



Problem Identification and Climate Change Perception of Bakerwal Pastoralists of Jammu & Kashmir

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ABSTRACT

The present study was conducted in J&K; North-Western hilly state of India during 2013 to 2015 to study the problems experienced by transhumant Bakerwal pastoralists in different phases of migration and their climate change perception. The sample of 120 respondents was selected randomly for problem identification while as 39 respondents were purposively selected for examining their climate change perception. The study revealed that lack of basic facilities (viz. shelter for animals and humans, clean drinking water, medical facilities, roads connectivity, marketing, education for children, electricity and means of communication) was the top ranking problem experienced by the respondents in summer pastures and en-route migration. This was followed by lack of veterinary health services and disease occurrence which were ranked second most important problems respectively. Reduced pastures availability and water scarcity for animals during later part of the winter were the top most problems experienced by the respondents at winter pastures. Further it was reported that respondents perceived a drastic change in predictability of weather conditions and incidences of torrential rains, cloud bursting, hail storms etc. in the study area. The respondents also expressed a moderate change in average seasonal temperature, amount of rainfall, amount of snowfall and severity of draught at pastures. The study recommends the immediate policy intervention on part of government for provision of various basic facilities to the Bakerwals in different phases of migration besides promotion of income diversification within pastoralism through skill development and need based training programmes for securing the livelihood of Bakerwals.

Keywords: Problems, Transhumance, Pastoralism, Climate change, Bakerwals

Among the various pastoral communities Bakerwals-“*high-altitude goatherds/ shepherds*”, represent the largest small ruminant rearing transhumant pastoralist group in Northern Himalayan region of Jammu & Kashmir. Small ruminant rearing forms their core economic activity. Their way of life prevents living in permanent settlements. The scheduling and destinations are predetermined according to the availability and needs of the animals for water and fodder. So it is necessary for them to have knowledge of their pastures, water resources, rainfall, snowfall, disease, political insecurity and national boundaries with access to markets and infrastructure (Bhasin, 2011). The ethnic groups in transhumant category are few and are of low population density in relation to the total land mass. There is also a low margin of surplus among them because of

low level of technology, little occupational specialization, high participation of women in the economy and highly flexible residence.

Bakarwals are socially, economically and politically marginalized group of people who are mostly living below poverty line and have very little access to various social, educational and health services provided by the state government. They are also making an economic contribution to the state's agricultural GDP by providing livestock products like meat, skin, wool and organic manure. Their transhumant lifestyle and economy is increasingly under stress due to a number of socio-economic and political pressures, including state policies and interventions, population growth, land-use change and integration into a market economy; and on the other hand, they are exposed

to climate change and its impacts on the environment and their life. Considering the importance of explaining the system to the outsiders in view of above explained facts, the present study was undertaken to identify the problem faced by Bakerwals in different phases of migration and to explore their climate perception.

MATERIALS AND METHODS

The Bakerwals were following many established traditional routes for migration. Through consultation with the experts of the Sheep Husbandry Department (J&K) and pilot survey of the study area 6 major routes of migration were selected covering Bakerwal movement from almost all the regions of the state. Along these migration routes there were certain nodal areas/transit points which were small pasture lands providing Bakerwals with good feed availability and space for providing rest to their animals and for themselves en-route. It was at these nodal/transit areas (Sanasar, Jawahar tunnel, Pir Ki Gali and Dobjan) and some camping sites adopted by Bakerwals en-route, which was found ideal for observation of their activities and also for data collection. The data was collected from the respondents at such locations.

Along each selected route 20 respondents were randomly selected; making a total of 120 respondents for the studying problems in different phases of migration. For studying climate change perception respondents whose age was more than 45 years were purposively selected and were only 39 in number. The data was collected by using pretested and structured interview schedule and was blended with participatory methods like key informant and focussed group discussions and direct observation.

RESULTS AND DISCUSSION

Socio- Personal Profile

The results of the study as presented in the Table 1 show that the majority (54.17%) of the respondents belonged to the middle age category. A great majority (87.50 %) of the respondents was illiterate and the major reason for this was found to be non permanent settlement of the respondents and non functional mobile schools. The family size of majority of respondents (57.50%) was small (<8) and only 15.83 per cent of respondents had large family size (>10). Majority of the respondents (60.00 %) had participation in only one organization followed by 35.00 per cent of the

respondents with participation in two organizations. Again the migratory mode of their life, living in practically marginal and far flung areas and having separated and scattered distribution in pastures and during migration leads to their low social participation.

In the study it was revealed that the respondents did not get information from any of the institutional sources. Among the non-institutional sources all the respondents got information from relatives and other Bakerwals. They were not having access and availability of any of the mass media sources other than radio which was their only mass media source of information.

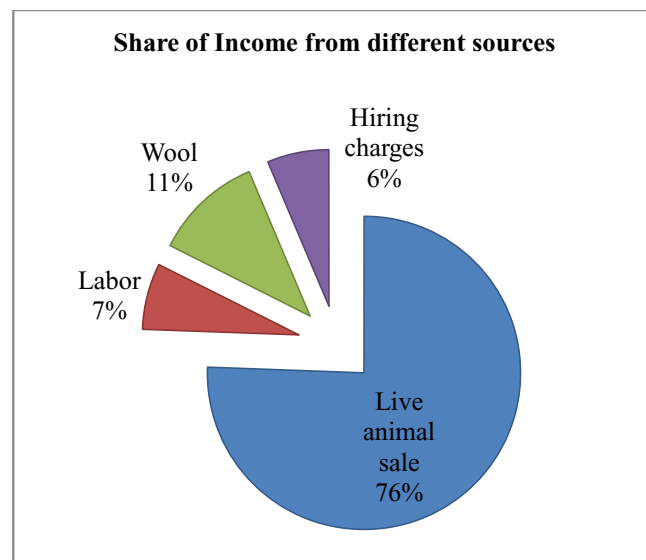


Fig. 1: Share of Income of respondents from different sources

Socio-economic Profile

The study revealed that majority (70.00 %) of the respondents was landless and all the respondents were having traditional grazing rights in summer and winter pastures. Small ruminant rearing was the only occupation of majority (69.17 %) of the respondents. The study found that the flocks of sheep and goat herded by the respondents had shared ownership i.e., owned by the group of families moving in group/Qafila. It was found as shown in Table 1 that the nearly half of the respondents (47.50 %) had small flock size (< 185 Goat and Sheep). This was followed by 43.33 per cent of respondents having a medium flock size (185 to 286 Goat and Sheep). There were a small proportion of the respondents (9.17 %) whose flock size was more than 286 Goat and Sheep. Further it was observed that the

Table 1: Socio personal and socio economic profile of Bakerwal pastoralists

n = 120				
Sl. No.	Variables	Categories	Frequency	Percentage
1	Age Mean: 40.57 Range: 21 – 75	Young (Up to 35 years)	36	30.00
		Middle (36-50 years)	65	54.17
		Old (>50years)	19	15.83
2	Education	Illiterate	105	87.50
		Functionally literate	0	0
		Primary	10	8.33
		Middle	3	2.50
		Secondary	2	1.67
		Senior Secondary	0	0.00
		Graduate and Above	0	0.00
3	Family size Mean: 7.60 Range: 4 - 13	Small (< 8)	69	57.50
		Medium (8- 10)	32	26.67
		Large (>10)	19	15.83
4	Social participation	Membership in one organization	72	60.00
		Membership in more than one organizations	42	35.00
		As an office – bearer	6	5.00
		Landless (0)	84	70.00
6	Land holding (Acres) Mean: 1.43 Range: 0 to 15	Marginal (Up to 2.5)	12	10.00
		Small (2.6-5)	14	11.67
		Medium (5.1-10)	6	5.00
		Large (>10)	4	3.33
		Only small ruminant rearing (SRR)	83	69.17
7	Occupation	SRR + Agriculture	11	9.16
		SRR + Labor	18	15.00
		SRR + Agriculture + Labor	8	6.67
		Small (< 185)	57	47.50
8	Flock/herd size (nos.) Mean: 302 Range: 45-750	Medium (185 - 286)	52	43.33
		Large (> 286)	11	9.17
		Low (< 87249)	81	67.50
9	Annual income (Rupees) Mean: 116345 Range: 40700-216800	Medium (87249 to 136846)	28	23.33
		High (> 136846)	11	9.17

majority of the respondents had more number of Sheep in their flocks than the Goats; giving the reasons that sheep had more demand, was more profitable and was easy to rear compared to the goats. However Singh *et al.* (2006) reported that the flocks consisted of more goats than sheep and the average size of the flocks was 431 sheep per flock which was more compared to our study.

The majority of the respondents (67.50 %) belonged to low annual income category with an average annual income of less than ₹ 87249 and only a small percentage of the respondents (9.17%) was found to be in higher income category with average annual income of more than ₹ 136846. It was also observed that the main income sources of Bakerwal pastoralists as shown in Figure

1 were sale of live animals and wool, labour or hiring charges for pasturing the animals of others. The study also revealed that the major share (75.57 %) of their annual income comes from the sale of live animals. The sale of the wool (11.22 %), labour (6.84 %) and hiring charges for pasturing sheep and goat of other Bakerwals or local village people (6.37%) also supplemented the annual income of the respondents.

Problems faced by the Bakerwal pastoralists

The transhumant pastoral life is an adaptation to the dry cold rangelands with extreme harsh environments that are non arable and limited in their production capacity. This mode of life makes them encounter a multitude of problems which keeps them struggling with various socio-economic and political issues besides fighting harsh nature all the time. The identified problems encountered in different phases of migration were ranked by Matrix

ranking technique. The problems are enlisted in Table 2 and have been discussed under three heads as follows.

Problems faced in winter pastures

The study reported that reduced pastures availability and water scarcity for animals during later parts of the winter were very serious problems effecting flocks and were ranked I and II by the respondents respectively. Rauniyar *et al.* (2000) reported underdevelopment of the pasturelands, poor nutritional value and low dry matter productivity as the important problem in their study area. Lack of basic facilities viz. shelter for animals and humans, clean drinking water, medical facilities, roads connectivity, marketing, education for children, electricity and means of communication was ranked III. Lack of veterinary health services and conflict with locals over use of pastures and common property resources were ranked IV and V respectively. The other problems like disease

Table 2: Problems faced by Bakerwal pastoralists in different phases of migration

n = 120

Sl. No.	Identified problems	Winter pastures	En-route migration	Summer pastures
1	Reduced pastures availability	I (85.72)	VI (58.11)	VI (49.45)
2	Water scarcity for animals	II (80.31)	IX (41.67)	VIII (39.23)
3	Conflict with locals	V (68.14)	V (61.67)	VII (43.71)
4	Lack of veterinary health services	IV (70.43)	IV (62.93)	II (81.18)
5	Disease occurrence	VI (61.14)	III (63.75)	V (65.35)
6	Lack of basic (public) facilities	III (78.30)	I (88.96)	I (86.10)
7	Predator attacks	VIII (48.36)	VIII (46.67)	III (75.24)
8	Inclement weather conditions	VII (54.13)	II (82.80)	IV (72.61)
9	Abortions due to stress	*****	XI (26.22)	*****
10	Theft and missing of animals	*****	X (29.38)	*****
11	Carrying animals fallen sick during migration	*****	VII (55.00)	*****

* Figures in brackets indicate Weight Score Percentage

occurrence, inclement weather conditions and predator attacks were ranked VI, VII and VIII by the respondents respectively.

Problems faced en-route migration

The study reported that the lack of basic facilities and inclement weather conditions were the most serious problem experienced by the respondent’s en-route migration and were ranked I and II respectively. The problems like disease occurrence, lack of veterinary health services and conflict with locals were ranked III, IV and V respectively. Reduced pastures availability due to restrictions of forest department limiting access to some forests and closure of some migration routes and overgrazing was ranked VI by the respondents. Carrying animals fallen sick during migration was ranked VII, predators attacks was ranked VIII, water scarcity for animals was ranked IX and theft and missing of animals was ranked X by the respondents. Abortions due to stress were expressed as the least problem during migration and were ranked XI. Problem like carrying sick animals, abortions of pregnant animals and theft of animals during migration were also reported by Rao *et al.* (2013).

Problems faced in summer pastures

The study showed that lack of basic facilities was also the most important problem faced by the respondents in the high altitude alpine and sub alpine pastures. Lack of veterinary health services, predator attacks and inclement weather conditions were other important problems faced by the respondents and were ranked II, III and IV respectively. Singh *et al.* (2006) reported that about 8-10 percent of the flock got killed by predators at high altitude

pastures. Disease occurrence at summer pastures was ranked V by the respondents. The respondents reported that reduced pastures availability due to nomination of some pastures as wild life reserves and protected lands was ranked VI. Conflict with locals and water scarcity for animals were less important problems in summer pastures and were ranked VII and VIII respectively. The problems identified in our study were also reported by the works of Dev (2003); Porwal *et al.* (2006); Singh (2006); Suresh *et al.* (2008); Koundal (2012) and Rao *et al.* (2013) in their respective studies.

Climate change perception of Bakerwal pastoralists

Climate change affects the natural resource base, primarily land, water and vegetation, which essentially pose a big challenge for the natural resource-dependent indigenous population of the region. The adaptive capacity of the human system is low, and vulnerability high, for the mountain communities because of limited public services, very little or no economic diversification, and strong dependence on a few resources (Banerji and Basu 2010). The present study was conducted in respect of the indicators like average seasonal temperature, amount of rainfall, amount of snowfall, incidence of torrential rains, cloud bursting, hail storms etc., predictability of weather conditions and severity of draught in the pastures.

These results are based on the interview and individual discussion with 39 respondents who were purposively selected. The respondents were asked about their perception of trend in climate change in the last one and a half decade (2000 onwards) based on their recent past memory; in a three point continuum of drastic change, moderate change and no change. The study showed that the respondents had a general consensus that they were experiencing climate

Table 3: Climate change perception of Bakerwal pastoralists

Sl. No.	Climatic factors	Drastic change	Moderate change	No change
1	Average seasonal temperature	4 (10.26)	28 (71.79)	7 (17.95)
2	Amount of rainfall	3 (7.69)	25 (64.10)	11 (28.21)
3	Amount of snowfall	3 (7.69)	22 (56.41)	14 (35.90)
4	Predictability of weather conditions	20 (51.28)	15 (38.46)	4 (10.26)
5	Incidence of torrential rains, cloud bursting, hail storms etc.	27 (69.23)	12 (30.77)	0 (0.00)
6	Severity of draught in pastures	6 (15.38)	23 (58.98)	10 (25.64)

n= 39

change and the results of which are presented in the Table 3. The majority of respondents perceived a moderate increase in the average seasonal temperature (71.79%) and a moderate decrease in the amount of the rainfall (64.10%) and snowfall (56.41%) in the study area over the last 15 years. Vedwan and Rhoades (2001) have reported a shift in the distribution of rain across time with a significant increase in the number of cloudy days. They also reported reduction in the amount and timing of snowfall.

Regarding the temperature they have reported a significant rise in their study area. The respondents reported a drastic change (51.28%) in the predictability of weather conditions based on their traditional wisdom which is in line with the findings of Wani *et al.* (2015) who also reported the respondent's perception of highly uncertain weather conditions in their study area.

The respondents reported occurrence of untimely snowfall and rainfall in the area was seriously affecting them particularly during migration when the flocks of the animals were under many stress factors. The findings of Tufail (2014) are in line with our findings who also reported an increase in the temperature and incidence of unseasonal snowfall and a decrease in the amount of rainfall in his study area. Further Wani *et al.* (2015) reported occurrence of long summers, short winters and less snowfall as perceived by the respondents, which triggered since late 1990s in their study area.

Further majority of respondents (69.23%) reported a drastic change in the occurrence of torrential rains, cloud bursting, hail storms etc. particularly at summer pastures and en-route migration; causing huge mortality in their flocks of sheep and goat. Vedwan and Rhoades (2001) have reported an increase in the cloud bursts and like in their study. The majority of the respondents (58.98 %) reported a moderate change in severity of droughts at the winter pastures towards the beginning of migration and some summer pastures also due to decreased rains and increased temperature in the area. Banerji and Basu (2010) have also reported an increase in incidence of draughts, snow storms and blizzards in the study area. Tufail (2014) also reported an occurrence of more severe droughts in his study area.

CONCLUSION

Bakerwals have low adaptive capacity and high vulnerability because of limited public services, very little or no economic diversification, and strong dependence on a few resources. Complex terrains, remoteness of the area and extreme weather conditions make the region and its people more vulnerable to the impacts of climate change. So there is an immediate need of promoting income diversification within pastoralism by organising certain skill development and need based training programmes. If any attempts are made by the Government for their settlement/ then some alternative livelihood options should be ensured for them in advance, so that they will not become the victims of improper policy intervention. Besides this the various identified problems need to be addressed on priority basis to provide a sigh of relief to the Bakerwals. There is a dire need to strengthen availability and access to various basic facilities in the study area viz. summer pastures, en-route migration and winter pastures, that will increase their resilience to the problems inherent to pastoralism and the perceived climate change impacts.

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