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ANALYSING HUMAN-ENVIRONMENT RELATIONS THROUGH CULTURAL TRANSFORMATION AMONG THE GADDIS OF CHAMBA AND KANGRA DISTRICTS OF HIMACHAL PRADESH, INDIA

Som Nath Thakur
Simrit Kahlon
Smita Bhutani
Pooja Sharma

Abstract

This study analyses the cultural transformation of a region through changes in livelihood, lifestyle, and vernacular architecture practices. Traditionally driven by environmental factors, these elements form a cultural landscape reflective of human-environment relations. The study reveals a shift from subsistence to commercial agriculture, increasing exotic animal varieties, and a decline in pastoralism. Lifestyle changes include improved access to modern amenities like electricity, piped water, and liquid petroleum gas (LPG) as a fuel for cooking. The villages of Kangra district have better access to these amenities than that of Chamba district due to more favourable topography and external interactions. Vernacular architecture practices have also shifted, with greater use of modern building materials and their external sourcing, especially in Kangra district. Overall, cultural transformation is driven by connectivity, accessibility, and state interventions.

Keywords: Human-environment relations, Cultural transformation, Landscape change, Gaddis, Cultural change.

Introduction

The understanding of human-environment relations has probably remained the most important theme of study in the discipline of geography (Galvin, 2006; Rasmussen and Arler, 2010; Degórski, 2014; Kőszegi et al., 2015). The emergence of the idea that it was the physical environment, particularly the climate that shaped human civilization can be traced back to the time of Aristotle (Marsh, 1864; Grossman, 1977; Badagliacca, 2002). However, with the advance of human civilization, very few communities can remain purely under the direct influence of physical environment (Kealhofer, 1996). The human interaction with nature has resulted serious repercussions for the inhabitants both at the micro (local) and macro (global) levels (Turner, 1997; Schimel et al., 2007; Bălteanu and Dogaru, 2011; Brady and Phemister, 2012). Cultural transformation is perhaps the most visible manifestation of change in human-environment relations (An et al., 2005; Telbisz et al., 2016). The term 'culture' encompasses the nature of all human activities, including their interventions and influences (Butzer, 1989). From disciplinary

perspective, culture was first studied by anthropologists in their study of the evolution of man (Grossman, 1977; Scholz and Binder, 2004). The use of term culture within geography was made by Carl Sauer in his study of the 'cultural landscape' that resulted from human action on the physical environment (Sauer, 1925).

The cultural landscape, therefore, is essentially a manifestation of human-environment interactions (Young, 1994; Ünaldı, 2007). The school of thought, of cultural geography, in India focussed on the study of settlement pattern and morphology, field pattern, house types, tools and implements and dress and food habits (Diddee, 2004; Singh, 2004; Manku, 2004; Marh, 2004; Singh, 2004). All these fall under the ambit of material culture and are termed tangible markers of culture. In the light of above, the present study has been undertaken to understand the human-environment relations through cultural transformation among the Gaddis of Himalayas.

Objectives of the Study

Major objectives of the study are:

- to analyse the direction of cultural transformation through changes in livelihood strategies, daily lifestyle choices, and traditional architectural forms, and
- to measure the extent of cultural transformation among the Gaddis.

Study Area

The study area comprises of Kangra and Chamba districts of Himachal Pradesh. It is located between 31° 38' 35" to 33° 13' 59" N latitudes and 75° 29' 09" to 77° 05' 04" E longitudes (Fig. 1). The climatic conditions vary with the altitude. At higher altitudes climatic conditions vary from temperate to semi-arctic types. The lower altitudes have semi-tropical climate, where temperatures are relatively high, and rainy season is well marked. The study area is inhabited predominantly by the Gaddi Tribe, that mainly dwells along the Dhaula Dhar mountain range.

Database and Methodology

This study is based on primary data collected from 1125 households of eighteen villages inhabited by Gaddis. These villages have been selected from three major ecological zones of the study area by applying stratified proportionate random sampling technique (Table 1; Fig.1). To assess the degree of cultural transformation among the Gaddis, three key dimensions, like livelihood practices, lifestyle patterns, and vernacular architectural forms, have been taken into account. To quantify the changes, eight indicators such as (i) agricultural practices, (ii) structure of livestock reared, (iii) pastoral practices, (iv) type of cooking fuel used, (v) sources of lighting, (vi) sources of drinking water, (vii) nature of building material used for construction of walls, floors, and roofs, and (viii) source of building material have been taken (Table 2). To assess the shift from the traditional living practices among the Gaddis, it has been assumed that previously all the households have been following the indigenous practices of living. For instance, it is presumed that all the households have been: (i) cultivating traditional Rabi crops such as barley, wheat, mustard, and peas, and Kharif crops like Sihul (Amaranthus amaranthoides), Chanai (Panicum miliaceum), maize, Phullan (Pennisetum glaucum), Bhres (Fagopyrum esculentum), and Kodra (Paspalum

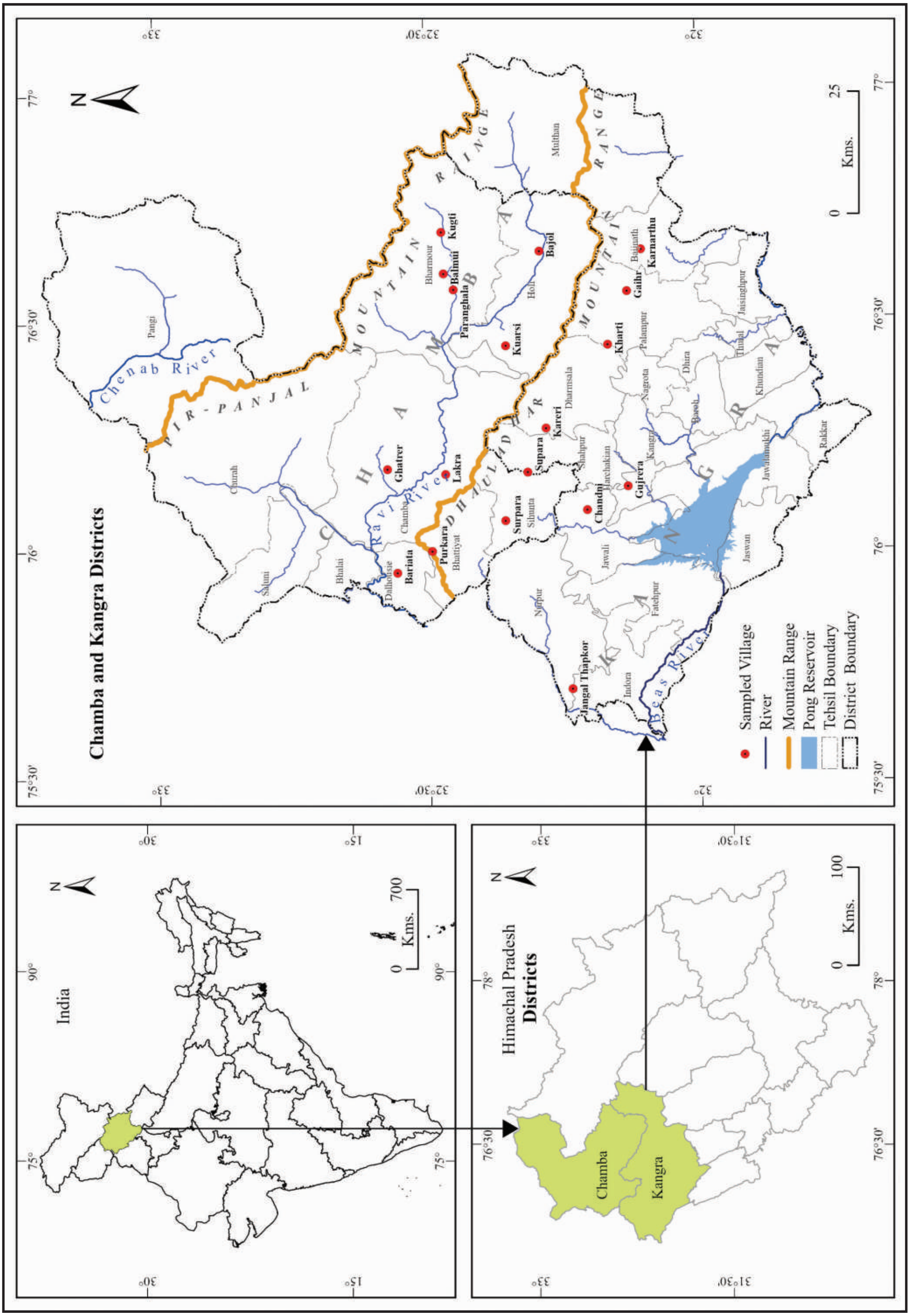
Chamba and Kangra Districts
Sampled Village
River
Mountain Range
Pong Reservoir
Tehsil Boundary
District Boundary
Kms.
India
Himachal Pradesh
Districts
Chamba
Kangra

Fig. 1

Table 1
Chamba and Kangra Districts: Details of Sampled Villages

Ecological Zone	Tehsil	Sampled Village	Altitude (meters)	No of Total Households	Households Surveyed
Southern Slopes of the Pir-Panjal	Bharmour	Balmui	2604	61	48
	Bharmour	Kugti	2610	37	31
	Bharmour	Paranghala	2106	28	23
	Holi	Bajol	2444	57	48
	Chamba	Ghatrer	2187	152	108
Northern Slopes of the Dhauladhar	Holi	Kuarsi	2235	54	43
	Chamba	Lakra	1667	191	168
	Dalhousie	Bariata	1581	72	57
Southern Slopes of the Dhauladhar	Sihunta	Surpara	1499	84	71
	Bhatiyat	Purkhara	1935	40	28
	Baijnath	Karnathu	1469	132	106
	Palampur	Kharti	1391	61	47
	Palampur	Gaihr	1472	71	59
	Dharamshala	Kareri Khas	1794	90	76
	Harchakian	Gujrera	607	91	73
	Jawali	Chandni	657	34	28
	Shahpur	Sapaira	1597	110	92
	Nurpur	Jangal Thapkaur	386	19	19
			Total	**1384**	**1125**

Source: Compiled by Authors.

scrobiculatum); (ii) rearing sheep; (iii) engaged in pastoralism; (iv) using wood for cooking; (v) using traditional sources of light (fire wood and/or kerosene); (vi) using Bouri (a traditional source of water for drinking); (vii) using traditional materials to construct wall (stone), floor (wood) and roof (slate), and (viii) have obtained construction material available from the local ecosystem.

To measure the change in the traditional practices of living, the percentage of households that have moved away from traditional living practices has been calculated and interpreted as the degree of cultural transformation, which has been measured by adopting the following formula:

$$X_i = 100 - P_i \quad (1)$$

where, X_i is the degree of change in the i^{th} indicator (in per cent) and P_i is the percentage of households still following the traditional practices of living. Similarly, changes in agricultural practices have been computed by applying the following formula:

$$AP = 100 - \left(\frac{50}{N_{CR}} n_{CR} + \frac{50}{N_{CK}} n_{CK} \right) \quad (2)$$

where, AP is the shift away from traditional agricultural practices (in per cent), N_{CR} and N_{CK} are the total number of traditional Rabi and Kharif crops, n_{CR} and n_{CK} are the number of Rabi and Kharif crops still being cultivated. To measure the change in the nature of building

Table 2
Chamba and Kangra Districts: Indicators of Cultural Transformation and AHP weightage

Indicator	Factor	Weight
Livelihood Practices	Agricultural practices	0.52
	Structure of livestock reared	0.14
	Pastoral practices	0.34
	Source of drinking water	0.59
Lifestyle Practices	Source of lighting	0.25
	Type of cooking fuel used	0.16
Vernacular Architecture Practices	Nature of building material used	0.66
	Source of building material	0.34

Source: Compiled by Authors. AHP: Analytical Hierarchical Model Process

material used for the construction of houses, following formula has been applied:

$$NB = \frac{(100 - P_w) + (100 - P_f) + (100 - P_r)}{n} \quad (3)$$

where, NB is the degree of change in nature of building material used (in per cent), P_w is the per cent of households still using traditional materials for construction of wall, P_f is the per cent of households still using traditional materials for flooring, P_r is the per cent of households still using traditional materials for roofing *'n'* is the number of factors.

A change in all the indicators has been normalized, aggregated and averaged to arrive at a combined index of cultural transformation. To calculate the index, the Min-Max data normalization technique has been applied by adopting the following formula:

$$X' = \frac{X - X_{min}}{X_{max} - X_{min}} \quad (4)$$

where, X is the original value, X' is the normalized value, and X_{min} and X_{max} are the minimum and maximum values of the indicators, respectively. The values of the index range between zero and one. Furthermore, the change against each parameter has been calculated individually by using weightage, calculated by applying analytical hierarchical process (AHP). The change in livelihood practices (LHP) has been calculated by applying following formula:

$$LHP = \sum_{i=1}^{n} \frac{AP_w + SL_w + PA_w}{n} \quad (5)$$

where, AP is the changes in agricultural practices, SL is the changes in structure of livestock reared and PA is the changes in pastoral practices. *'w'* is the weight of the factor and *'n'* is the number of factors. The changes in lifestyle practices (LSP) have been calculated by using the following formula:

$$LSP = \sum_{i=1}^{n} \frac{ST_w + SD_w + TF_w}{n} \quad (6)$$

where, ST is the change in source of light, SD is the change in source of drinking water and TF is the change in type of cooking fuel used. *'w'* is the weight of the factor and *'n'* is the number of factors. The change in vernacular architecture practices (VAP) is calculated by using the following formula:

$$VAP = \sum_{i=1}^{n} \frac{SB_w + NB_w}{n} \quad (7)$$

where, SB is the source of building materials

and *NB* is the nature of building materials used. *'w'* is weight of the factor and *'n'* is the number of factors. Finally, the cultural transformation index (CTI) has been calculated by applying the following formula:

$$CTI = \sum LHP + LSP + VAP \qquad (8)$$

where, *LHP* is the livelihood practices, *LSP* is the lifestyle practices and *VAP* is the vernacular architectural practices. Apart from above, the village level *CTI* values have been interpolated to a continuous surface in ArcGIS Pro 3.3 using the IDW (Inverse Distance Weighted) tool (Fig 2).

Results and Discussion

Livelihood Practices

In this section changes in the livelihood practices of Gaddi's have been discussed under three aspects: (i) agricultural practices, (ii) structure of livestock reared, and (iii) pastoral practices.

(i) Agricultural Practices

The study reveals that the traditionally grown crops like phullan (Pennisetum glaucum), bhres (Fagopyrum esculentum), chanai (Panicum miliaceum), sihul (Amaranthus amaranthoides), mah (Vigna mungo), kolth (Dolichos biflorus), kodra (Paspalum scrobiculatum) and kauni (Setaria italica) in the Kharif season have been replaced with cash crops like rajmah (Phaseolus vulgaris), potato (Solanum tuberosum), maize (Zea mays), and other seasonal vegetables, while wheat (Triticum aestivum) along with barley (Hordeum vulgare) continued to be cultivated during the Rabi season (Table 3). The highest shift has been observed in Chandni village, followed by Kugti, Lakra, and Sapaira villages. While the lowest shift has been found in Gaihr, Surpara, Purkhara, and Karnarthu villages. The study reveals that the traditional food grains such as phullan (Pennisetum glaucum), bhres (Fagopyrum esculentum), chanai (Panicum miliaceum), sihul (Amaranthus amaranthoides), kodra (Paspalum scrobiculatum), kauni (Setaria italica) are no longer being cultivated. Additionally, climate change, particularly altered precipitation patterns, have adversely affected the yields of traditional crops (Thakur 2019). However, the commercialization of agriculture remains the primary driver behind the change in cropping patterns.

(ii) Livestock Reared

The study reveals that 91.52 per cent of the surveyed households have been keeping livestock. At district level, in Chamba district 93.02 per cent and in Kangra district 89.71 per cent households have been keeping livestock (Table 4). In Chamba district there are two villages of Bariata and Surpara and in Kangra district there are three villages such as, Chandni, Gujrera and Sapaira, where all the households are not keeping livestock. It indicates that people are shifting away from the activity of livestock rearing. The study further reveals that 90.09 per cent of the households are rearing cows, while about 30 per cent are rearing sheep and goats. It has been observed that there are six villages such as Bariata of Chamba district and Chandni, Gaihr, Kareri Khas, Kharti, and Sapaira of Kangra district where none of the households has been keeping sheep or goats anymore. In Kangra district, only 5.32 and 6.16 per cent of the households have been found having sheep and goats. Whereas in Chamba district 47.25 per cent households have been keeping sheep and 50.39

Table 3

Chamba and Kangra Districts: Changes in the Cropping Pattern

Village	Traditionally Grown Crops		Presently Grown Crops		Percentage of Traditional Crops Still Grown
	Rabi Season	Kharif Season	Rabi Season	Kharif Season	
Bajol	Barley, Wheat, Mustard, Peas	Sihul, Chanai, Maize, Phullan, Bhres, Kodra	Wheat, Barley, Mustard	Rajmah, Potato, Maize, Seasonal Vegetable	37.50
Balmui	Barley, Wheat, Mustard, Peas	Sihul, Chanai, Maize, Phullan, Bhres, Mah	Wheat, Barley, Mustard	Rajmah, Potato, Maize, Seasonal Vegetable	37.50
Bariata	Barley, Wheat, Mustard	Maize, Kauni, Sihul, Maur, Kolth, Kodra	Barley, Wheat, None	Maize, Potato, Seasonal Vegetable	41.66
Ghatrer	Barley, Wheat, Peas, Mustard, Maur	Chanai, Maize, Kodra, Kauni, Mah	Wheat, Barley	Maize, Rajmah, Potato	30.00
Kuarsi	Barley, Wheat, Green peas, Maur	Sihul, Chanai, Maize, Phullan, Bhres, Kauni	Wheat, Barley, Mustard, Green Peas	Rajmah, Mah, Potato	37.50
Kugti	Barley, Wheat, Peas, Maur	Sihul, Chanai, Maize, Phullan, Bhres, Kolth	Wheat, Barley, Mustard	Rajmah, Potato, Maize, Seasonal Vegetable	25.00
Lakra	Barley, Wheat, Peas, Mustard, Maur	Maize, Mah, Kolth, Sihul, Chanai, Kauni, Kodra, Phullan, Greenpeas	Wheat, Barley	Maize	25.50
Paranghala	Barley, Wheat, Mustard, Maur	Sihul, Chanai, Maize, Phullan, Bhres, Mah	Wheat, Barley Mustard	Rajmah, Potato, Maize, Seasonal Vegetable	45.83
Purkhara	Barley, Wheat, Mustard	Maize, Sihul, Mah, Kodra, Kolth, Kauni	Wheat, Barley, Mustard	Maize, Seasonal Vegetable	58.33
Surpara	Barley, Wheat, Mustard	Maize, Sihul, Mah, Kodra, Kolth, Kauni	Wheat, Barley, Mustard	Maize, Seasonal Vegetable	58.33
Chandni	Wheat, Barley, Mustard	Maize, Til, Mah	Wheat	Rice, Maize, Vegetable, Chari, Bajra	16.66
Gaihr	Barley, Wheat, Mustard	Maize, Sihul, Kodra, Kolth	Wheat, Barley, Mustard	Maize, Potato	62.50
Gujrera	Wheat, Barley, Mustard, Til	Maize, Potato	Wheat	Maize	37.50
Jangal Thapkaur	Barley, Wheat, Mustard	Maize, Mah, Masar, Mung	Wheat, Barley	Maize, Seasonal Vegetable	45.66
Kareri Khas	Barley, Wheat, Mustard	Maize, Sihul, Mah, Kolth	Wheat, Barley	Maize, Rajmah	45.66
Karnathu	Barley, Wheat, Mustard	Rice, Maize, Sihul,	Wheat, Barley	Rice, Potato	49.98
Kharti	Barley, Wheat, Mustard	Sihul, Mah, Kolth	Wheat, Barley	Maize, Potato	33.32
Sapaira	Wheat, Barley, Mustard, Flaxseed	Mah, Kolth, Maize, Sihul, Rice, Kodra, Potato, Onion, Garlic	Barley, Wheat, Onion	Rice, Maize, Potato, Seasonal Vegetable	25.55

Source: Compiled by Authors.

Table 4

Chamba and Kangra Districts: Percentage of Surveyed Households Rearing Different Types of Livestock and Pastoralism

Village	Rearing Livestock	Exotic Cow	Indigenous Cow	Sheep	Goat	Practicing Pastoralism
Bajol	100.00	0.00	100.00	20.83	37.50	6.33
Balmui	100.00	0.00	100.00	91.67	95.83	5.36
Bariata	46.15	100.00	0.00	0.00	0.00	1.22
Ghatrer	100.00	0.00	100.00	100.00	100.00	3.67
Kuarsi	100.00	3.85	96.15	30.77	46.15	10.00
Kugti	100.00	0.00	100.00	43.48	56.52	6.23
Lakra	100.00	34.43	61.99	25.00	21.43	3.65
Paranghala	100.00	0.00	100.00	100.00	100.00	3.90
Purkhara	100.00	0.00	100.00	60.71	32.14	2.15
Surpara	84.00	58.58	10.98	0.00	14.29	4.86
Chamba District	**93.02**	**20.58**	**71.37**	**47.25**	**50.39**	**4.74**
Chandni	52.00	100.00	0.00	0.00	0.00	4.56
Gaihr	100.00	100.00	0.00	0.00	0.00	5.26
Gujrera	96.15	84.61	11.53	0.00	8.00	4.50
Jangal Thapkaur	100.00	100.00	0.00	10.53	5.26	3.06
Kareri Khas	100.00	67.51	29.71	0.00	0.00	2.22
Karnathu	100.00	0.00	100.00	32.00	36.00	1.06
Kharti	100.00	100.00	0.00	0.00	0.00	3.49
Sapaira	69.57	48.16	21.41	0.00	0.00	0.00
Kangra District	**89.71**	**70.00**	**19.37**	**5.32**	**6.16**	**3.02**
Study Area	**91.52**	**39.65**	**50.44**	**28.99**	**30.92**	**3.97**

Source: Compiled by Authors.

per cent goats. There are only two villages like Ghatrer and Paranghala of Chamba district where all the households are keeping sheep and goats. It has been found that 70 per cent of the households in Kangra district and 20.58 per cent households of Chamba district have been rearing exotic cows. Thus, the people have been adopting exotic cows, indicating transformation towards more commercial and modernized forms of livestock management.

(iii) Pastoral Practices

Pastoral practices have decreased to the extent that only 3.97 per cent of the households are engaged in pastoral activity. In Kangra district, only 3.02 per cent, while in Chamba district, 4.74 per cent households are engaged in pastoralism (Table 4). At the village level, there are only 4 villages in Chamba district and one village in Kangra district where more than 5 per cent of the households are associated with the pastoral activities. Thus, the Gaddis have shifted away from their traditional occupation of pastoralism and livestock rearing. This has happened due to social, economic, and infrastructural development along with expansion of agriculture that have reduced the space for pastoralism (Thakur et al. 2025). The availability of alternative occupations is another reason for giving up livestock rearing.

Lifestyle Practices

Lifestyle practices are deeply intertwined with human-environmental relationships (Davidson and Ray, 1991). These practices are not only shaped by immediate environment but also reflect cultural adaptations (Hukkinen, 2006). The lifestyle practices of the Gaddis have undergone significant changes in response to environmental and technological influences (Thakur, 2019). In this study, three indicators: (i) source of drinking water (ii) source of light, and (iii) type of cooking fuel used have been taken to highlight the changes in lifestyle practices.

(i) Source of Drinking Water

Traditionally, Gaddis were dependent on bouri (a natural spring in the mountains) for drinking water. However, at present, only one-fourth of the households are dependent on bouri as a source of drinking water. In Kangra district, this proportion is less than one-fifth (17.24 per cent) while in Chamba district it is slightly less than one-third (31.43 per cent) (Table 5). Out of the eighteen sampled villages, the households of four villages are totally dependent on bouri as a source of drinking water. On the other hand, 12 villages are not having any dependency on bouri. This speaks of a major shift in the source of drinking water as 95.54 per cent of the households have reported their dependence on piped water supply. At district level, it has been found that all the households in Chamba district and 97.54 per cent in Kangra district are dependent on piped water supply (Table 5).

(ii) Source of Light

Electricity, kerosene and firewood are the main sources of light. The dependence of the households is the highest on electricity followed by kerosene and firewood (Table 6). Firewood and kerosene are the traditional ones, while electricity has become a recent source of light. The use and availability of electricity is higher in Kangra district with more than half of the population depending on electricity, whereas 40.23 per cent of the households of Chamba district depend on electricity as source of light (Table 6). About one-fourth (24.47 per

Table 5
Chamba and Kangra Districts: Percentage of Surveyed Households using Different Sources of Drinking Water

Village	Bouri	Hand Pump	Piped Water
Bajol	0.00	0.00	100.00
Balmui	0.00	0.00	100.00
Bariata	0.00	0.00	100.00
Ghatrer	0.00	0.00	100.00
Kuarsi	100.00	0.00	100.00
Kugti	100.00	0.00	100.00
Lakra	0.00	0.00	100.00
Paranghala	0.00	0.00	100.00
Purkhara	100.00	0.00	100.00
Surpara	0.00	0.00	100.00
Chamba District	**31.43**	**0.00**	**100.00**
Chandni	8.00	72.00	80.00
Gaihr	0.00	0.00	100.00
Gujrera	38.46	0.00	100.00
Jangal Thapkaur	0.00	0.00	100.00
Kareri Khas	0.00	0.00	100.00
Karnathu	0.00	0.00	100.00
Kharti	0.00	0.00	100.00
Sapaira	100.00	0.00	100.00
Kangra District	**17.24**	**8.87**	**97.54**
Study Area	**25.00**	**4.02**	**95.54**

Source: Compiled by Authors.

cent) of the households in Chamba district depend on firewood. While, in Kangra district only 3 per cent of the households use firewood as source of light.

(iii) Cooking Fuel Used

Wood, kerosene, liquid petroleum gas (LPG) and electricity are the fuels being used for cooking. LPG and electricity are relatively recent types of fuels for cooking, whereas wood and kerosene are traditional ones. It has been observed that more than one type of fuel is used for cooking. Wood is the preferred one, due to its easy availability. The study reveals that more than two-fifths of the households are dependent on wood, one-fourth are dependent on LPG, one-fifth are using kerosene oil and a little more than one tenth of the households are using electricity for cooking. About 52 per cent households in Chamba district and about 38 per cent in Kangra district are dependent on wood for cooking. While 30.97 per cent households in Kangra district and 17.17 per cent in Chamba district are dependent on LPG for cooking (Table 7). From the above it is concluded that wood continues to remain the most preferred source of fuel for cooking, but LPG is also fast gaining popularity.

Table 6
Chamba and Kangra Districts: Percentage of Surveyed Households using Different Sources of Lighting

Village	Electricity	Kerosene	Firewood
Bajol	36.92	32.31	30.77
Balmui	38.71	35.48	25.81
Bariata	63.41	36.59	0.00
Ghatrer	38.59	35.09	26.32
Kuarsi	37.15	37.14	25.71
Kugti	34.85	34.85	30.30
Lakra	45.91	39.34	14.75
Paranghala	44.19	34.88	20.93
Purkhara	35.90	33.33	30.77
Surpara	37.88	34.85	27.27
Chamba District	**40.23**	**35.30**	**24.47**
Chandni	55.56	44.44	0.00
Gaihr	71.43	28.57	0.00
Gujrera	61.90	38.10	0.00
Jangal Thapkaur	57.58	42.42	0.00
Kareri Khas	49.31	41.10	9.59
Karnathu	53.19	46.81	0.00
Kharti	53.33	46.67	0.00
Sapaira	48.94	42.55	8.51
Kangra District	**55.31**	**41.69**	**3.00**
Study Area	**45.91**	**37.70**	**16.39**

Source: Compiled by Authors.

Vernacular Architectural Practices

House is one of the basic needs of humans and is the first impression of human-environment interaction in any area. Vernacular architecture is the term used for description of the building types. In this study, the change in vernacular architecture has been studied in terms of: (i) building material used for the construction of wall, roof and floor and (ii) source of building materials.

(i) Building Materials Used

Traditionally, for constructing Gaddis houses, walls were constructed with stones, floors with wood and roofs with slates. These materials were locally available. A shift from traditional material has been noticed as bricks have become the preferred one for the construction of walls; concrete for flooring and concrete or tin for roofing. In Kangra district, only 47.09 per cent whereas in Chamba 96.11 per cent of the households are using stone for construction of walls. The highest change in material to construct the wall is found in Jangal Thapkaur village of the Kangra district where none of the households have used stones for the construction of walls. However, in Chamba district, leaving aside Bariata and Purkhara

Table 7
Chamba and Kangra Districts: Percentage of Surveyed Households using different Types of Fuel for Cooking

Village	Wood	Kerosene	LPG	Electricity
Bajol	82.76	17.24	0.00	0.00
Balmui	92.31	7.69	0.00	0.00
Bariata	33.34	6.94	36.11	23.61
Ghatrer	46.81	38.30	14.89	0.00
Kuarsi	68.42	13.16	0.00	18.42
Kugti	52.27	29.55	9.09	9.09
Lakra	39.99	21.43	24.29	14.29
Paranghala	43.18	15.91	27.27	13.64
Purkhara	68.29	26.83	4.88	0.00
Surpara	45.46	27.27	21.82	5.45
Chamba District	**52.14**	**20.60**	**17.17**	**10.09**
Chandni	35.72	17.14	35.71	11.43
Gaihr	26.98	12.70	39.69	20.63
Gujrera	45.61	14.04	33.33	7.02
Jangal Thapkaur	55.88	17.65	26.47	0.00
Kareri Khas	39.99	15.56	27.78	16.67
Karnathu	35.72	28.57	28.57	7.14
Kharti	34.29	27.14	30.00	8.57
Sapaira	43.40	22.64	24.53	9.43
Kangra District	**38.45**	**19.53**	**30.97**	**11.05**
Study Area	**45.01**	**20.04**	**24.36**	**10.59**

Source: Compiled by Authors.

villages all the households of other villages are still building walls with stones (Table 8).

Interestingly, the use of wood for making floor has been reduced, as at present only 66.51 per cent of the sampled households have used wood for making floor. The noticeable change has been observed in Kangra district where 46.05 per cent households depend on wood, as compared to Chamba district (92.48 per cent). At village level, none of the households of Gaihr, Gujrera and Jangal Thapkaur villages of Kangra district have used wood as construction material for floor, while there is no such village in Chamba district (Table 8). The study further reveals that at present only 66.90 per cent of the households are using slate for roofing. In Kangra district 44.30 per cent, whereas in Chamba 90.98 per cent households are using slate for roofing. Thus, Kangra district has witnessed a greater change in the use of material for roofing than Chamba district. The highest change at village level has been found in two villages of Gaihr and Jangal Thapkaur of Kangra district, where none of the households have used slate for roofing (Table 8).

(ii) Sources of Building Materials

Also, the source from where building

Table 8
Chamba and Kangra Districts: Nature and Source of Building Material Used

Village	Percentage of Households using Traditional Building Materials				Percentage of Households Sourcing Building Material within the Region
	Wall Material	Floor Material	Roof Material	Overall, Nature of Building Material	
Bajol	100.00	100.00	100.00	100.00	100.00
Balmui	100.00	100.00	88.89	96.30	100.00
Bariata	38.46	23.08	80.77	47.44	23.08
Ghatrer	100.00	100.00	100.00	100.00	100.00
Kuarsi	100.00	100.00	100.00	100.00	100.00
Kugti	100.00	100.00	100.00	100.00	100.00
Lakra	100.00	100.00	100.00	100.00	100.00
Paranghala	100.00	100.00	100.00	100.00	100.00
Purkhara	90.48	85.71	85.71	87.30	90.48
Surpara	100.00	90.91	100.00	96.97	75.00
Chamba District	**96.11**	**92.48**	**90.98**	**93.19**	**92.27**
Chandni	13.33	13.33	70.00	32.22	6.67
Gaihr	10.00	0.00	0.00	3.33	10.00
Gujrera	61.11	0.00	61.11	40.74	50.00
Jangal Thapkaur	0.00	0.00	0.00	0.00	0.00
Kareri Khas	69.57	43.48	60.87	57.97	60.87
Karnathu	80.00	60.00	80.00	73.33	70.00
Kharti	36.36	18.18	63.64	39.39	43.18
Sapaira	87.50	83.33	87.50	86.11	100.00
Kangra District	**47.09**	**46.05**	**44.30**	**45.81**	**46.77**
Study Area	**70.73**	**66.51**	**66.90**	**68.05**	**67.42**

Source: Compiled by Authors. HH: Households

material is procured for the construction of Gaddi houses has changed. Earlier all of the houses have been built by using locally available material, but at present 67.42 per cent of the houses have been built with material available at local level (Table 8). In Kangra district, 46.77 per cent of the households, whereas in Chamba district 92.27 per cent have used locally available building materials. More dependency on locally available building material in Chamba district is due to poor road connectivity which makes it difficult to procure building material from outside the region.

Cultural Transformation

Taking into account the indicators of cultural transformation, the study reveals that the greatest change has taken place in source of drinking water, followed by the structure of livestock reared, use of wood for cooking, pastoral practices, sources of light, agricultural practices, sources of building material, and nature of building material (Table 9). Overall,

Table 9
Chamba and Kangra Districts: Indicators of Cultural Transformation

Village	Livelihood Practices			Lifestyle Practices			Vernacular Architecture Practices	
	Agricultural Practices	Structure of Livestock Reared	Pastoral Practices	Use of Wood	Source of Light	Source of Drinking Water	Nature of Building Material	Source of Building Material
Bajol	0.54	0.79	0.37	0.15	0.00	1.00	0.00	0.00
Balmui	0.54	0.08	0.46	0.00	0.16	1.00	0.04	0.00
Bariata	0.45	1.00	0.88	0.90	1.00	1.00	0.53	0.77
Ghatrer	0.71	0.00	0.63	0.70	0.14	1.00	0.00	0.00
Kuarsi	0.54	0.69	0.00	0.37	0.16	0.00	0.00	0.00
Kugti	0.82	0.56	0.38	0.61	0.01	0.00	0.00	0.00
Lakra	0.81	0.75	0.63	0.80	0.52	1.00	0.00	0.00
Paranghala	0.36	0.00	0.61	0.75	0.32	1.00	0.00	0.00
Purkhara	0.09	0.39	0.78	0.37	0.00	0.00	0.13	0.09
Surpara	0.09	1.00	0.51	0.72	0.11	1.00	0.03	0.25
Chamba District	0.50	0.53	0.53	0.54	0.24	0.70	0.07	0.11
Chandni	1.00	1.00	0.54	0.87	1.00	0.92	0.68	0.93
Gaihr	0.00	1.00	0.47	1.00	1.00	1.00	0.97	0.90
Gujrera	0.54	1.00	0.55	0.71	1.00	0.61	0.59	0.50
Jangal Thapkaur	0.37	0.89	0.69	0.56	1.00	1.00	1.00	1.00
Kareri Khas	0.37	1.00	0.78	0.80	0.69	1.00	0.42	0.39
Karnathu	0.27	0.68	0.89	0.87	1.00	1.00	0.27	0.30
Kharti	0.64	1.00	0.65	0.89	1.00	1.00	0.61	0.57
Sapaira	0.81	1.00	1.00	0.75	0.72	0.00	0.14	0.00
Kangra District	0.50	0.95	0.70	0.80	0.93	0.82	0.58	0.57
Study Area	0.50	0.71	0.60	0.66	0.55	0.75	0.30	0.32

Source: Compiled by Authors.

the greatest shift in all the indicators have been found in Kangra district than Chamba. The transformation index for Kangra district (0.78) is higher than that of Chamba (0.40). At village level, Jangal Thapkaur village (0.99) of Kangra district reported highest, whereas, Kuarsi village (0.16) of Chamba district witnessed lowest cultural transformation index (Table 10). In Kangra district, seven out of the eight sampled villages, while in Chamba district, only one out of the ten sampled villages, has registered the index of cultural transformation more than the average of study region. On the basis of cultural transformation, the sampled villages have been categorised as under:

(i) Very High Level of Cultural Transformation

The study reveals that five villages have recorded very high (above 0.80) level of cultural transformation index. Out of these five villages, four villages such as Jangal Thapkaur, Chandni, Gaihr, and Kharti fall in Kangra district, while the fifth village Bariata is from Chamba district (Table 10). These four villages of Kangra district are located in the southern Dhaula Dhar range. Whereas, the fifth village, Bariata of Chamba district is situated in close proximity to the tourist centre of Dalhousie and the cantonment of Bakloh. Therefore, Bariata stands out as an island of cultural transformation surrounded by the areas exhibiting very low levels of cultural transformation (Fig. 2).

(ii) High Level of Cultural Transformation

Three villages namely Gujrera, Kareri Khas and Karnathu of Kangra district have recorded high level of cultural transformation index varying between 0.60 to 0.80. These three villages are situated in the southern aspect of Dhaula Dhar range where road connectivity is comparatively better, and proximity to the metalled road is less than two kilometres, therefore cultural transformation is high.

(iii) Moderate Level of Cultural Transformation

Moderate level of cultural transformation index ranging between 0.40 to 0.60 has been witnessed by four villages. Out of these Lakra, Ghatrer and Surpara villages fall in Chamba district, while the fourth village Sapaira falls in the Kangra district. None of these villages have metalled road connectivity and the average distance from a metalled road in their case is more than three kilometres, hence cultural transformation is moderate.

(iv) Low Level of Cultural Transformation

Five villages, such as Paranghala, Bajol, Balmui, Kugti and Purkhara of Chamba district have registered low level of cultural transformation index varying between 0.20 to 0.40. All these five villages are located above 2000 meters of altitude. None of these villages have road connectivity and the average distance from a metalled road is more than four kilometres.

(v) Very Low Level of Cultural Transformation

A very low level of cultural transformation index (less than 0.20) has been witnessed by Kuarsi village of Chamba district. Very low level of cultural transformation in this village is attributed to absence of road connectivity and a higher altitude of more than 2200 meters. Thus, location in terms of altitude and connectivity with or distance from the metalled road are the major factors that have played their role in

Table 10
Chamba and Kangra Districts: Cultural Transformation Index

Village	Livelihood Practices (LHP)				Lifestyle Practices (LSP)				Vernacular Architecture Practices (VAP)			Cultural Transformation Index (CTI)
	Agricultural Practices	Structure of Livestock Reared	Pastoral Practices	LHP	Use of Wood	Source of Light	Source of Drinking Water	LSP	Nature of Building Material	Source of Building Material	VAP	
Bajol	0.28	0.11	0.13	0.17	0.02	0.00	0.59	0.20	0.00	0.00	0.00	**0.38**
Balmui	0.28	0.01	0.16	0.15	0.00	0.04	0.59	0.21	0.02	0.00	0.01	**0.37**
Bariata	0.24	0.14	0.30	0.23	0.14	0.25	0.59	0.33	0.35	0.26	0.30	**0.86**
Ghatrer	0.37	0.00	0.22	0.20	0.11	0.04	0.59	0.25	0.00	0.00	0.00	**0.44**
Kuarsi	0.28	0.10	0.00	0.13	0.06	0.04	0.00	0.03	0.00	0.00	0.00	**0.16**
Kugti	0.43	0.08	0.13	0.21	0.10	0.00	0.00	0.03	0.00	0.00	0.00	**0.25**
Lakra	0.42	0.11	0.22	0.25	0.13	0.13	0.59	0.28	0.00	0.00	0.00	**0.53**
Paranghala	0.19	0.00	0.21	0.13	0.12	0.08	0.59	0.26	0.00	0.00	0.00	**0.40**
Purkhara	0.05	0.06	0.27	0.12	0.06	0.00	0.00	0.02	0.08	0.03	0.06	**0.20**
Surpara	0.05	0.14	0.18	0.12	0.12	0.03	0.59	0.24	0.02	0.09	0.05	**0.42**
Chamba District	**0.26**	**0.24**	**0.18**	**0.17**	**0.09**	**0.06**	**0.41**	**0.19**	**0.05**	**0.04**	**0.04**	**0.40**
Chandni	0.52	0.14	0.19	0.28	0.14	0.25	0.54	0.31	0.45	0.32	0.38	**0.97**
Gaihr	0.00	0.14	0.16	0.10	0.16	0.25	0.59	0.33	0.64	0.31	0.47	**0.91**
Gujrera	0.28	0.14	0.19	0.20	0.11	0.25	0.36	0.24	0.39	0.17	0.28	**0.73**
Jangal Thapkaur	0.19	0.13	0.24	0.18	0.09	0.25	0.59	0.31	0.66	0.34	0.50	**0.99**
Kareri Khas	0.19	0.14	0.27	0.20	0.13	0.17	0.59	0.30	0.28	0.13	0.21	**0.70**
Karnathu	0.14	0.10	0.30	0.18	0.14	0.25	0.59	0.33	0.18	0.10	0.14	**0.65**
Kharti	0.33	0.14	0.22	0.23	0.14	0.25	0.59	0.33	0.40	0.19	0.30	**0.86**
Sapaira	0.42	0.14	0.34	0.30	0.12	0.18	0.00	0.10	0.09	0.00	0.05	**0.45**
Kangra District	**0.26**	**0.19**	**0.24**	**0.21**	**0.13**	**0.23**	**0.48**	**0.28**	**0.39**	**0.20**	**0.29**	**0.78**
Study Area	**0.26**	**0.22**	**0.21**	**0.19**	**0.11**	**0.14**	**0.44**	**0.23**	**0.20**	**0.11**	**0.15**	**0.57**

Source: Compiled by Authors.

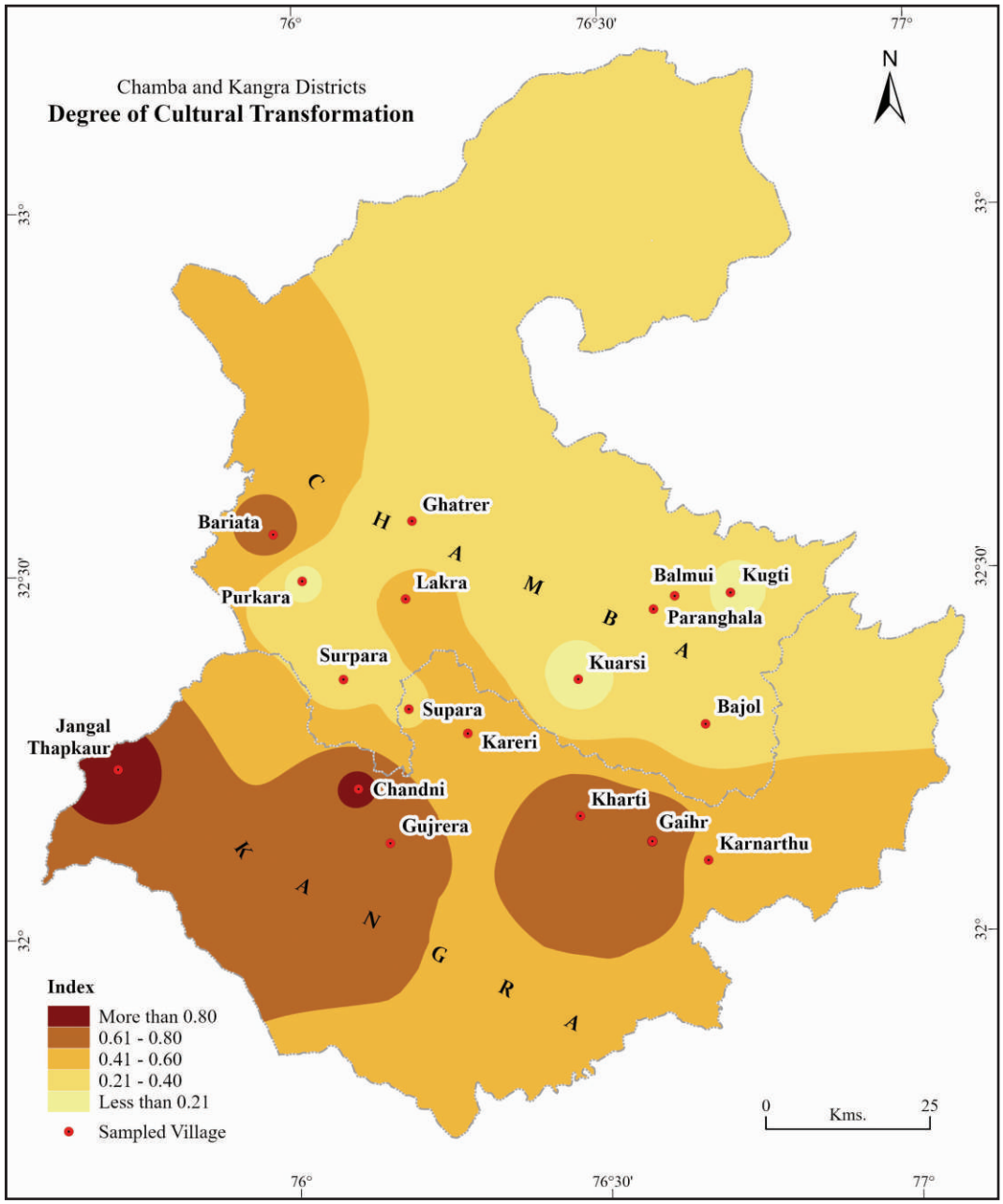
Chamba and Kangra Districts
Degree of Cultural Transformation
N
76°
76°30'
77°
33°
32°30'
32°
Bariata
Ghatrer
Purkara
Lakra
Balmui
Kugti
Paranghala
Surpara
Kuarsi
Supara
Bajol
Kareri
Jangal
Thapkaur
Chandni
Kharti
Gujrera
Gaihr
Karnarthu
CHAMBA
KANGRA
Index
More than 0.80
0.61 - 0.80
0.41 - 0.60
0.21 - 0.40
Less than 0.21
Sampled Village
0
Kms.
25

Fig. 2

cultural transformation of the villages in the study area.

Conclusions

This study has been addressed to understand the cultural transformation in an area, which is the product of human-environment relations. A significant shift in the livelihood practices, decline in pastoralism, changes in crop varieties and dietary habits have been observed. Lifestyle changes have also been observed owing to improved access to modern amenities like electricity, water, and fuel for cooking. Also, changes in vernacular architecture have been witnessed due to a shift in building materials sourced from outside the area. These changes are more noticeable in the villages of Kangra district, due to greater external interaction, accessibility, and resource availability. The cultural transformation is more pronounced in Kangra district, where out of 8 villages, 7 have recorded high to very high level of cultural transformation. Whereas in Chamba district out of 10 villages only one village has witnessed very high level of cultural transformation. These transformations are largely driven by changes in human-environment relations which have resulted due to greater connectivity, accessibility, and state-led initiatives.

References

An, L., Linderman, M., Shortridge, A., Qi, J. and Liu, J. 2005. Exploring complexity in a human-environment system: an agent-based spatial model for multidisciplinary and multiscale integration. *Annals of the Association of American Geographers,* 95 (1):54-79.

Badagliacca, A. 2002. Theoretical approach to the global comfort problem in the man–environment interactions. *Building and Environment,* 37 (10): 975-982.

Bălteanu, D. and Dogaru, D. 2011. Geographical perspectives on human-environment relationships and anthropic pressure indicators. *Romanian Journal of Geography,* 55 (2): 69-80.

Brady, E. and Phemister P. 2012. *Human-environment Relations: Transformative Values in Theory and Practice.* Springer, Netherlands: 116

Butzer, K. W. 1989. Cultural ecology. In *Geography in America,* eds., Gaile, G. L. and Willmott, C. J., Merrill Publishing, Columbus: 192-208.

Davidson, A. W. and Ray M. A. 1991. Studying the human-environment phenomenon using the science of complexity. *Advances in Nursing Science,* 14 (2): 73-87.

Degórski, M. 2014. Relationships between human-environment-space of place-the evolution of research paradigms in geography and the challenge of modernity. *Geographia Polonica,* 87 (3): 409-421.

Diddee, J. 2004. Evolution of folk house types in Maharashtra. In *Cultural Geography: Form and Process,* eds., Grover, N. and Singh, K. N., Concept Publishing Company, New Delhi: 51-59.

Galvin, K. A. 2006. *Human-environment Interactions: New Directions in Human Ecology.* Wadsworth Cengage Learning, Belmont: 406.

Grossman, L. 1977. Man-environment relationships in Anthropology and Geography. *Annals of the Association of American Geographers,* 67 (1): 126-144.

Hukkinen, J. 2006. Sustainability scenarios as interpretive frameworks for indicators of human-environment interaction. In *Sustainable Development Indicators in Ecological Economics,* ed., Lawn, P. A. Edward Elgar Publishing Limited, UK: 291-316.

Kealhofer, L. 1996. Human-environmental relationships in prehistory: an introduction to current research in south and southeast Asia. *Asian Perspectives,* 35 (2): 111-117.

Kőszegi, M., Zsolt, B., Telbisz, T. and Mari, L. 2015. Human-environment relationships in modern and postmodern geography. *Hungarian Geographical Bulletin,* 64 (2): 87-99.

Manku, D. S. 2004. Gujjar settlement morphology in the Beas-Sutlej Kandi: an evolutionary perspective. In *Cultural Geography: Form and Process,* eds. Grover, N. and Singh, K. N., Concept Publishing Company, New Delhi: 97-111.

Marh, B. S. 2004. Three rural house types of the Ravi River valley. In *Cultural Geography: Form and Process,* eds., Grover, N. and Singh, K. N., Concept Publishing Company, New Delhi: 60-74.

Marsh, G. P. 1864. *Man and Nature.* Charles Scribner, New York: 480.

Rasmussen, K. and Arler, F. 2010. Interdisciplinarity at the human-environment interface. *Geografisk Tidsskrift-Danish Journal of Geography,* 110 (1): 37-45.

Sauer, C. O. 1925. *The Morphology of Landscape.* University of California Press, California: 53.

Schimel, D., Redman, C., Dearing, J., Graumlich, L., Leemans, R., Crumley, C., Hibbard, K., Steffen, W. and Costanza, R. 2007. Evolution of the human-environment relationship. *The Encyclopaedia of Earth* : 1-7. https://editors.eol.org/eoearth/wiki/Evolution_of_the_human-environment_relationship. Accessed on April 12, 2020.

Scholz, R. W. and Binder, C. R. 2004. Principles of human-environment systems (HES) research. In *Complexity and Integrated Resources Management', International Environmental Modelling and Software Society,* 1-6. Switzerland: International Environmental Modelling and Software Society http://www.iemss.org/iemss2004/pdf/biocomplexity/schoprin.pdf. Accessed on May 16, 2021.

Singh, D. 2004. Evolution of field pattern in a Punjab village. In *Cultural Geography: Form and Process,* eds., Grover, N. and Singh, K. N., Concept Publishing Company, New Delhi: 112-145.

Singh, M. 2004. The changing rural house type of Punjab: an expression of socio-economic and cultural change. In *Cultural Geography: Form and Process,* eds., Grover, N. and Singh, K. N., Concept Publishing Company, New Delhi: 75-96.

Telbisz, T., Imecs, Z., Mari, L. and Bottlik, Z. 2016. Changing human-environment interactions in medium mountains: the Apuseni mountains (Romania) as a case study. *Journal of Mountain Science,* 13 (9): 1675–1687.

Thakur, S. N. 2019. *Changing Man-Environment Relations: The Case of Gaddi Tribe.* Ph.D. dissertation,

Department of Geography, Panjab University, Chandigarh, India: 257.

Thakur, S.N., Kahlon, S., Bhutani, S. and Sharma, P. 2025. Nomadic pastoralism in western Himalaya: a journey through history, politics, development, and the fall of Gaddi pastoralists. *Human Ecology,* 53 (1): 1-14.

Turner, B. L. 1997. Spirals, bridges and tunnels: engaging human-environment perspectives in geography. *Ecumene,* 4 (2): 196–217.

Ünaldı, Ü. E. 2007. A negative example area in human-natural environment relationship: Erciyes mountain (Turkiye). *Humanity and Social Science Journal,* 2 (1): 139–147.

Young, O. R. 1994. The problem of scale in human/environment relationships. *Journal of Theoretical Politics,* 6 (4): 429-447.

Dr. Som Nath Thakur, Assistant Professor,
Department of Geography,
Gaya College Gaya,
Magadh University, Bodh Gaya, Bihar.

Dr. Simrit Kahlon, Professor,

Dr. Smita Bhutani, Professor,

Dr. Pooja Sharma, Senior Research Fellow,
Email: pooja7220@gmail.com
(Author for Correspondence)
Department of Geography,
Panjab University, Chandigarh.

punjab geographer