1476	840	315	232	104	144	42	72	58	18
F6	1640	770	189	290	104	48	126	72	29	36
F7	1230	770	315	174	208	96	42	144	58	54
F8	1722	700	378	232	104	48	84	36	58	18
F9	1476	560	189	290	104	144	210	72	58	36
F10	1066	700	378	232	260	96	126	144	58	18

Table 6: Total score, mean garrett score and final rank after garrett ranking method.

Factors/ Rank	Total score	Mean garrett score	Final rank
F1	2196	43.92	10
F2	2859	57.18	8
F3	2741	54.82	9
F4	3012	60.24	7
F5	3301	66.02	3
F6	3304	66.08	2
F7	3091	61.82	5
F8	3380	67.6	1
F9	3139	62.78	4
F10	3078	61.56	6

Figure 1 to 4 indicates the graphical representation of the ranking of the respondents to each factor, garrett value. Total and mean garrett score respectively.

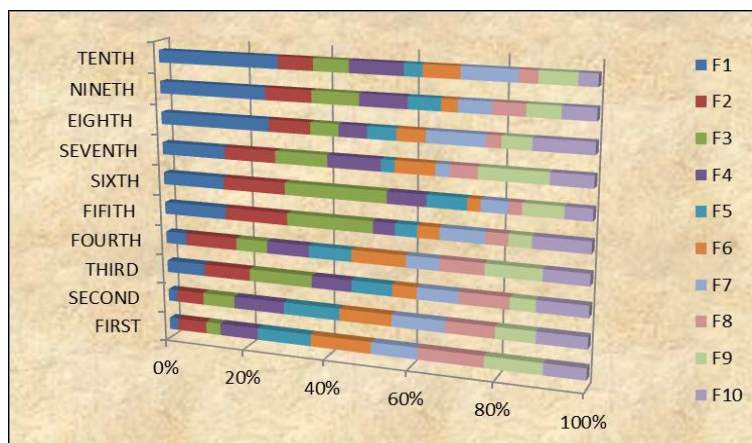


Fig 1: Ranking of the respondents to each factor

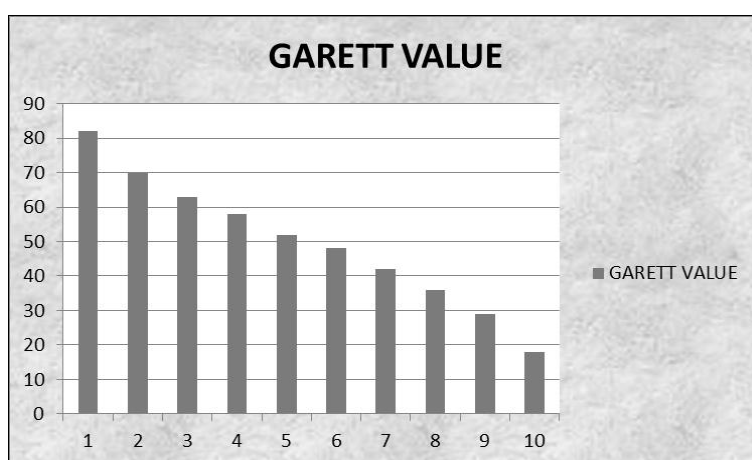


Fig 2: Garrett value for each factor

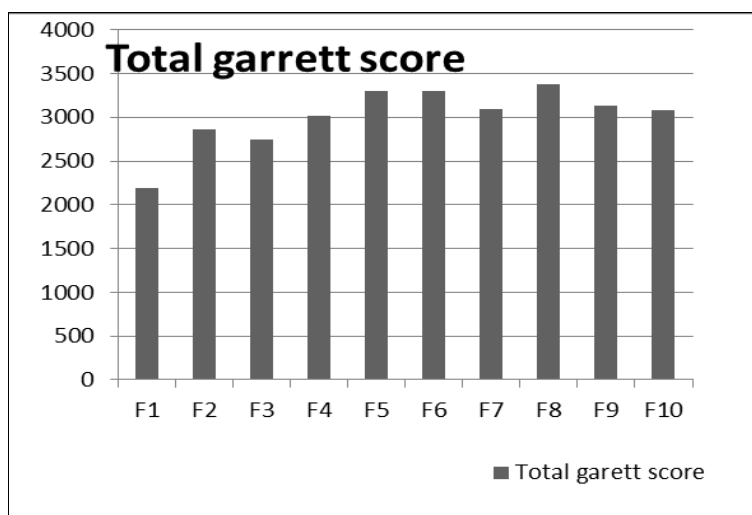


Fig 3: Total garrett score for each factor

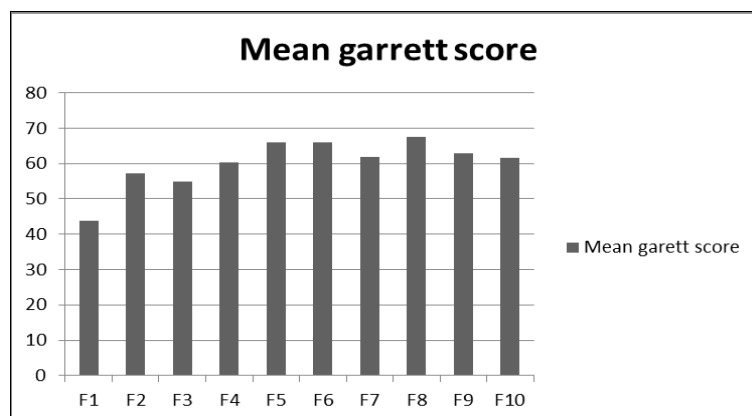


Fig 4: Mean garrett score for each factor

4. Results and Discussions

Production and reproduction risk is always in the top constraint faced by the livestock keepers. Low milk production and less income return and non-availability of pure bred is the major constraints faced by the livestock keepers (Jayavarathan *et al.* 2012) [8]. Management practices like lack of space for rearing and capital to own land for rearing animals is the least priority after garrett ranking method. But it was given first priority by the farmers before ranking.

5. Conclusion

Cattle have long played a central role in agriculture, contributing significantly to livelihoods, culture, and food security worldwide (Kolekar *et al.* 2023) [9]. Despite their significance, modern farming threatens the major resources including non-exploitation of the potential of native cattle breeds, random crossbreeding with exotic breeds, urbanization and market shifts (Selvan *et al.* 2022) [10]. Youth's disinterest in crop-livestock agriculture and the inability to pass down animal keeper knowledge to the next generation leads to a loss of cultural identity and heritage when breeds go extinct (Li *et al.* 2024) [11]. Decreasing trend in the native cattle population necessitates documentation of farmers' preferences and to address the breeding practices at the household level. This knowledge is critical from the perspective of conservation and documentation of this native cattle as registered breed for development of new ideas which is highly essential for the food security of millions of farmers, and to formulate future research strategies on cattle breeding and conservation of elite native cattle breeds in the breeding tracts.

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