

An Analysis of Educational Infrastructure Availability: Study of Rural Himachal Pradesh

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Abstract: *The present study is an attempt to understand the development of educational facilities in rural Himachal Pradesh, 2001-2011. This study focuses on some important indicators of educational infrastructure such as literacy rate, schools per 1000 population, single teacher school, drop-out rate, enrolment ratio rural, total enrolment (1-5 class), total enrolment (6-8 class), pupil teacher ratio. These indicators help to determine the level of educational facilities development in rural Himachal Pradesh. The main statistical tool used in present study is composite index which is an outcome of z-score. The distribution of educational facilities in rural area of Himachal Pradesh is uneven i.e. Solan shows highest position in the composite index of level of educational facilities which is followed by following districts Chamba, Kinnaur, Hamirpur, Kullu, Bilaspur, Sirmaur, Una, Kangra, Solan, Mandi and Lahaul & Spiti.*

Keywords: Educational infrastructure, rural areas, z-score, composite index

1. Introduction

Literacy has made a remarkable progress in Himachal Pradesh. At the time of Independence, Himachal Pradesh had the lowest literacy rate in India with about 8 percent literate population. The state was in fact classified as the backward state in North India. The literacy rate however, improves steadily and today Himachal Pradesh has 6th rank among all Indian major states (except union territory). It has about 82.8 percent overall literacy rates in which 89.5 and 75.9 percent of male and females are literates respectively. Comparatively, overall literacy in India is 73 percent, with 80.9 and 64.6 percent in males and females respectively (Census of India, 2011).

Himachal Pradesh has acquired a special position in the literacy rate; enrolment of the students between the age group 6-14 has increased in absolute numbers while dropout rate has fallen considerably especially among the girls child of SC/STs families. The number of female children in 10th class is now comparable to the male of same standard and the same pattern is observed at higher secondary level. The state intervention was critical in making possible the expansion of the infrastructure in the state. The quality of leadership available to the state in its formative years also enhanced the favorable conditions created by this social environment. The tremendous expansion in the school system and innovative scholarship schemes to retain girl students in school after primary classes, provided the access and impetus to build on the favorable social conditions (Sanan, 2004).

2. Study Area

Himachal Pradesh is a mountainous state of India situated in north western Himalaya. Its geographical location lies in between the longitude and latitudes of 30° 22' 44" to 33° 12' 40" and 75° 45' 55" to 79° 04' 20" E. It extends from the Shiwalik hills in the south to the Great Himalayan range, including a slice of Trans-Himalaya in the north. It is characterized by the physiographic diversity with altitude

varying from 300 m in plains of Kangra and Una to nearly 7,000m in Central Himalayan range of Lahaul and Spiti. It covers a geographical area of 55,673 km², which is about 1.69 percent total geographical area of India. Administratively, Himachal Pradesh is divided into 3 divisions, 12 districts, 55 sub divisions, 85 tehsils, 78 blocks and 17,882 inhabited villages. In 2011, the population of the Himachal Pradesh was 68.65 lakhs, in which 34.82 lakhs male and 33.83 lakhs were females. The most important characteristic of the population distribution is that about 89.96 percent lives in rural Himachal Pradesh. The region is drained by five major rivers i.e. Satluj, Beas, Chenab, Yamuna and Ravi (Census of India, 2011).

Himachal Pradesh is primarily an agrarian state where agriculture and horticulture are major economic activities. Tourism activities both religious and adventurous are the other major economic activities that play an important role in source of livelihood.

Study Area



The concentration of population is high in southern area whereas other areas are sparsely populated. The state is also vulnerable to the natural hazard i.e. earthquakes, flood, landslide and glacial lake outburst floods. The global warming is also a big challenge in front of the state; it has an adverse impact on agriculture belt of apple. The accessibility, availability, sustainability, quality and affordability of socio-economic and infrastructure development are the biggest challenges for state (Singh, 2014).

3. Database and Methodology

3.1 Database

Database of the present study is based on secondary sources. Various types of data are required for the fulfillment of the objectives of present study. Some important sources are statistical abstract of Himachal Pradesh and village directory of Census of India, 2011. Indicators like literacy rate, schools per 1000 population, single teacher school, drop-out rate, enrolment ratio rural, total enrolment (1-5 class), total enrolment (6-8 class) and pupil teacher ratio have been calculated by taking data from unified district information system for education (UDISE). These indicators help to determine the level of educational facilities development in rural Himachal Pradesh.

3.2 Methodology

The present study finds "Composite Index/score" as an important statistical tool to solve the research problem. A composite index/score is an index that shows the overall picture of the concerned problem and this problem is solved by selecting some important indicators. These indicators are decided in advance for the understanding the entire phenomena in a composite whole. Another key statistical tool of composite index is the "Z-score". It is an outcome from the following formula,

$$Z\text{-score} = \frac{X - \bar{X}}{S.D.}$$

Where, S.D. is standard deviation,

X is the simple value of indicators

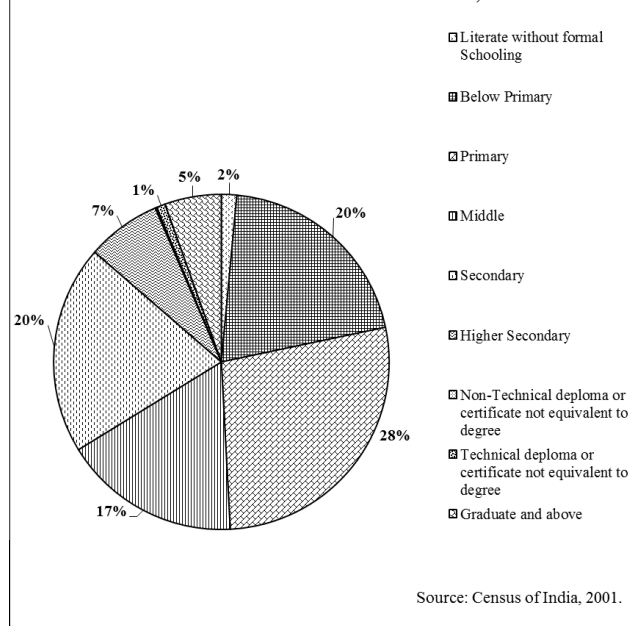
\bar{X} is the mean of all the values of X.

Maps have been prepared by arc gis 9.3 and quartile method is taken for the categorization of data.

4. Educational Profile of Himachal Pradesh

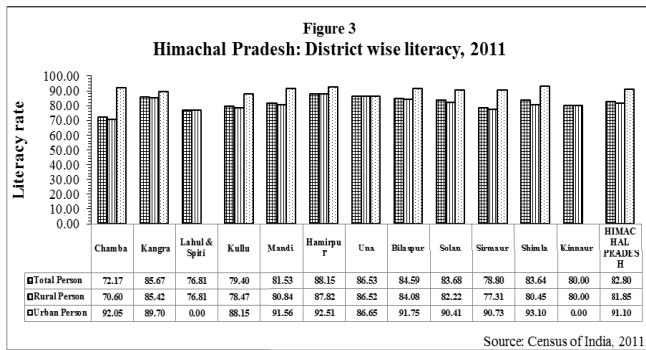
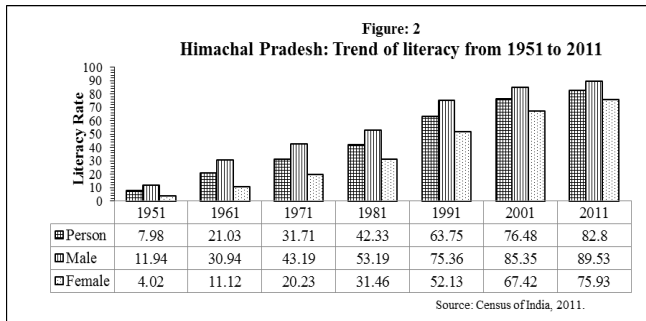
The composition of literate population in Himachal Pradesh is shown in the fig. 1. The total literate population in the state was 4041621 in 2001; it is about 76.48 percent of the total population of the state. Among the total literate population 20 percent attains only below primary level of education, 28 percent up to primary, 17 percent middle, 20 percent secondary and only 7 percent attains higher secondary education.

Figure: 1
Himachal Pradesh: Educational Attainment, 2001

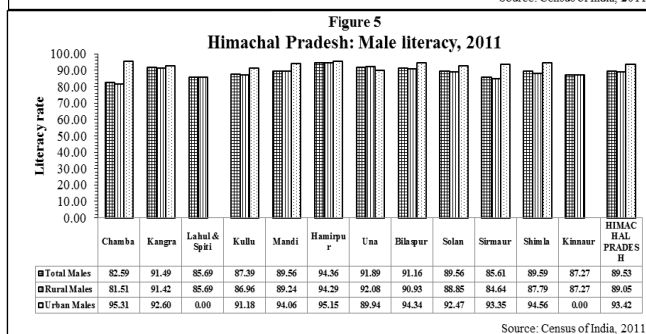
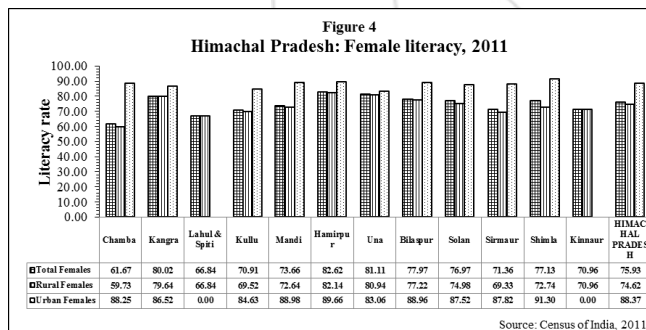


Only 5 percent of the literate population gets success in the attainment of education up to graduate and above graduate level. Actually these figures are alarming to the state government of Himachal Pradesh, because the majority of literate population is limited up to the primary level. The most important challenge for the state is to convert this level of education beyond the primary level. State government has failed in the system of higher education because the desire number of student is not coming in various streams at higher education level i.e. Himachal Pradesh has only 1 percent literates who are technical diploma or certificate holder. It is utmost important for the state that it diversified the composition of its literate population. Another important point for the education system of the state is that it should focused on the secondary and higher secondary level of education (Himachal Pradesh Development Report, 2009).

The trends of literacy rate in Himachal Pradesh are shown in fig.2; it is increased by 21.42 per cent points from 1981 to 1991 and by 12.73 percent points from 1991 to 2001 and during the last decade by 6.32 points and reached to 82.8 percent literacy. Fig. 4 shows the females literacy in both rural and urban Himachal Pradesh. The total female literacy rate is much above the national average at 75.93 percent. Comparatively, it was only 64.60 in India. Likewise, there is wide gap in rural-urban female literacy rate both in the state as well as national level. It is 74.62 percent and 88.37 percent for rural and urban in the state of Himachal Pradesh whereas the corresponding figures at national level are 57.9 percent and 79.10 respectively. At district level rural female literacy Chamba district lies at the bottom followed by Lahaul and Spiti, Sirmaur, Kullu and Kinnaur.



The low level of female literacy in these districts is attributed to the lack of educational facilities i.e. single classroom school, single teacher school, high repetition rate etc. Whereas, fig.5 shows the male literacy rate in rural and urban Himachal Pradesh. Male literacy is much higher than female in both rural and urban areas. Urban males are 93.42 percent literate whereas they are 89.05 percent literate in rural areas. It is much higher than the national values of male literacy rate i.e. 77.20 % and 88.80 percent respectively.



5. Result and Discussion

5.1 Gross Enrolment Ratio

Gross enrolment ratio (GER) is a ratio between the total enrolments up to primary level and their respective age group (6-11 years) population. The literacy rate calculated

on the basis of GER presents a fake picture of literacy rate because it involves all the child population admitted in schools irrespective of their age. Government of India adopted a special technique in 1991 for the calculation of literacy rate in India; in which the population lies between the age group of 0-5 years are excluded from the calculation of literacy rate. Therefore, the state of literacy must be calculated by taking Net Enrolment Ratio (NER).

Gross enrolment ratio is helpful in understanding the current and future trend of literacy in any given area. It is also helpful in the estimation of quality of education; because the enrolment in the private schools is starts from the 2.5 to 3 years and students have learnt from various modern techniques i.e. play schools, nursery schools, kindergarten schools and Montessori schools. The admissions in government school are started in the age of 6th year of children.

$$\text{Gross Enrolment Ratio (GER)} = \frac{\text{Total Enrolment in Grade I-V}}{\text{Population of Age Group 6-11}} \times 100$$

The inter-district variation in term of gross enrolment ratio (GER) is a special feature in the state; it's 9 out of 12 districts have more than 100 GER. It means that children below 6 years are also enrolled in schools. The pattern of GER can be seen in Fig. 2.15; it is clearly visible that the highest GER in state lies in Sirmaur followed by Chamba, Kullu, Solan, Shimla, Kinnaur, Una, Mandi and Bilaspur. Only three districts have gross enrolment ratio below 100 percent i.e. Hamirpur, Kangra and Lahaul & Spiti.

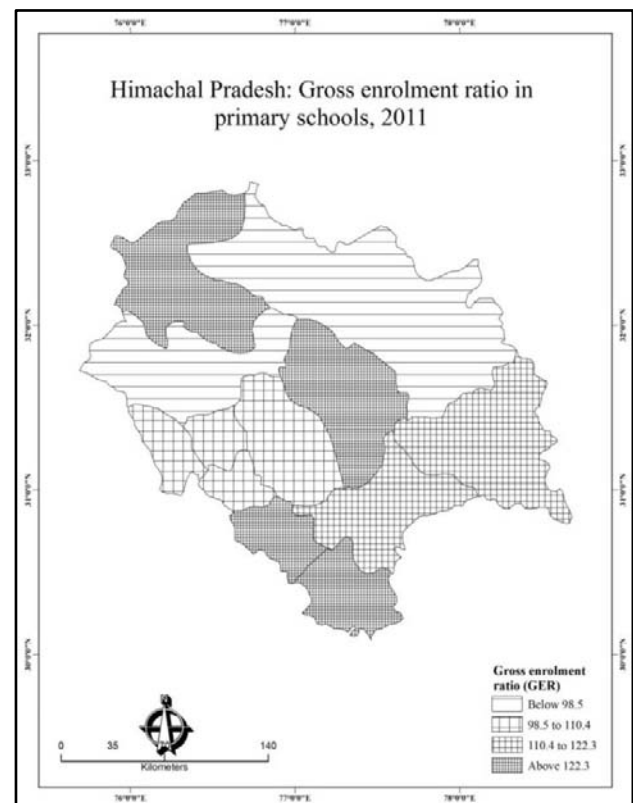


Figure 6

The lowest GER in Lahaul and Spiti is attributed to the presence of highly rough terrain in the district. It is a cold dessert in North-Western India, which remain inaccessible during winter month due to snow. The opening of schools has changed the perception of peoples. Now they are getting opportunities of modern technologies and their occupational culture have changed steadily; the younger generation is coming forward for the government jobs. With the opening of the modern mean of communication peoples who were previously worked on mules; now worked by using trucks; their local women works in the fields mainly the cash crops i.e. seed potato, peas and hopes which is indeed revolutionized the local economy of the valley (District Handbook, Lahaul & Spiti, 2011).

5.2 Net Enrolment Ratio

The net enrolment ratio (NER) is a ratio between absolute populations of age group (6-11years) to the total enrolment in the same age group.

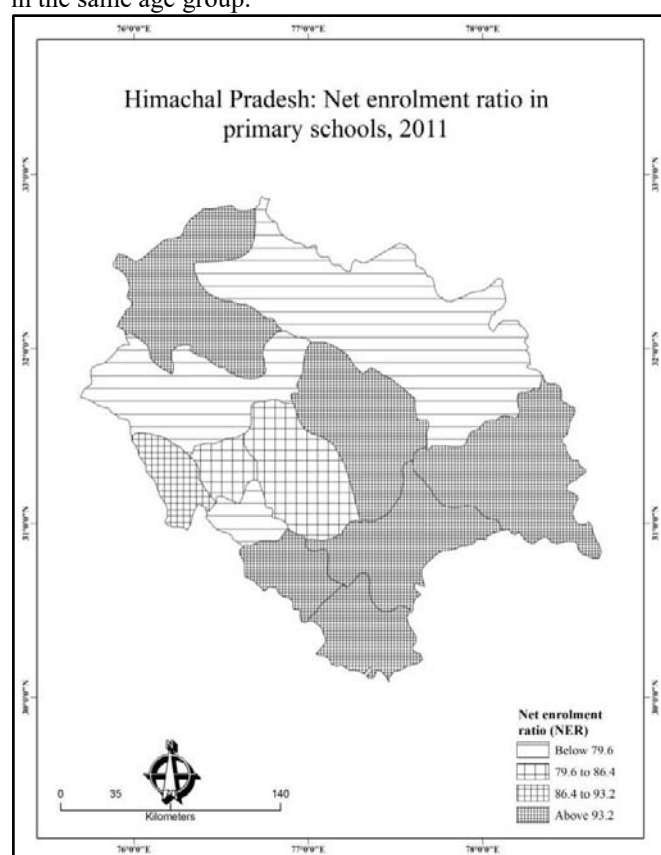


Figure 7

The literacy rate calculated on the basis of NER gives us true picture of literacy rate in the concerned area. It is helpful in the calculation of current status of literacy.

$$\text{Net Enrolment Ratio} = \frac{\text{Enrolment of 6-11 years age group population}}{\text{Population of age group 6-11 years}} \times 100$$

It can also helpful in the estimation of future trends of literacy. The inter-district performance in term of NER, in a mountainous state like Himachal Pradesh, is praiseworthy task; because after having such a rough terrain its

performance in the field of education attainment is an incredible or can be taken as a bench marks for all other states those are lagging behind in term of education attainment. Some of its districts attain 100 percent enrolment like Solan, Kullu, Sirmaur and Chamba. Other districts like Shimla, Kinnaur, Mandi, Una and Hamirpur also got more than 80 percent enrolment in term of primary education. Districts like Bilaspur, Kangra and Lahaul & Spiti also perform a satisfactory result in term of net enrolment ratio.

5.3 Drop-out Rate

Drop-out rate is the percentage of students failing to complete a particular school or it involves all the persons who are not attending any school in the school going age group. Drop-out rate is inversely correlated with the literacy rate. It is also negatively correlated with the socio-economic prosperity of any region. High drop-out rate can harm any country in the attainment of technological advancement. It can become a source of anarchy in any country. Every country tries to overcome on drop-out rate by introducing free and compulsory education. A country like India gives a legal right to attain free and compulsory elementary education. Along with this there are several other constitutional provisions for right to Education i.e. article 21A was added by 86th constitutional amendment which provide us education as a fundamental right, even before this article 45 in part IV provides free and compulsory education, article 51A is related with the fundamental duties according to this article it is the duty of our parents to provide opportunities for education to their children in the age group of 6-14 (Laxmikanth, 2004).

$$\text{Drop-out Rate} = \frac{\text{Number of students Drop-out from grade 'G' in Year 'T'}}{\text{Total no of Student in Grade 'G' in Year 'T'}} \times 100$$

There are some attractive scholarship schemes also run by the state government to increase their net enrolment ratio. Some important scholarship are *Dr. Ambedkar MedhaviChattarvritti Yojana*, *Swami Vivekananda UtkrishtChattarvritti Yojana*, *Thakur Sen Negi UtkrishtChattarvritti Yojana*, *MaharshiBalmikiChattarvritti Yojana*, *Indira Gandhi UtkrishtChattarvritti Yojana for Post Plus Two*, *High School Merit Scholarship*, *Rashtriya Indian Military College Scholarship*, *IRDP Scholarship Scheme*, *Financial Assistance to the Children of Armed Force Personnel Killed Different Wars and Operations*, *Sainik School SujanpurTihra Scholarship*, *NDA Scholarship Scheme*, *ProtsahnChattarvritti Yojana* etc. (Murthy, 2012).

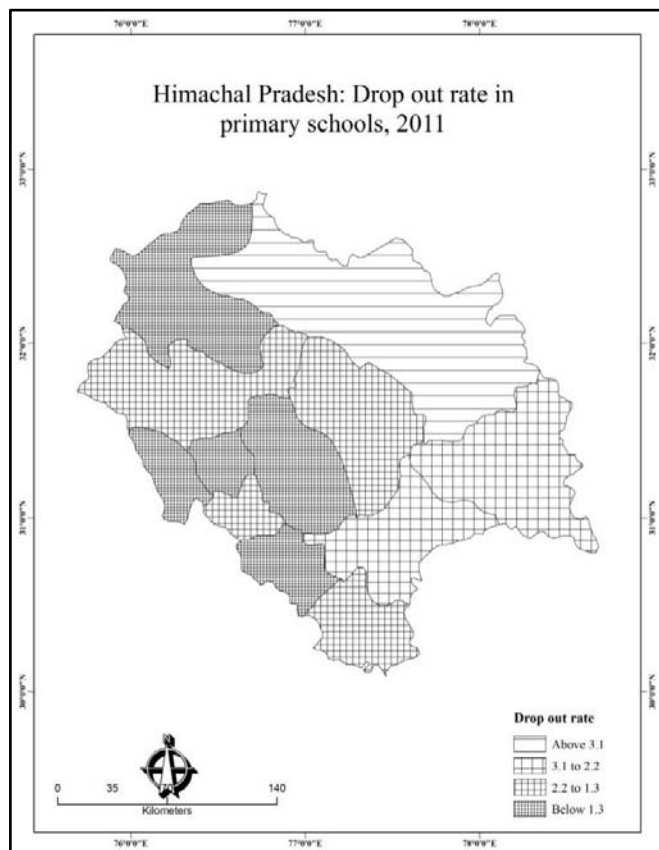


Figure 8

The drop-out rate in some districts is high in comparison to the other districts i.e. 3 district namely Lahaul and Spiti, Shimla and Kinnaur have exceptionally high drop-out rate (more than 3 percent) in the state whereas some other districts like Chamba and Mandi have marginal level of drop-out rate of below 1 percent. Districts like Kangra, Bilaspur, Kullu, Sirmour, Hamirpur, Solan and Una are lies in the intermediate categories of (1-2 percent) drop-out rate.

5.4 Repetition Rate

Repetition rate refers to the total number of students who are not succeeded in next class and again enrolled in his or her same class in which they had enrolled in last year. High repetition rate of any state indicates towards the lack of quality education infrastructure i.e. single teacher school, single classroom schools, lack of basic amenities

$$\text{Repetition Rate} = \frac{\text{Nubmer of repeaters in grade 'g' in year 't+1'}}{\text{Total number of students in grade 'g' in year 't'}} \times 100$$

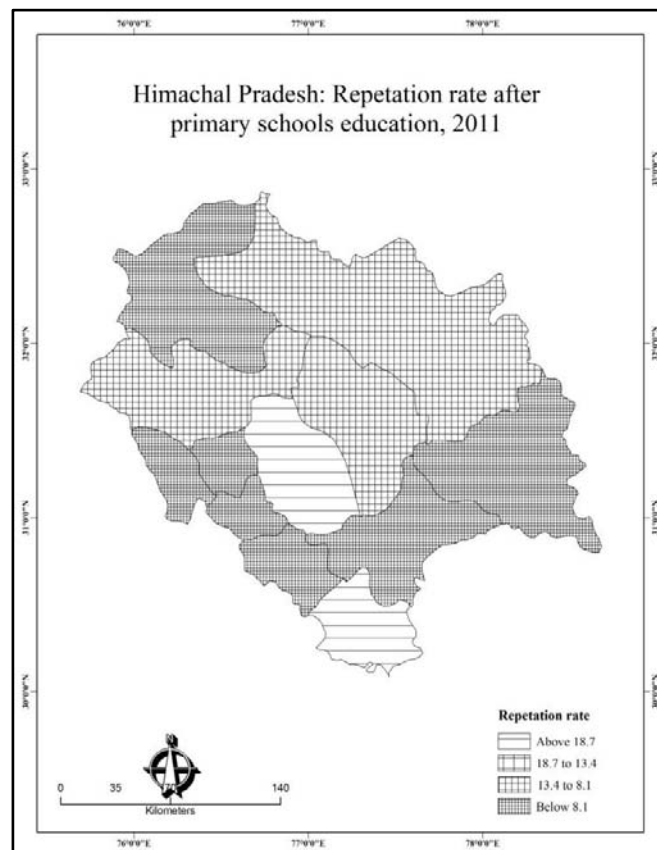


Figure 9

like toilets, drinking water, electricity, lack of basic stationary in the school, road connectivity and distance from home etc.

Fig. 9 shows the repetition rate after primary level of education and reached up to VIIIth class. Repetition rate is negatively related with the quality of education and vice versa. Higher the repetition rate lower will be the quality of education and if the education system is based on principal of quality education the repetition rate will be minimize. The repetition rate of some districts is exceptionally very high; Mandi and Sirmour have more than 20 percent repetition rate though Sirmour have highest GER (134 percent) and NER (100 percent). These districts are followed by Kullu, Kangra, Solan, Hamirpur, Una and Chamba. Bilaspur and Kinnaur are the lowest repetition rate in the state. Hence, according to this indicator success rate is highest in Kinnaur district.

5.5 Single Teacher Primary Schools

Single teacher school is also an important indicator to understand the educational facilities in the state. It is the ratio of primary schools having single teacher and the total primary school in the state/districts. Single teacher schools are also negatively affect the quality of educational facilities. The most important factors those affect the status of single teacher school can be as follows i.e. physiographic barriers, availability of teachers, availability of students, availability of school infrastructure etc.

$$\% \text{ Single Teacher Schools} = \frac{\text{Primary Schools having Single Teacher in Position}}{\text{Total Primary Schools}} \times 100$$

According to Fig. 10 Lahaul and Spiti district shows the highest ratio (15.4 percent) of single teacher schools. This district is characterized by rough topography and considered as a cold desert in north India and thus it is sparsely populated. It has lowest GER and NER and highest drop-out rate and single classroom schools. It is followed by Shimla, Kangra, Mandi, Una, Solan, Kullu, Sirmaur, Hamirpur, Bilaspur, Kinnaur and Chamba.

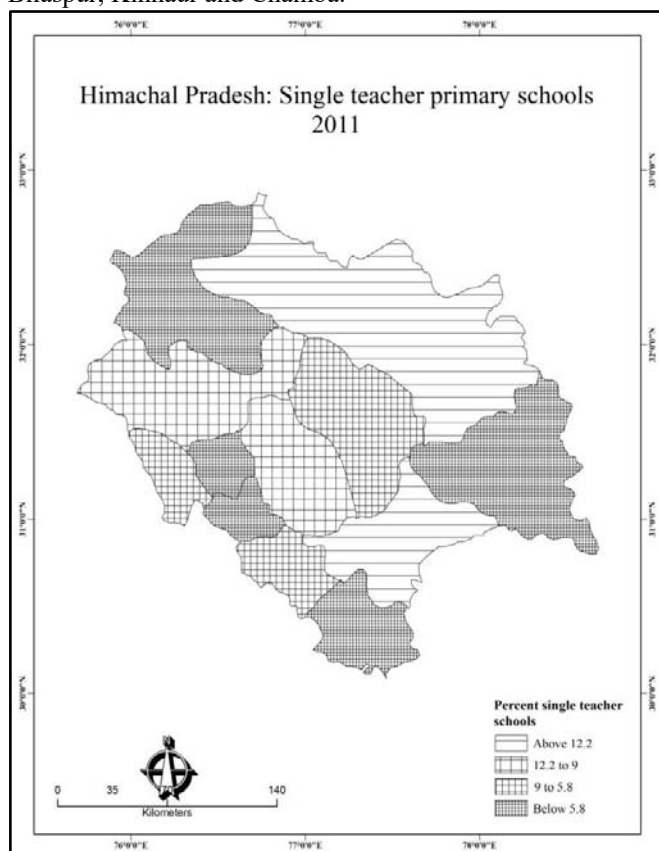


Figure 10

5.6 Single Classroom Primary Schools

Single classroom schools are the most important indicator to evaluate the educational facilities in any State/Districts. It is the ratio of primary schools having single classroom and the total primary school in the state/districts. Single teacher schools are also negatively affect the quality of educational facilities.

$$\% \text{ Single Classroom Schools} = \frac{\text{Primary Schools having Single Classroom}}{\text{Total Primary Schools}} \times 100$$

The status of single classroom schools is affected by some important factors i.e. availability of land for construction, availability of local pupils, investment, topography, availability of teachers etc. Fig. 11 shows that Lahaul and Spiti is the single largest district with 36.10 percent of its primary schools are having only single classroom. This district is followed by Kangra, Chamba, Mandi, Shimla, Bilaspur, Kinnaur, Kullu, Una and Sirmaur. Solan and Hamirpur are the districts with less than 1 percent single classroom primary Schools; hence, the level of educational facilities is highest in these two districts.

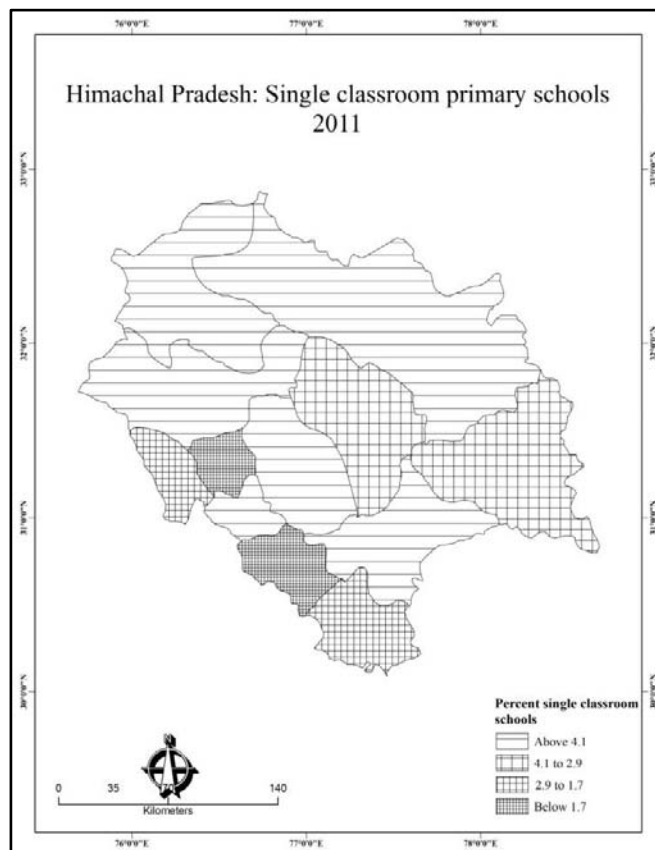


Figure 11

5.7 Pupil –Teacher Ratio

Pupil-teacher ratio (PTR) is a ratio between total enrolment and total number of teacher at any particular level of education. It is negatively related with the level of educational facilities in any State/districts. A lower value of PTR is considered as a source of good education environment in the schools. The value of Lahaul and Spiti at primary level is five it means that there is one teacher on every five students. We can conclude that a teacher can handle five students more efficiently than any other large number of students. A lower value of PTR is helpful in the building of quality education infrastructure. The PTR can be calculated by the applying of following formula:

$$\text{Pupil-Teacher Ratio} = \frac{\text{Total Enrolment in the Primary School}}{\text{Total Teachers in the Schools of Primary Category}}$$

Fig. 12 shows that the performance of PTR at primary level in the state is very good; it is the Lahaul & Spiti having one teacher on every 5 students whereas other districts like Kinnaur, Shimla, Mandi, Bilaspur, Hamirpur, Kangra comes under the category of 10-15 PTR value. The condition of PTR in the districts like Kullu, Chamba, Solan, Sirmaur and Una is lowest in the state. Geography of the area has impact on PTR, It is negatively associated with altitude and positively associated with accessibility and population concentration. Overall the condition of PTR is very good in Himachal Pradesh.

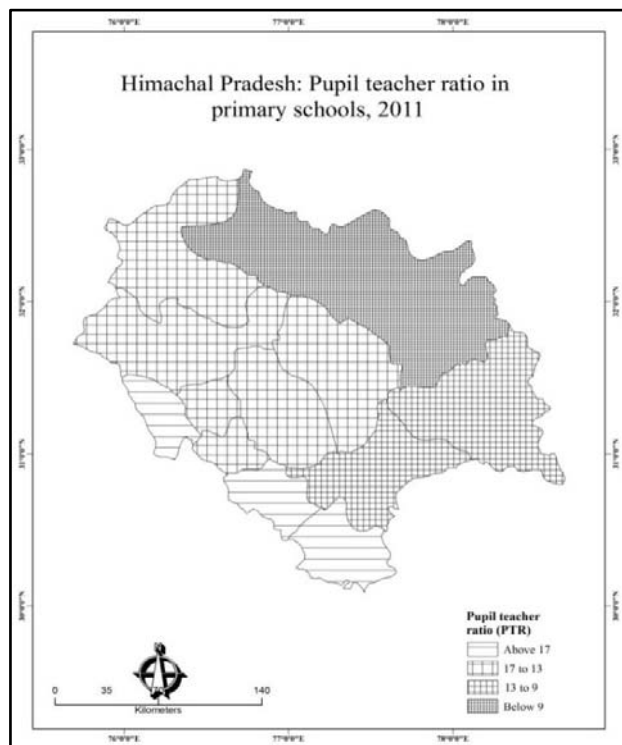
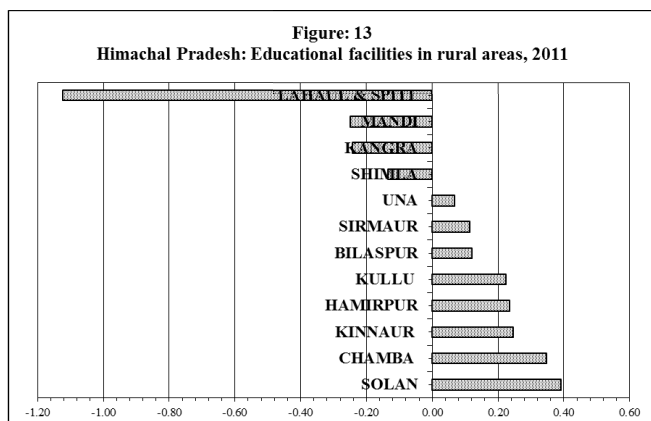


Figure 12

6. Conclusion

The results of composite index are shown in fig. 13 in which some indicators are considered as negative correlated with the level of educational facilities i.e. repetition rate, pupil-teacher ratio, single teacher schools, single classroom school and drop-out rate; whereas some of them are positively correlated i.e. gross enrolment ratio, net enrolment ratio and literacy rate. The results of the above calculation are related with the availability of educational facilities in rural Himachal Pradesh. These results are also affected by several other socio-economic conditions prevails in the state i.e. density of population, nature of job, distance of school, parents education, social security, road density, climatic conditions etc.



Some districts lies in the foothills of Shiwalik range have better educational facilities i.e. Solan, Hamirpur, Bilaspur, Una and Sirmaur. The presence of other infrastructural facilities in this region became the main cause for the development for better educational facilities in this region i.e. high road density, accessibility, all weather school, better

school infrastructure, industrialization, high density of population etc. The intermediate region between *Shiwalik* in southwest and Greater Himalaya in northeast direction lies in the intermediate category of educational facilities development; it includes Shimla, Mandi and Kangra. The district of Lahaul & Spiti situated in Greater Himalayas region and also known as cold dessert in north India; it is least developed in educational facilities. The rough terrain, sparsely population distribution and accessibility to educational facilities in this region remain the prime focus of policy makers.

Solan lies in first position in term of educational facilities in the state. The performance of Solan is attributed to the presence of all-weather schooling; presence of schools having more than single teacher and classroom; the gross enrolment is also more than 100 percent; net enrolment ratio is also 100 percent. The pupil-teacher ratio is slightly more than the national average. Along with these educational facilities various other socio-economic conditions are also responsible for the better performance. Solan is also known for '*Mushroom city of India*' because of high production of mushroom in the city. A large number of cultivators are growing mushroom in the vicinity of the city. A national research institution for mushroom is functioning at *Chamba Ghat* in Solan district. Dr. Y.S. Parmar university of Horticulture and Forestry is the only university of its kind not only in India but in Asia functioning in Solan district at *Nauni*.

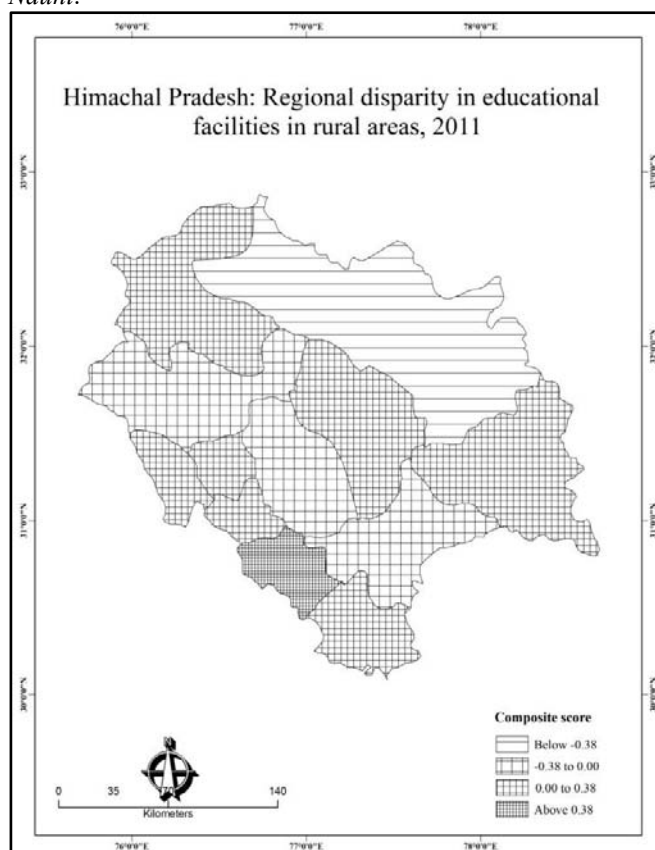


Figure 14

It is also known as the '*City of Red Gold*' as a large amount of tomatoes is grown and exported to other parts of India through its wholesale vegetable and fruit market. Climatic condition of the district is pleasant in the state which not

only attract the local tourist but from rest of the world. Some important tourist sites are 800 year old Kuthar fort, *Gurkha or Arki fort* and *Chail Palace*. One important area of Nagar Panchayat, Baddi is also developed as an industrial and institutional area. Some important economic activities are leather shoes, woolen garment, steel furniture, bamboo product, medicines, chemicals, textiles, wine and brewery product and bakery product.

Chamba district occupies second position in state in term of availability of educational facilities. The gross enrolment ratio in this district is 132 percent and net enrolment is 100 percent. The drop-out rate is negligible in Chamba district; it is only 0.8 percent at primary level. The schools with single teachers are only 2.6 percent whereas the single classroom schools are 5 percent. The pupil-teacher ratio is more than the state average. Along with this Chamba is a sparsely populated district which holds first position in term of scheduled tribe population. Pangi, Holi and Bharmour sub-tehsils are the tribal belt of the district. Chamba's economy is based on agriculture and tourism industries. Some important tourist sites are *Khajjiar*, *Dalhousie* and Bharmour. Chamba is famous for its *Chamba Chappal*, *Chamba Rumal*, *Chamba Paintings*, *ChambaChuk*, bakery product, woolen shawls, wooden furniture, earthen ware, bamboo ware and old age temples and *Bhuri Singh Museum*. The peoples of Chamba is used to undertake various activities like metal craft, embroidery, wood carving, stone carving and paintings etc. Chamba district is also known for its local hydroelectricity projects (HEP) i.e. *BairaSiul*, *Chamera-I* and *Chamera-II*.

Mandi occupy second last position in term of availability of educational facilities in Himachal Pradesh state. It is also engaged in various other economic activities like wooden furniture, metal sheet almirah, bakery product, shoe manufacturing, woolen cloths, guns, woolen garments, woolen shawl and metal sheet material. Other centre of attraction in the district is the *Sunken garden*, which is situated on the bank of the Beas river. Until mid-20th century, Mandi was on the trade route between Yarkant county and Ladakh to Hoshiarpur and Indian plain, served as commercial hub and trade centre.

Surrounded by snowcapped mountain district of Lahaul and Spiti is a smallest district in term of population. The present district is divided into two cd blocks named as Lahaul and Spiti. The area under Lahaul includes the track of both *Chandra* and *Bhaga* up to their confluence near *Tandi*. The area under Spiti includes the track of Spiti river and its tributary the Pin river. *Ladakhis* refers its name as *Laho-yul* which means southern country as its location lies south of *Ladakh Range*. Whereas Spiti acquire its name from a river named as Spiti; it is locally known as *Piti* which in Tibetan language mean middle province. The people of Lahaul are influenced by the cultures of Kullu, Chamba and Ladakh; whereas Spiti is influenced by Tibet and Ladakh culture.

Lahaul and Spiti lies on the last position in term of availability of educational facilities in rural Himachal Pradesh. It has about 76.81 percent literacy rate with 86.6 percent GER, 72.8 percent NER, 5 percent PTR, 4 percent DOR, 10.7 percent RR, single teacher schools and single

classroom schools are 15.4 and 36.1 percent respectively. The lowest position in term of availability of educational facilities in Lahaul and Spiti is attributed to the presence of highly rough terrain in the district. With the opening of schools in these types of circumstances has changed the perception of peoples; now they are getting opportunities of modern technologies and their occupational culture have changed steadily; the younger generation is coming forward for the government jobs. With the opening of the modern mean of communication peoples who were previously worked on mules; now worked by using trucks; their local women works in the fields mainly concentrated on cash crops i.e. seed potato, peas and hopes which is indeed revolutionized the local economy of the valley. Nowadays, the district has attained fame in producing high qualities potato crop and peas which are in much demand not only in India but also in foreign countries. Due to climate change the apple growing belt of Himachal Pradesh is also shifting in the district this is going to become an additional income source of the local population (Rana et. Al, 2013).

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