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Animal husbandry practices of *Soliga* tribe in core and buffer zone of Biligiri Rangana hills of Karnataka

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Soliga is a Scheduled Tribe, which lives in the hilly forest areas of Bili Giri Rangana hill and Mahadeshwara hill of Chamarajanagar district. After declaration of Bili Giri Ranganath Temple as wildlife sanctuary (1974), *Soliga* lifestyle got affected and displaced *Soligas* settlements to periphery (Buffer area) and allowed some of the settlements inside (Core area) the forest. Presently, after passing of Recognition of Forest Rights Act, 2006, *Soliga*s have been vested rights to the forest and land as well as given opportunity for collaborative management. The government agencies worked in *Soliga*'s area, only with respect to anthropological point of view like providing medical facilities', electricity, low cost houses and other basic necessities. However, livelihood security by improving the income through animal husbandry is not worked out. A detailed survey of the available literature on the lifestyle of the *Soliga* tribe in general, and those residing in BRT Wildlife Sanctuary in particular, reveals that there are hardly any studies available on the animal husbandry practices. Thus the study was undertaken to compare the animal husbandry of *Soligas* in buffer and core zone of B R Hills.

The present study was carried out in Biligiri Rangaswamy Temple (BRT) Wildlife Sanctuary located in the Chamarajanagar district of Karnataka. It covers three taluks, viz. Yelandur, Chamarajanagar, and Kollegal. It lies in the coordinates of 77°–77°16'E, 11°47'–12°9'N, covering an area of 540 sq km. It has warm hilly weathers and houses 61 *Podus* (colonies) of which Yelandur has 10 *Podus*, Chamarajanagar has 25 *Podus*, and Kollegal has 26 *Podus*/ colonies. Respondents (105) from 11 villages of core zone (inner most area) and 149 respondents from 16 villages of buffer zone (*peripheral area*) were selected for the study.

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Only the head of the family/responsible person of the family was considered for the purpose of the interview and recorded in predefined schedule.

The parameters collected from the selected respondents were livestock holding (total number of livestock possessed by the respondent at the time of investigation). Percentage of respondents was calculated for each species and respondents of one species were also calculated for other species. Numbers of animals in each different stage were also calculated for each species, rearing system (Semi extensive, housed during night hours; Intensive, housed 24 h and fed inside the building and Backyard, birds are let loose in the back yard during day time and housed in the night), type of housing (Open, area fenced without any roofing material; Closed, shed with side wall with roofing), shelter use pattern (Whether shelter provided during night only, day only or both during day and night was recorded), housing location (Shed is attached to dwelling, near to dwelling or away from the own dwelling was recorded), floor space availability (On observation of animal shed inside, if there is any placement of body extremities, viz. leg, head of one animal on body part of the other animal was considered as crowded or less space provided. If there are no such incidents, then it is considered as sufficient space), lighting and ventilation (If there is proper visibility inside the shed, then it was considered as sufficient. If there is dried floor and no suffocation inside the shed considered as good ventilation), type of floor (Floor made of *Earthen/ Kutchha*, *Brick paved or Cement/Pucca* was noted), type of pillar, Roof / manger (Type of pillars used for supporting the roof was noted based on their feedback and physical observation), side wall material (Wall made of brick and cement or brick and mud was recorded for each respondent), duration of grazing hours (Time and duration for which animals were taken for grazing during day hours both in core zone and buffer zone was recorded), diet (Dry fodder like maize, ragi and Jowar or dry leaves, green fodder like maize or lopped forest tree leaves (or sometimes *Kadusoppu*), Grains like millets, cereals etc. Kitchen waste if any was recorded), animal husbandry practices and

marketing (Type of breed, breeding by natural service or by artificial insemination, practices like colostrum feeding etc. was recorded. Any Sale of live animals and animal products and sale of dung as a manure was also noted) and general ill conditions (Respondents were asked regarding commonly occurring ill conditions in their livestock based on their experience. Then respondents were asked to rank as 1 to 7 based on seriousness of economic loss and frequency of occurrence. The ill condition ranked as 1 was given highest score (7) and vice versa. Then total score was summed for all respondents. Then final ranking was done. Further, frequency percentage was also calculated for each disease).

The data collected from respondents were coded, tabulated, analyzed and presented in the form of tables. The various statistical tools like arithmetic mean, percentage, and chi square test etc were used in analysis of data.

The percentage of livestock keepers in core and buffer zone was 67.6% and 65.77% respectively. The effect of livestock possessed by respondents in two zones differed significantly ($P<0.05$). Although, rest of the people had animals at one or other time but were sold in difficult times. Those who had livestock kept either one of the species like goat, sheep, cattle and poultry and mixture of all. All animals were reared with zero input. The predominant species in core zone was goats (41.9%) followed by poultry (17.14%), cattle (16.19%) and sheep (8%). In buffer zone, people had cattle (40.93%), goat (36.24%), poultry (6.04%) and sheep (11.40%). Relatively high percentage of cattle and sheep was found in buffer zone. However, poultry rearers were relatively higher (17.14%) in core zone compared to buffer zone (6.04%). Results clearly indicate that in buffer zone cattle and goats are most preferred species and conversely in core zone goat and poultry are more preferred species. There is no trend of buffalo rearing among the *Soligas* in both core and buffer zone as *Soligas* believe that if they consume the buffalo milk their intelligence will be decreased. The goat ($P<0.01$), cattle ($P<0.01$) and sheep ($P<0.05$) rearing significantly differed in core and buffer zone.

Among each species, percentage of female adult of goat (39.42%), cattle (6.2%) and sheep (41.42%) was higher in core and buffer zone followed by lactating goat (18.53%), cattle (23.65%), and sheep (15.71%). This indicates that males were removed as and when they felt excess or for their emergency need leading to more female adults in the group. Results show that 18% of the respondents had bullock in buffer zone and 3.22% in core zone. This clearly indicates that bullocks are used for ploughing in the buffer zone for growing agricultural crops like *ragi* and maize. However, respondents though had land in the core zone, but mostly used for growing pepper and *ragi* where bullocks are not so important. Further, poultry was also kept as alternative species in core zone. A study by Sorathiya (2015) showed combination of goat keeping with other classes of livestock by *Ahirs* tribal in Gujarat.

All *Soligas* provided green fodder during night time. This green fodder is generally harvested from forest. Therefore, it is more significant in core zone. Few *Soliga*s (around 16–18%) provided the dry fodder in core zone. Dry fodder is mainly consisted of dry leaves harvested from forest (*kadusoppu*) and sometimes straw. However, majority of the farmers provided dry straw during night hours. Less people provided only grains as supplements in core zone. Conversely, majority (60–80%) of the farmers in buffer zone provided grains as supplement feeds. This could be due to more growing of grains in agricultural fields. Smriti (2013) revealed that majority (76.25%) of the respondents did not adopt balanced concentrate feeding.

Supplementation of kitchen was also followed in buffer zone for both large and small ruminants. In case of poultry, majority of the *Soligas* fed grains and kitchen waste in both zones. Tailor *et al.* (2012) indicated that major constraints faced by tribal farmers were non-availability of green fodder throughout the year. Maousami (2015) reported that 63.7% respondents were following grazing system and 80% respondents offered only straw at hill *Korwa* of Chattisgarh. Further, it was revealed that few (13%) respondents were offering feed thrice and this finding was in line with the findings of Mishra *et al.* (2017), Sharma and Singh (2008), Singh *et al.* (2013).

More than 60% of the *Soliga*s grazed in groups and rest of the people took their animals separately in smaller groups. Conversely in core zone more people took their animals separately for grazing. Generally it was observed that 2 or 3 person used to take the cattle and other species of the whole village. They used to get some token amount for taking other's animals for grazing. In both core and buffer zone, animals were taken for grazing daily. There were no conflicts between two herds while grazing activity. This was true even for buffer zone. Sorathiya (2015) studied that majority of *Ahirs* (79%) were herding the goats mutually especially the person from their combined flocks was employed for the herding. Only 70% of the villages had community drinking water in the core zone while 93% of villages in buffer zone had community drinking water facility which was built by local bodies. Our study revealed that running stream, pond, harvested water, rain and well are common source of water. Very few villages in core zone (6) and in buffer zone (14) had water storage facility. Nandi *et al.* (2011) found that pond water is the major source of drinking water (58.14%) for Bengal Goats in West Bengal of goats.

All (100%) the farmers followed the semi extensive system of rearing both in buffer zone and core zone, wherein animals were taken for grazing during day time. Maousami (2015) also reported that majority (86.9%) of respondents were practicing semi-intensive system of rearing in hill *Korwa* tribes in Chattisgarh state. Few (41%) of respondents were using bamboo and woods whereas majority (59%) respondents were using *kachcha* (mud) house as housing material for poultry.

In buffer zone, animals were let loose in the early morning (around 7 AM) to hilly region and brought back in the evening (around 6 PM). There is a trend of taking all categories of animals belonging to different owners by one or two persons

of the village. He will be paid nominal fee for that. Same trend was also being followed in core zone. However, timings were different. In the core zone animals were taken for grazing after 10 AM and brought back at around 4 PM in the evening. In the core zone both in the early morning and late evening, there is possibility of wild animal movement. In buffer zone, *Soligas* kept the animals in open house (100%), where there will be only fenced area without covered area. Brajmohan *et al.* (2010) reported that the goats were released in the morning and allowed to graze on natural grazing land and road side grazing areas till evening. Smriti (2013) revealed that 60% of respondents kept their animals for grazing as well as stall feeding and 40% respondents adopted only stall feeding. However, all *Soligas* had closed type of housing in core zone as livestock is to be protected from predators. However, it had reverse trend in buffer zone and very few (8%) respondents had the facility of close house to keep the calf, pregnant, sick animals. Further, poultry were always kept in closed house system both in buffer and core zone to prevent from predators.

The location of cattle shed was adjacent to their dwelling in core zone, however, in case of buffer zone, 35%, 8% and 57% respondents had shed attached to dwelling, near to dwelling and at the field respectively. In majority (95–98%) of the houses, floor space was not adequate for cattle, sheep, goat and poultry. This could be due to scarcity of land. This also holds same to buffer zone as well. Natural Light was adequate in both core zone (97%) and buffer zone (93%). This could be due to half side wall and that half side wall was also made from wooden materials. Majority of the shed were well ventilated due to perforated side wall. Majority of houses were dirty from inside both in core and buffer zone. This dirtiness was due to uneven mud floor that led to stagnation of urine, faeces and also due to higher stocking density (of different species). Majority (98–100%) of the sheds had earthen floor. This was covered with bedding materials in the evening hours. This not only helped in reducing filthiness but also helped in preparation of organic manure. Maousami (2015) reported that only 37.5% respondents were cleaning the sheds daily. Kulkarni and Jawahar (2000) also reported that 82.50% of small goat holders did not adopt the sanitary practices in their goat shed.

The pillar used in construction of the animal shed was made up of wood in both zones. However, few people (2–5%) also used readymade concrete pillars. Nearly 42–50% of people used full wall for the shed and rest of the respondents constructed half wall. The similar trend was also observed in buffer zone but of relative percentage (30–40%). In case of full wall construction, material used for construction was either brick or mud and sometimes both.

The roof was mainly made up of thatched roof material followed by tiles and GI sheets. But no respondent had asbestos sheet roof. All (100%) respondents from study area were using temporary housing. Maousami (2015) reported that majority (68.7%) of the owners were using bamboo and woods as housing material for shed whereas 31.2% were using *kachcha* (Mud) house in hill *Korwa* tribes in Chattisgarh state.

The majority (95–98%) of the people had not provided any facility for feeding inside the shed. But those who have provided, it was mainly made of wooden materials (88–95%). More than 90% of the people kept non-descript cattle breeds in both zones. Only few people kept local recognized breed like Bargur. Most of the people in core zone (96%) and in buffer zone (91%) followed natural service practices and rest followed artificial insemination. Breeding of animals is done not by choice but rather naturally during grazing hours. Respondents who had not kept male animal for mating were dependent on other owners who owned males. The effect of breeds and breeding management practiced by respondents in two zones was not significant ($P>0.05$). Maousami (2015) reported that 87.5% of respondents were preferring natural service for cattle, only 12.5% respondents were practicing artificial insemination. Smriti (2013) revealed that 93.75% adopted artificial insemination.

Colostrums feeding was not practiced in both the zones of B.R. hills. There was tendency of making sweets from colostrum in the area. Smriti (2013) revealed that 97.50% tribal respondents adopted colostrum feeding to their new born calves. Maousami (2015) reported that only 11.9% respondents of were taking special care of dam before and after birth to new born.

There was no special management care given to either pregnant or lactating animals. However, efforts were made to keep the advance pregnant animal separate wherever possible. Live animals were slaughtered and the meat was sold during traditional festivals of *Soligas* like *Mari habba, Kulemari*, birth day and obituary ceremonies. Whenever slaughtering of goat and sheep was done, it was shared on cost basis (₹ 5000–₹ 6000/animal) within the village. Dung was not sold in the core zone as it is being completely used by themselves for their agriculture field as manure. However, most (85%) of *Soliga*s in buffer zone sold (₹ 1200/ tractor load) the dung to people as there is lot of demand for organic manure.

Among the general ill conditions, diarrhoea, fever, off-feed, cold or pneumonia, constipation, wound and lameness ranked 1, 2, 3, 4, 5, 6 and 7, respectively in core zone based on score system. The total scoring of the respective ailments were 495, 494, 416, 314, 216, 171 and 142 respectively. Corresponding ailments in buffer zone had ranking in order as off-feed, diarrhoea, fever, cold or pneumonia, constipation, wound and lameness, and score were 632, 625, 458, 427, 260, 232, 117 respectively. Diarrhoea ranked first in core zone while off-feed ranked first in buffer zone. The effect of general ill conditions of livestock as per respondents in two zones was not significant ($P>0.05$).

Among metabolic diseases, bloat, toxicity, acidosis, ketosis and milk fever scored 442, 392, 335, 164 and 140 respectively and hence ranking order was 1, 2, 3, 4, 5 and 6 in core zone. The score for toxicity, bloat, acidosis, ketosis and milk fever was 370, 315, 227, 184, 124, 112, 101,

respectively in buffer zone. Based on score method bloat ranked first followed by toxicity, acidosis, ketosis, milk fever in core zone. However in buffer zone, it was toxicity, bloat and the rest remained in same order. The effect of metabolic diseases of livestock by respondents in two zones was not significant (P>0.05). Jyoti (2017) reported that bloat or tympanitis was one of the most common digestive disorders in livestock as reported by the respondents. This problem is largely associated with grazing of lush pasture, which contains a high portion of clover.

In case of parasitic disease, the score for external parasitic and internal parasitic diseases was 112 and 101 and ranked as 1 and 2, respectively in core zone. The score for internal parasitic diseases and external parasitic diseases was 150 and 144, and ranking was vice-versa in buffer zone. The effect of parasitic diseases of livestock in two zones was not significant (P>0.05).

Among infectious diseases, the ranking order for FMD, BQ, PPR, HS and Enterotoxaemia was 1, 2, 3, 4, and 5 with score of 306, 253, 234, 197 and 177, respectively in core zone. The corresponding score was 439, 365, 279, 161 and 136 for FMD, BQ, HS, PPR and enterotoxaemia in buffer zone. FMD was most prevalent in both the zones. However, BQ in cattle and PPR in goat equally felt on the top of deadly diseases. The effect of bacterial or viral diseases of livestock in two zones was not significant (P>0.05).

Very few people followed de-worming in core zone (25.3%) and that too by ITK (Indigenous Traditional Knowledge) methods using local herbal drugs. However, majority of the people did de-worming in buffer zone (63.26%) but by veterinarians. This clearly indicates that buffer zone villages had good linkages with primary veterinary centers. Whenever, ill conditioned are faced, they are generally treated by self in core zone. However, it was vice-versa in buffer zone i.e. animals were treated by veterinarians or livestock inspectors.

Majority (80.41%) of *Soliga* people followed the vaccination in buffer zone by veterinarian and while 19.58% did not vaccinate, whereas 11.26% did vaccination and 88.73% did not vaccinate their animals in core zone. However, very few animal were vaccinated during camps.

Maousami (2015) revealed that majority of respondents were not practicing the use of antibiotics, vaccination schedule, deworming schedule, use of ectoparasitic drugs and treatment of sick animal by veterinarians. Smriti (2013) revealed that 63.75% did not adopt regular vaccination.

The common constraints of *Soliga* are lack of sufficient pasture land and restriction of grazing for animals in forest area, lack of scientific knowledge about the livestock farming, poor delivery of veterinary services, problem of land alienation and land rights, illiteracy and ignorance of the government facilities. Traditional innovation by *Soliga* was, control of *Lantana camara* growth by manual removal near grass places (Hulu thotti), shifting cultivation. Further, *Soligas* constructed *Attane* (Tree top shelter) for watching the wild animal movement to control damage of the crops grown in their fields

SUMMARY

Soliga tribe is one of the most backward tribe among all other tribes in Karnataka and still they are not in mainstream of the society. Majority of the *Soliga*s are rearing livestock species and cattle and goats are predominant ones. This contributes seasonal income. It can be concluded that *Soliga*s in the buffer zone had better access to treatment and marketing facilities than core zone.

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