



DETERMINING THE TYPES OF RURAL SETTLEMENT IN HIMACHAL PRADESH THROUGH BERNARD'S METHOD (1931)

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ABSTRACT

The present study attempts to determine the type of rural settlements in the twelve districts of Himachal Pradesh. The mountainous terrain of the state of Himachal Pradesh is assumed to provide an excellent example of physical control of landscape on the development of human settlements with particular reference to rural settlements. Bernard Method (1931) has been applied to determine the type of rural settlements in the districts. The type of rural settlements can be compact, semi-compact, semi-sprinkled and dispersed. Deterministic control of physical landscape is quite clearly visible through the existence of dispersed nature of rural settlements in almost all the districts. But possibilistic tendencies are also observed in a few Community Development (C.D.) blocks of some districts through the existence of compact type of rural settlements.

Keywords: Bernard Method, deterministic control, possibilistic tendencies, rural settlement.

INTRODUCTION

The type of rural settlement is dependent on the actual piece of land upon which it is built. The 'Site' factor assumes significance in determining the type of rural settlement. The state of Himachal Pradesh with its mountainous terrain is assumed to provide an excellent example of such a site which will play an important role in determining the rural settlement types. The state of Himachal Pradesh located in the northern part of India is a high-altitude region. There are twelve districts in the state which are included within three divisions. The three divisions are Kangra, Mandi and Shimla. Shimla the state capital is included within the Shimla division.

The study takes into account the several villages included under all the Community Development (C.D.) blocks of the twelve districts. In Chamba district there are seven C.D. blocks consisting of 1591 villages and 94596 rural households. In Kangra district there are fifteen C.D. blocks consisting of 3869 villages and 318379 rural households. Lahul and Spiti district has two C.D. blocks consisting of 521 villages and 6674 rural households. In Kullu district there are five C.D. blocks consisting of 326 villages and 84358 rural households. In Mandi district there are ten C.D. blocks consisting of 3338 villages and 203747 rural households. In Kinnaur district there are three C.D. blocks consisting of 660 villages and 19976 rural households. Una district has five C.D. blocks with 848 villages and 100502 rural households. Bilaspur district has three C.D. blocks with 1061 villages and 74712 rural households. Hamirpur district has six C.D. blocks with 1725 villages and 98115 rural households. In Shimla district there are ten C.D. blocks consisting of 3231 villages and 129854 rural households. In Solan district there are five C.D. blocks consisting of 2544 villages and 96510 rural households. Sirmaur district has six C.D. blocks with 976 villages and 85087 rural households.

Bernard's method (1931) for determination of rural settlement type has been applied in the present study. Bernard's formula can be suitably applied to secondary source of data on area, number of villages and number of

rural households of the C.D. blocks. The Bernard index value denoted by 'K' will indicate the type of rural settlements in the twelve districts of Himachal Pradesh.

STUDY AREA

The state of Himachal Pradesh is administratively divided into twelve districts. The twelve districts are included within three divisions (Census, 2011). The Kangra division consists of three districts namely Chamba, Kangra and Una (Census, 2011). The Mandi division consists of five districts namely Bilaspur, Hamirpur, Kullu, Lahaul and Spiti and Mandi. The Shimla division consists of four districts namely Kinnaur, Shimla, Solan and Sirmaur.

Chamba district located in the northern part of Himachal Pradesh has an elevation ranging between 559 and 6162 metres (Census, 2011). Kangra district located in the north western part has an altitude between 400 and over 6000 metres (Census, 2011). Una district is located in the south western part of the state and its altitude varies between 332 and 1162 metres (Census, 2011). Bilaspur district is located in the south western part of the state and its altitude is about 2000 feet (Census, 2011). Hamirpur district is located in the south western part of the state and has an altitude varying between 470 and 1235 metres (Census, 2011). Kullu district is located in the eastern part of the state and has an altitude ranging between 1089 and more than 6632 metres (Census, 2011). Lahula and Spiti district is located in the norther and north eastern part of Himachal Pradesh and has an elevation ranging between 1582 and 7010 metres (Census, 2011). Mandi district is located in the central part of the state and its altitude ranges between 503 and 4034 metres (Census, 2011). Kinnaur district is located in the eastern part of the state and has an elevation between 1973 and 6791 metres (Census, 2011). Shimla district is located in the southern part of the state and the altitude ranges between 300 to 6000 metres (Census, 2011). Solan district is located in the south western part of the state and its altitude is between 284 and 2069 metres (Census, 2011). Sirmaur district is located in the southern part of Himachal Pradesh and has an elevation between 358 and 3544 metres (Census, 2011). The state is a part of the Western Himalayas and thus is a high-altitude region.

OBJECTIVES

The present study is an attempt to find out the following:

1. To determine the type of rural settlements in the twelve districts of Himachal Pradesh by applying Bernard's Method (1931).
2. To analyse the deterministic and possibilistic tendencies behind the existence of the rural settlement types.

MATERIALS AND METHOD

The present study is entirely based on secondary data. Census 2011 data has been obtained from the Census tables and District Census Handbooks of the twelve districts of Himachal Pradesh. Bernard's Method (1931) has been applied. Bernard's formula consists of the components- area of the C.D. blocks in square kilometres denoted by 'S', number of rural households in the C.D. blocks denoted by 'M' and number of villages in the C.D. blocks denoted by 'N'. The Index value denoted by 'K' has been calculated by multiplying number of rural households in the C.D. blocks with area of the C.D. blocks and dividing the result obtained by square of the number of villages. Existing literatures has been consulted and reviewed to find out the significance and distinctiveness of the present study.

PREVIOUS WORKS

The following studies have been conducted on the application of Bernard's Method for determination of the type of rural settlements.

Chandrakar (2026) in her research paper on "A Study of Geographical Identification for the Types of Rural Settlement in Amravati District, 2011" has applied Bernard's method for identifying rural settlements in the selected study area. She has found out that physical factors play a significant role in determining the type of rural settlement.

Ghosh (2026) in her research paper on “Determining the type of rural settlements in some selected districts of West Bengal through Bernard’s Method (1931)” has elaborated on the type of rural settlements in the highly ruralized districts of West Bengal namely Bankura, Koch Bihar, Purba Medinipur and Uttar Dinajpur. The study based on secondary data of Census 2011 brings forth the fact that geographical location along with hazard proneness of the selected districts has resulted in dispersed rural settlements in those districts.

Bhore (2023) in his research paper on “Geographical analysis of dispersal index of rural settlement in Chhatrapati Sambhajinagar (Aurangabad) district using GIS techniques” has elaborated about the rural settlement types in Aurangabad district using Bernard’s Method (1931). He has found out the vital role of physical factors in determining the type of rural settlements in the tehsils.

Pagar (2021) in his research paper on “Geographical Analysis of Types of Rural Settlement in Nashik District, Maharashtra” has applied Bernard’s Method (1931) for determining the type of rural settlements in the fifteen tehsils of Nashik district. The study based on Census 2011 data has concluded by bringing forth the importance of physical factors in determining rural settlement type.

The present study elaborates on the determination of the type of rural settlements in the twelve districts of Himachal Pradesh on the basis of several mathematical calculations following Bernard’s Method (1931). Such type of study on a mountainous state of Himachal Pradesh has not been done earlier and thus can be said to be distinctive.

RESULTS AND FINDINGS

RURAL SETTLEMENT TYPE IN CHAMBA DISTRICT

Chamba district has seven Community Development (C.D.) blocks. The calculated K values are below 1000, precisely below 600 (Table 1) indicate the dispersed nature of rural settlements in the district. In Saluni C.D. block the lowest calculated K value is 92.70. The highest K value of 562.95 is found in Pangi C.D. block.

Table 1: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Chamba district.

C.D. BLOCK	AREA (S)	RURAL HOUSEHOLDS (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Pangi	1600.52	3952	106	6325255.04	11236	562.95
Tisa	996.51	12680	264	12635746.8	69696	181.30
Saluni	576.74	15051	306	8680513.74	93636	92.70
Chamba	386.96	14914	122	5771121.44	14884	387.74
Bhattiyat	644.08	23400	356	15071472	126736	118.92
Mehla	880.34	16430	185	14463986.2	34225	422.61
Bharmaur	1818.37	8169	252	14854264.53	63504	233.91

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN KANGRA DISTRICT

Kangra district has fifteen C.D. blocks. The calculated K values shown in Table 2 indicate the dispersed nature of rural settlement in the district. The highest and lowest calculated K values are 581.58 and 35.34 which belong to the C.D. blocks of Baijnath and Sulah respectively.

Table 2: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Kangra district.

C.D. BLOCK	AREA (S)	RURAL HOUSEHOLDS (M)	NUMBER OF VILLAGE S (N)	S*M	N ²	K
Nurpur	374.28	25238	303	9446078.64	91809	102.89
Indora	406.22	21482	208	8726418.04	43264	201.70
Fatehpur	395.96	23376	310	9255960.96	96100	96.32
Nagrota Surian	308.93	21948	212	6780395.64	44944	150.86
Pragpur	416.39	25932	304	10797825.48	92416	116.84
Dera	713.92	28165	538	20107556.8	289444	69.47
Kangra	249.96	22745	263	5685340.2	69169	82.19
Rait	343.47	22441	260	7707810.27	67600	114.02
Dharmsala	283.8	15906	116	4514122.8	13456	335.47
Nagrota Bagwan	180.11	18478	266	3328072.58	70756	47.04
Bhawarna	222.52	21432	165	4769048.64	27225	175.17
Lambagaon	229.29	18630	281	4271672.7	78961	54.10
Baijnath	1339.59	20822	219	27892942.98	47961	581.58
Panchrukhi	103.6	15236	141	1578449.6	19881	79.39
Sulah	171.06	16548	283	2830700.88	80089	35.34

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN LAHUL AND SPITI DISTRICT

Lahul and Spiti district has two C.D. blocks. Out of the two blocks the lowest K value is 97.82 which is found in Lahul and the highest K value is 343.74 which is found in Spiti (Table 3). The K value of both the blocks indicates dispersed type of rural settlement.

Table 3: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Lahul and Spiti district.

C.D. BLOCK	AREA (S)	RURAL HOUSEHOLDS (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Lahul	2010.84	4091	290	8226346.44	84100	97.82
Spiti	7101.11	2583	231	18342167.13	53361	343.74

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN KULLU DISTRICT

Kullu district has five C.D. blocks. The highest K value is 3338.83 which is found in Anni C.D. block indicating compact rural settlement type (Table 4). Kullu and Nirmand C.D. block have semi-sprinkled type of rural settlements.

Table 4: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Kullu district.

C.D. BLOCK	AREA (S)	RURAL HOUSEHOLD S (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Naggar	102	22630	185	2308260	34225	67.44
Kullu	148.85	25436	56	3786148.6	3136	1207.32
Banjar	94.14	11943	42	1124314.02	1764	637.37
Anni	78.5	12292	17	964922	289	3338.83
Nirmand	78.55	12057	26	947077.35	676	1401.00

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

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RURAL SETTLEMENT TYPE IN MANDI DISTRICT

Mandi district has ten C.D. blocks. Rural settlements in all the C.D. blocks are dispersed in nature as found out from the calculated K values. Among the C.D. blocks the lowest K value of 34.45 is found in Karsog and the highest K value of 146.33 is found in Balh (Table 5).

Table 5: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Mandi district.

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

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C.D. BLOCK	AREA (S)	RURAL HOUSEHOLD S (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Chauntra	236.39	17012	278	4021466.68	77284	52.03
Drang	526.4	18182	320	9571004.8	102400	93.47
Dharpur	266.3	20442	264	5443704.6	69696	78.11
Gopalpur	222.67	21734	307	4839509.78	94249	51.35
Sundarnagar	422.66	21449	290	9065634.34	84100	107.80
Balh	223.07	24688	194	5507152.16	37636	146.33
Mandi Sadar	597.91	27453	364	16414423.23	132496	123.89
Gohar	359.3	14792	334	5314765.6	111556	47.64
Seraj	500.99	17216	388	8625043.84	150544	57.29
Karsog	594.91	20779	599	12361634.89	358801	34.45

RURAL SETTLEMENT TYPE IN KINNAUR DISTRICT

Kinnaur district has three C.D. blocks. Rural settlements in all the C.D. blocks are dispersed in nature as found out from the calculated K values. Among the C.D. blocks the lowest K value of 224.23 is found in Nichar and the highest K value of 347.81 is found in Kalpa (Table 6).

Table 6: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Kinnaur district.

C.D. BLOCK	AREA (S)	RURAL HOUSEHOLDS (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Poo	3383.79	5471	278	18512715.09	77284	239.54
Kalpa	1673.08	7824	194	13090177.92	37636	347.81
Nichar	1186.21	6681	188	7925069.01	35344	224.23

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN UNA DISTRICT

Una district has five C.D. blocks. Rural settlements in all the C.D. blocks are dispersed in nature as found out from the calculated K values. Among the C.D. blocks the lowest K value of 53.50 is found in Bangana and the highest K value of 800.68 is found in Haroli (Table 7).

Table 7: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Una district.

C.D. BLOCK	AREA (S)	RURAL HOUSEHOLDS (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Amb	336.24	20668	208	6949408.32	43264	160.63
Gagret	251.98	18395	92	4635172.1	8464	547.63
Bangana	418.51	15570	349	6516200.7	121801	53.50
Una	215.72	24694	109	5326989.68	11881	448.36
Haroli	306.28	21175	90	6485479	8100	800.68

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN BILASPUR DISTRICT

Bilaspur district has three C.D. blocks. Rural settlements in all the C.D. blocks are dispersed in nature as found out from the calculated K values which is less than 100. Among the C.D. blocks the lowest K value of 64.55 is found in Ghumarwin and the highest K value of 82.90 is found in Jhandutta (Table 8).

Table 8: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Bilaspur district.

C.D. BLOCK	AREA (S)	RURAL HOUSEHOLDS (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Ghumarwin	226.55	22498	281	5096921.9	78961	64.55
Jhandutta	360.85	24414	326	8809791.9	106276	82.90
Bilaspur Sadar	512.88	27800	454	14258064	206116	69.17

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN HAMIRPUR DISTRICT

Hamirpur district has six C.D. blocks. But census data is not available for the individual blocks of Hamirpur, Bhoranj and Bamson. So, they have been considered as a unified block as Hamirpur-Bhoranj-Bamson. Rural settlements in all the C.D. blocks are dispersed in nature as found out from the calculated K values which is less than 50. Among the C.D. blocks the lowest K value of 25.64 is found in Nadaun and the highest K value of 41.77 is found in the unified Hamirpur-Bhoranj-Bamson (Table 9).

Table 9: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Hamirpur district.

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN SHIMLA DISTRICT

C.D. BLOCK	AREA (S)	RURAL HOUSEHOLD S (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Tira Sujanpur	143.15	7663	184	1096958.45	33856	32.40
Nadaun	250.7	22403	468	5616432.1	219024	25.64
Bijhri	273.62	20778	381	5685276.36	145161	39.17
Hamirpur-Bhoranj-Bamson	423.18	47271	692	20004141.78	478864	41.77

Shimla district has ten C.D. blocks. But data on area is not available in the census for two blocks- Mashobra and Basantpur. Hence calculation of K value could not be done for Mashobra and Basantpur. Rural settlements in all the C.D. blocks are dispersed in nature as found out from the calculated K values. Among the C.D. blocks the lowest K value of 25.86 is found in Chaupal and the highest K value of 396.47 is found in Chauhara (Table 10).

Table 10: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Shimla district.

C.D. BLOCK	AREA (S)	HOUSEH OLDS (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Rampur	867.53	15690	220	13611545.7	48400	281.23
Nankhari	158.47	6075	102	962705.25	10404	92.53
Narkanda	238.12	10117	186	2409060.04	34596	69.63
Theog	475.47	16345	486	7771557.15	236196	32.90
Chaupal	499.38	16006	556	7993076.28	309136	25.86
Jubbal-Kothkai	534.16	16387	421	8753279.92	177241	49.39
Rohru	303.17	12480	188	3783561.6	35344	107.05
Chauhara	1138.32	10304	172	11729249.28	29584	396.47

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN SOLAN DISTRICT

Solan district has five C.D. blocks. All the rural settlements are of dispersed type with low K values. Among the C.D. blocks the lowest K value of 12.75 is found in Solan and the highest K value of 54.17 is found in Nalagarh. (Table 11).

Table 11: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Solan district.

C.D. BLOCK	AREA (S)	HOUSEHOLDS (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Kunihar	392.54	17534	520	6882796.36	270400	25.45
Nalagarh	697.59	34752	669	24242647.68	447561	54.17
Dharampur	276.75	20895	583	5782691.25	339889	17.01
Solan	197.41	14937	481	2948713.17	231361	12.75
Kandaghat	211.55	8392	291	1775327.6	84681	20.96

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

RURAL SETTLEMENT TYPE IN SIRMAUR DISTRICT

Sirmaur district has six C.D. blocks. All the rural settlements are of dispersed type as indicated by the K values (Table No.). Among the C.D. blocks the lowest K value of 62.00 is found in Pachhad and the highest K value of 889.52 is found in Shillai (Table 12).

Table 12: Calculation of Bernard Index for determining the type of rural settlement in the C.D. blocks of Sirmaur district.

C.D. BLOCK	AREA (S)	HOUSEHOLDS (M)	NUMBER OF VILLAGES (N)	S*M	N ²	K
Rajgarh	412.39	9025	140	3721819.75	19600	189.89
Pachhad	406.5	10549	263	4288168.5	69169	62.00
Nahan	286.74	14313	210	4104109.62	44100	93.06
Paonta Sahib	366.34	31460	191	11525056.4	36481	315.92
Sangrah	486.28	11567	122	5624800.76	14884	377.91
Shillai	272.09	8173	50	2223791.57	2500	889.52

Source: Source: District Census Handbook, Part XII- A, Village and Town Directory, Himachal Pradesh, 2011.

Computed by the Author.

CONCLUSION

Physiography controls the development of the human settlements. Generally dispersed settlements develop in mountainous region. Deterministic control of physiography is quite evident from the existence of mostly dispersed settlements in all the districts of Himachal Pradesh. The lowest and highest K value is 12.75 and 3338.83 which is found in Solan C.D. block of Solan district and Anni C.D. block of Kullu district respectively. The calculated K values have a high range between 12.75 and 3338.83. About 95.8 per cent of all the C.D. blocks have K value below 1000 indicating dispersed type of rural settlements. Out of this 95.8 per cent, 2.9 per cent of the C.D. blocks have K value less than 20, 13.04 per cent have K value between 20 and 40, 26.09 per cent have K value between 40 and 80, 18.84 per cent have K value between 80 and 120, 4.35 per cent have K value between 120 and 160, 5.80 per cent have K values between 160 and 200, 200 and 240, 240 and 350, 350 and 450, 2.90 per cent have K values between 450 and 550, 4.35 per cent have K values between 550 and 650, 2.9 per cent have K values between 650 and 850 and 1.45 per cent have K values between 850 and 1000 respectively. About 2.8 per cent of the C.D. blocks have K value between 1000 to 1500 indicating semi-sprinkled rural settlement type. About 1.4 per cent of the C.D. blocks have K value between 1500 to 3500 indicating compact rural settlement type which is an expression of possibilistic tendencies in a high-altitude mountainous region where deterministic control of physical landscape is prominent and dominant.

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