RESEARCH PAPER

Study on grassland dependent communities of Amrit Mahal Kaval, Karnataka State

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Abstract: A research study was conducted in Chitradurga district during 2022-23 using a *Retrospective survey* design. Data was collected by personal interview using pre tested standardized schedule through ODK collect software using tablets with sample size constituted of 300 farmers. The findings revealed that nearly half of the respondents (46.26%) belonged to middle age group (31-50 years), 27.05 per cent were illiterates and 34.52 per cent of them belonged to backward caste. Majority (72.95%) of the respondents lived in nuclear family, more than half of the them (51.96%) belonged to the medium family size (5-8 members) category, had medium level of farming experience (63.35%) and had two farmers in their family engaged in farming (57.65%). Regarding landholdings, nearly half of the respondents (48.35% and 56.63%) had marginal rainfed and irrigated landholdings respectively. More than half of the respondents (56.23%) belonged to high income category and nearly half of the respondents' incomes from livestock (42.35%) fall under low category. More than half of the respondents (66.90%) kept herd size below 6 ACU and owned diverse combinations of livestock. Most of the respondents (56.23% and 41.99%) had low mass media media and social participation respectively. Cotton, ragi, maize and groundnuts were the main crops grown by the respondents and long duration crops grown were arecanut and coconut. Significant differences were observed in all the socio-economic parameters of grassland dependent communities over the period of 20 years as observed by paired 't' value showing significance at 0.01 level except for the number of small ruminants possessed by the respondents where the differences were insignificant.

Key words: Amrit Mahal Kaval, Grassland dependent communities

Introduction

In India, about 24 per cent of land is covered with grasslands (Banerji, 2021). About 20.5 million people depend upon livestock for their livelihood. But grasslands are least appreciated and undervalued natural environments where, less than 1 per cent of Indian grasslands come under the protected area network, making it one of the most neglected and abused ecosystems in the country (Das, 2011). This has led to the urgent need for improvement of pastures as well as judicious implementation of grazing management practices.

Grassland dependent communities who are termed as pastoralists are large number of people dependent on grasslands for their livelihood, use grasses as fuel, shelter and various traditional activities. Many grasslands spread across Karnataka which covers total land area of 9,04,000 ha. One such unique grassland in Karnataka is Amrit Mahal Kaval. Probably, this is the only largest grassland devoted to the protection of a species of cattle anywhere in the world.

Amrit Mahal Kavals are livelihood-supporting, biodiversity-rich and ecologically-sensitive semi-arid grassland ecosystems of Karnataka which are dedicated for conservation of Amrit Mahal cattle. Kavals are distributed in 62 places and 6 districts of Chikkamagalur, Chitradurga, Hassan, Davanagere, Mandya and Tumkur (Ashwatha, 2020). There were 240 Kavals with history of 500 years, which covers an area of 4,13,519 acres are rich in biodiversity, habitat for many endangered species and also provide material for various local handicrafts, minor forest produce and medicinal plants (Saldanha, 2013). But major portions of Kavals presently were diverted by the government

for industrial and urban projects in addition to the expansion of agriculture, instead of protecting the habitat of Amrit Mahal Cattle. Thus, amidst the pressure, only 63 Kavals are left in 6 districts today which spread over an area of 68,440 acres (Saldanha, 2013).

Degradation of Kavals affects the livelihood of grassland dependent communities and hence this study was conducted to ascertain changes in socio-economic condition of grassland dependent communities.

Material and methods

Study recorded changes in socio-economic conditions over a period of 20 years, which is related to the past. So, *Retrospective Survey* research design was used for the study in which respondents answer to the questions to report on events from the past. Study was conducted in Chitradurga district as it has highest area under Amrit Mahal Kavals among six districts during 2022-23. Three taluks: Challekere, Hosdurga and Holalkere in which Kaval spreads in Chitradurga district were considered for selection of respondents. Proportionate sampling was used to finalize total number of respondents based on the area of Amrit Mahal Kaval under each taluk. As Holalkere taluk has maximum area it was decided to select 150 respondents, Challekere taluk has got second highest area, so it was decided to select 100 respondents. Hosdurga taluk has comparatively less area, so 50 respondents were selected. The total sample size was 300 respondents. Among 300 respondents, responses from 19 respondents were invalid. Hence, total respondents considered for analysis was 281. Data was collected by personal

interview technique using pre tested standardized schedule through ODK collect software using tablets. Recall method was used to get information on socio-economic changes before 20 years. MS excel and SPSS versions 21 were used for analysis.

Results and discussion

Socio-economic profile of grassland dependent communities

Nearly half of the respondents (46.26%) belonged to middle age group (31-50 years) followed by old age group (40.93%) (Table 1). Majority belonging to middle and old age groups because, they continue to remain in villages and also understand the role of grassland in livestock husbandry. So, Similar results were reported by Suresh *et al.* (2010), Nanda and Sharma (2018), Zhen *et al.* (2014), Nasry *et al.* (2017), Berhanu *et al.* (2022).

Nearly one third of the (27.05%) respondents were illiterates, followed by 21 per cent of them who educated up to high school, 17.79 per cent up to primary school (Table 1). The probable reasons might be poor financial conditions to pursue college education and lack of colleges in the rural areas. The results are in line with Zhen *et al.* (2014) where 61.3 per cent of the respondents were illiterates or had only attended primary school due to difficulty of access to the nearest school and low family income. Almost equal per cent of the respondents belonged to backward caste (34.52%) and scheduled tribe (34.16%), respectively (Table 1).

Sheep and goats are usually raised by Scheduled Tribe and backward communities where as forward caste usually possess large ruminants. This could be the reason for the present finding. Similar findings were reported by Suresh *et al.* (2010). Majority (72.95%) of the respondents were living in nuclear family while 27.05 per cent belonged to a joint family system (Table 1). Probable reason could be that Joint family system is fast disintegrating to nuclear system for various reasons in the society and lack of willingness to share resources among members of joint family. Suresh *et al.* (2010) reported the similar findings. More than half of the respondents (51.96%) belonged to medium family size (5-8 members) category followed by small (34.88%) and large (13.17%) categories (Table 1).

The study area belongs to semi-arid ecosystem. Farmers might have preferred to have more working hands to secure their livelihood. So they might have opted for more children. This could be the reason for half of the respondents belonging to medium family size. Abate (2016) reported the average household size of family as 10.4±7.0 members. Similar findings were reported by Abule *et al.* (2005).

More than half of the respondents (63.35%) had medium level of farming experience, while one-fifth of them (21.00%) had higher farm experience. Farming experience depends mostly based on the age and education of the farmer that less than half of the respondents belonged to middle age group and three-fourth of the respondents had basic education. They may have begun agriculture as their primary occupation soon after completing their formal education. These findings are in agreement with results of Kavithaa *et al.* (2021).

More than half of the respondents (57.65%) reported having two farmers in their family engaged in farming. Almost equal per cent of respondents' families had one (15.30%) and 3 farmers (14.23%) members in farming (Table 1). Getting hired labors would reduce the profit level. So, in majority of the respondents' family two or more than two members are involved in farm activities.

Nearly half of the respondents (48.35%) and almost one-third of the respondents (29.34%) possessed marginal and small land holdings, respectively (Table 1). Land fragmentation among family members over the generation which is currently the common phenomenon in rural areas might have reduced the size of the land holdings. As per the findings of Choudary *et al.* (2018), the results found that 54.2 per cent of the respondents were landless and 45.5 per cent had marginal land holding because of nomadic lifestyle of the respondents in Himalayan region of Nepal. Of total, 59 per cent of respondents had irrigated land holdings in which, more than half of the respondents (56.63%) and one-third of the respondents (31.93%) possessed marginal and small land holdings respectively (Table 1). The probable reason could be that fragmentation and sub-division of agricultural land from generation to generation, as most families today prefer to live as nuclear families. The findings were in accordance with Patil *et al.* (2012). All the respondents had bore wells as the source of irrigation in their land (Table 1). Bore wells were the most prevalent sources of irrigation in the study area since there are no canals and river besides the area receives scanty rainfall.

More than half of the respondents (56.23%) belonged to high income category followed by nearly one third of them (28.47%) in medium income category (Table 1). Annual income includes earnings from crops, livestock, farm work, and other sources and hence majority of them belonged to high-income category. Choudary *et al.* (2018) reported that 73.40 per cent of the respondents were in medium annual income category (₹ 87,062-1,54,354) followed by low and high income category and similar findings were reported by Salamula *et al.* (2017) . Nearly half of the respondents' incomes from livestock (42.35%) fall under low category followed by medium (39.50%) category (Table 1).

Majority of the respondents possessed small herd size and heavy rainfall during last year causing death of many small ruminants which directly affected their income from livestock sector. Main source of income in all pastoral groups (Hamer, Benna and Tsemay) Omozone of Southern Ethiopia was from sale of livestock (Admasu *et al.*, 2010). More than half of the respondents (66.90%) kept herd size below 6 ACU; this is followed by 22.84 per cent of the respondents with the herds in the range of 7 to 13 ACU (Table 1). Reason for having greater number of herds could be the availability of vast patch of grassland to graze their animals.

Majority of the Bakarwal tribe (70.8%) in Jammu district had medium herd size of 93 to 133 animals followed by large category (19.2%) having more than 133 animals (Choudary *et al.*, 2018). Kumar *et al.* (2011) reported similar findings.

Table 1. Socio-economic profile of grassland dependent communties

Independent variables	Respondents	
	Frequency	Per cent
Age (Years)		
Young (18-30)	36	12.81
Middle (31 to 50)	130	46.26
Old (51 and above)	115	40.93
Mean = 48.06 SD=13.92 SE = 0.83		
Education(Numbers)		
Illiterate (Cannot read and write)	76	27.05
Primary education (1 to 4)	50	17.79
Middle school (5 to 7)	43	15.30
High school (8 to 10)	59	21.00
PUC (11 to 12)	31	11.03
Graduation and above (Above 12)	22	07.83
Mean = 5.95 SD=4.99 SE = 0.30		
Caste		
Backward caste	97	34.52
Scheduled tribe	96	34.16
Forward caste	66	23.49
Scheduled caste	22	07.83
Family type		
Joint	76	27.05
Nuclear	205	72.95
Family size (numbers)		
Small (upto 4)	98	34.88
Medium (5 to 8)	146	51.96
Large (>8)	37	13.17
Mean =6.08 SD=3.78 SE = 0.23		
Farming experience (years)		
Low (<13.69)	44	15.65
Medium (13.86 to 39.13)	178	63.35
High (>39.13)	59	21.00
Mean = 26.41 SD = 12.72 SE = 0.76		
Family members engaged in farming (numbers)		
1	43	15.30
2	162	57.65
3	40	14.23
4	20	07.13
>4	16	05.69
Mean =2.36 SD=1.24 SE = 0.07		
A. Land holding (acres)		
Rain fed (n=242)		
Landless	13	5.37
Marginal (Up to 2.5)	117	48.35
Small (2.51 to 5.00)	71	29.34
Semi-medium(5.01 to 10.00)	32	13.22
Medium (>10.01 to 25.00)	09	03.72
Mean =3.76 SD=3.45 SE = 0.21		
B.Irrigated (n=166)		
Marginal (Up to 2.5)	94	56.63
Small (2.51 to 5.00)	53	31.93
Semi-medium (5.01 to 10.00)	18	10.84
Medium (>10.01 to 25.00)	01	00.60
Mean =2.96 SD=2.14 SE =0.13		
Source of Irrigation		
Bore wells	166	100.00
Annual income (₹)		
Low (<60000)	43	15.30
Medium (600001-120000)	80	28.47
High (>120001)	158	56.23
Mean =265058.04 SD= 324342.63 SE = 19348.66		
Livestock income (₹ /year)		
Low (<32,863)	119	42.35
Medium (32,864-1,17,883)	111	39.50
High (>1,17,884)	51	18.15
Mean =75373.52 SD=100025.68 SE =5967.03		
Herd size (ACU)		
<3	112	39.86
4-6	76	27.05
7-10	48	17.08
11-13	19	06.76
14-16	08	02.85
>16	18	26.41
Mean =6.03 SD=6.82 SE = 0.41		
Mass media participation		
Low (<6.11)	158.00	56.23
Medium (6.11-13.92)	17.00	06.05
High (>13.92)	106.00	37.72
Mean =10.01 SD=9.19 SE = 0.55		
Social participation		
Low (<0.47)	118	41.99
Medium (0.47-1.31)	101	35.94
High (>1.31)	62	22.06
Mean =1.00 SD=0.98 SE = 0.06		

More than half (56.23%) and more than one-third (37.72%) of respondents had low and high levels of mass media participation (Table 1). It could be due to low literacy rate and lack of awareness about recent media. The results are in line with Jeelani *et al.* (2015) that respondents had low mass media participation. Nearly half of them (41.99%) had low social participation, followed by more than one-third (35.94%) involved in medium social participation (Table 1). The above findings could be related to lack of enthusiasm, lack of time, and lack of perceived financial rewards from participation in various activities conducted by social organizations. Findings are in accordance with Jeelani *et al.* (2015).

Among different combinations of livestock possessed by the respondents, 11.74 per cent owned buffalo, 8.19 per cent owned sheep and equal per cent of them (6.76%) possessed local cow and sheep+goat. Further, equal percentages of the respondents (6.05%) owned only crossbred cow and only goat and 4.27 per cent local cow+buffalo. Remaining compositions were local cow+bullock (3.56%), buffalo+local cow+bullock (3.56%), local cow+bullock+sheep+goat (3.20%), buffalo+local cow+ bullock+sheep+goat (3.20%), buffalo+goat (2.85%), local cow+goat (2.85%), buffalo+local cow+bullock+goat (2.14%), buffalo+sheep (2.14%), goat+buffalo+local cow (2.14%) and other compositions (24.20%) (Table 2)

Sati and Singh (2010) indicated that cattle constituted about 67.78 per cent of the total livestock population, out of which cows were 41.79 per cent, buffaloes were 23.72 per cent followed by goats (23.52%). Beyene *et al.* (2014) reported different combination of livestock possessed by the respondents.

In the research region, cotton, ragi, maize, and groundnuts were the main crops grown by the respondents during *kharif* season with an average cultivation area of 3.15, 3.02, 1.93, 1.92 acres/household respectively. During *rabi*, ragi was cultivated

Table 2. Herd composition of the respondents   n=281

Particulars	Respondents	
	Frequency	Per cent
Buffalo	33	11.74
Sheep	23	08.19
Local cow	19	06.76
Sheep+Goat	19	06.76
Crosbred cow	17	06.05
Goat	17	06.05
Local cow+Buffalo	12	04.27
Local cow+Bullock	10	03.56
Buffalo+Local cow+Bullock	10	03.56
Local cow+Bullock+Sheep+Goat	09	03.20
Buffalo+Local cow+Bullock+Sheep+Goat	09	03.20
Buffalo+Goat	08	02.85
Local cow+Goat	08	02.85
Buffalo+Local cow+Bullock+Goat	06	02.14
Buffalo+Sheep	06	02.14
Goat+Buffalo+Local cow	06	02.14
Other compositions	68	24.20

Table 3. Cropping pattern followed by the respondents   n=268

Crops	Area (acres)
Kharif	
Maize	03.15
Groundnut	03.02
Ragi	01.93
Cotton	01.92
Rabi	
Ragi	01.74
Long duration crops	
Arecanut	02.33
Coconut	02.29

by respondents with an average area of 1.74 acres/household. Maize, groundnut, ragi and cotton were emerged as dominant crops as they, require less rainfall, and can grow with minimal or no irrigation facility. Long duration crops grown were arecanut and coconut with an average cultivation area of 2.33 and 2.29 acres/household, respectively since the prevailing climatic factors favor these crops besides good market facilities created in the study region (Table 3).

Changes in socio-economic conditions of grassland dependent communities

Significant differences were observed in all the socio-economic parameters of grassland dependent communities over the period of 20 years as observed by paired 't' value showing significance at 0.01 level except for the number of small ruminants possessed by the respondents where the differences were insignificant (Table 4).

A significant decline in the number of family members, land holdings per household, average grazing hours of the livestock's per day, number of crops cultivated and average number of large ruminants per household was observed. Reasons could be consciously restricting family size, land defragmentation among family members, cultivation of commercial crops and lack of labour for animal husbandry activities. Contrary to this, increase in number of educated persons in family was due to urbanization, more educational opportunities, better economic conditions and societal demands.

As a reverse trend, income generation from small ruminants and large ruminants per annum and total annual income of households were increased from past 20 years due to advancement in breeding techniques, animal nutrition could have led to increase in productivity. There was slight increase in the average number of small ruminants but the results were statistically non significant, which could be attributed to random variation rather than a consistent trend.

From the findings of the Singh *et al.* (2015), it was found that lifestyle was changed according to 78 per cent of the respondents due to better educational opportunities and income from cash crops had increased possible livelihood options for the younger generation seeking employment in towns.

Table 4. Changes in socio-economic condition of grassland dependent communities

Particulars	Changes (mean/range)		Difference	Paired 't' value
	Present	Past (>20 yrs)		
Family size	6.08±3.782-33	8.45±4.972-30	(-)2.37±1.19	6.17**
Number of educated person in family	2.64±1.450-10	1.48±1.410-6	(-)1.43±1.12	13.93**
Land holding per household (acres)	4.80±4.380-30	7.37±7.230-50	(-)3.33±4.89	8.03**
Average grazing hours (hr/day)	7.06±2.220-10	8.15±1.580-10	(-)1.12±2.01	8.92**
Number of crops cultivated/ year	2.2±1.17 0-10	3.84±1.890-10	(-)1.71±1.44	17.78**
Number of large ruminants (average/household)	4.85±6.73 0-47	6.49±7.910-60	(-)4.65±6.67	3.43**
Number of small ruminants (average/household)	24.70±42.060-300	22.98±51.770-500	(+)1.72±9.71	0.62
Number of family members willingly involved in animal grazing	2.15±1.270-8	3.37±2.420-15	(-)1.54±1.91	9.58**
Income from small ruminants (₹ /annum)	50218.93±86843.03 0-640000	29259.79±63781.88(+) 0-500000	20959.14± 23061.15	4.85**
Income from large ruminants (₹ /annum)	25986.34±72592.17 0-800000	15206.41±86426.23(+) 0-1400000	10779.93± 13834.06	2.96**
Total income(₹ /annum)	265058.04±324342.63 20000-2335000	178412.10±278143.83(+) 15000-3000000	86645.94± 46198.63	5.77**

** 1% level of significance

Conclusion

The present study shows that family size, landholding per household, number of educated person in family, number of crops cultivated, grazing hours of large and small ruminants, average number of small and large ruminants per household and number of family members willingly involved in animal grazing were declined from past 20 years to present due to urbanization and economic shifts leading to reduced dependence on traditional agriculture and livestock practices. On the other hand, income from small ruminants, income from large ruminants and total annual income were increased from past 20 years to present might be due to improved breeding, healthcare, and market access, resulting in higher productivity and profitability in the livestock sector. Lifestyle of the dependent communities changed due to wide range of livelihood options for younger generation in urban areas.

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