NEIGHBOURHOOD DEVELOPMENT AND CASTE DISTRIBUTION IN RURAL INDIA♣

Rajesh Raushan and R Mutharayappa∗

Abstract

An overwhelming majority (above two-third) of India's population particularly those resident in villages have not performed adequately to move up the ladder of human development Indicators. However, many villages in rural India are better developed while others lag behind in terms of development indicators. Infrastructural development of a village or community has a direct bearing on its degree of human development. In the context, the study tries to examine the level of neighbourhood development and their linkages with caste group disparity in rural India using IHDS: 2004-05 data. Based on selected infrastructural indicators such as communication & services, educational and health institutions, level of neighbourhood development is measured taking village as a unit of analysis. Further, employing factor analysis techniques, composite index of neighbourhood development is constructed. Results of the study reveal that 27 percent villages or neighbourhoods are highly developed, 52 percent moderately and rest are poorly developed. Considering different components, respectively 27 percent, 19 percent and 31 percent villages have been found highly developed on communication & services, education and health institutions. Caste group domination shows that a higher proportion of ST followed by SC people live in poorly developed neighbourhoods as against a higher proportion of Others caste group people who live in highly developed neighbourhoods; and same has been the case for educational institutions but not so for health institutions. Around half of the rural population is concentrated in moderately developed villages. Study provides insights on why poor people are performing inadequately on human development indices. The Study supports the view that poor infrastructural development and lack of opportunity lead to inequality of outcomes in terms of human development. Hence, the prime focus of micro level planning and policy formulation centred on rural India should be concerned with neighbourhoods where concentration of poor people is more. It will help to stimulate the growth and development of neighbourhoods as well as the people living there to contribute to the nation as a whole.

Key Words: Caste groups, Composite Index, Factor Analysis, Human Development, Neighbourhood, Rural India.

Introduction

Development is defined as the process of improving and enhancing the quality of the people through reducing deprivation of the required components of development and increasing the possibility to live with freedom in line with their capability. According to a more fundamental view, there are three possible and equally important developmental aspects that can raise people's standard of living by creating conditions and environments conducive to their growth and enlarging the possibilities to attain their choices. These three possible aspects of development are interlinked; increase in personal income and education tend to improve their standard of life which may be possible through various social,

political, and economic institutions which promote choices through making available more services. Notably, development is broadly measured in terms of growth and progress of economic, social and demographic indicators directly or indirectly of the people at national, regional, state or community level. However, very few studies are found to have focussed on environmental factors that influence people's progress. Environmental factors have a decisive role in human development. This can be understood clearly from the spatial development differentials like urban parts being always more developed than their rural counterparts in any nation. In the Indian context too, the degree of human development can be gauged from status of spatial development of the area studied.

Past six decades have witnessed progress on various economic, social and political dimensions of development in India, but we are still far behind the required pace of development to make it complete and universal. The unequal progress has led to huge disparity within the country on various social and economic indicator of spatial development, like urban India performing much better than rural India. There is ample evidence to strengthen the inference that rural residents have poorer socioeconomic development status on health, education, income, employment, etc. than their urban counterparts. Interestingly, it is also notable that urban areas are more developed than rural ones, although there is huge disparity within the urban space in regard to developmental issues. It is worth noting here that more than two-third (69%) of our population still lives in rural India as against less than one-third in urban India (RGI, 2011). All available evidences indicate that much of rural India is facing the problem of unequal and unplanned development, making the notion of development ambiguous. Development of rural area is an index of development of villages. In terms of aggregation of resources, providing services and amenities, etc. village/rural development achieved hitherto is very meagre. Therefore more attention needs to be given to accelerating human development in rural India to reach the expected target. This developmental dichotomy can be studied by considering village as a neighbourhood and development of village as neighbourhood development.

Need for the Study

But, there is also the problem of lack of quantified data on village level indicators of conducive conditions for human development on the one hand and indicators of responses of villagers to development stimuli on the other. Further, studies pertaining to villages are broadly limited to individual or particular villages which provide the insights of developmental process of the particular village but the conclusions of such studies cannot be generalized for other villages. Also, there are no such theories or models of sub sequential change and development at the village level to derive insights for formulation and implementation of appropriate policies (Adelmen & Dalton, 1971). Further, studies have broadly used social structure and social institutions using 'caste dimension' to analyse social modification, cultural transformation and political power relation in rural India from a simple village perspective but, caste structure and their linkages are yet to be studied with village or neighbourhood development perspective in rural India. This may be one of the reasons for lagging behind in terms of policy outcome; this aspect therefore needs investigation. It is because poor (low) caste people mostly live in poorly developed villages in turn result in them showing poor development indicators or, is some villages poorly developed because its inhabitants have low human development index. The paradox

needs to be investigated. A probable reason for poor village development is the lack of supportive resources and services availability which leads inequality of opportunity to poor caste people which in turn results in inequality of outcomes.

Many rural areas have seen a rapid integration with the global economy while others seem to have lagged behind. This could be an additional reason for some villages remaining still underdeveloped. It is important to add here that characteristics of communities have an influential effect on the development of rural areas as well as important consequences for human development (Desai et al, 2010). Given the all too obvious link between micro-level policy framework and human development in villages, the study intends to measure the level of development of neighbourhoods and their linkages to the caste group disparity in rural India.

Moving from 'Village Development' to 'Neighbourhood Development'

There are several studies that focus on village development from people's perspective but few done with region-specific perspective. Like, people a village having high literacy rate, better standard of living, better health outcomes for their population are termed as developed villages compared to others that have poor score on the above indicators. However most of the time, it is lack of a conducive environment that hampers the progress of people residing in such environments. So, development from a village perspective is required as much as the progress of their residents. Notably, very few studies have been indecisive about conditions and environments conducive to growth and enlarging the possibilities of the villagers to attain their choices at village level. The net result is a complex set of causes have made rural areas in general and villages in particular to lag behind in development indicators as compared to their urban counterparts. These causes may be physical infrastructure, institutions, and amenities and services intended to lead the villages to development on one hand and their residents on other hand. For example, availability of roads in rural areas have been found very catalysing in improving economic, demographic and health conditions of the people in such villages. An evaluation study on development of all weather road under '*Bihar Rural Roads Project*' in the med- 80s found that annual income, literacy, use of contraception, treatment seeking behaviour, employment generation and contacts with outer world had increased significantly after providing road connectivity to villages (Lal, 1989).

Studies by NCAER[1] on human development and their linkages with village level variables had found positive and consistent relationships of transport and communication infrastructure with household income, percent of people living below poverty line and average wage rate; education and health infrastructure with level of literacy and demographic and health indicators like the villages having sub centres and/or *anganwadi* centre; had high prevalence of immunization, contraceptive prevalence, low morbidity incidence and low birth rates, although such association is not necessarily straight forward (Shariff, 1999, Desai et al, 2010). It has found that villages located closer to district towns have greater infrastructural development than those located farther away (Desai et al, 2010). Further, villages connected by *pucca* roads and bus stops showed high literacy and enrolment rates for both

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[1] National Council of Applied Economic Research, New Delhi, India.

males and females. They also had high immunization and low child under nutrition. Interestingly, the poor infrastructural development has been found linked with adverse demographic outcome in rural India (Shariff, 1999). But there are very few studies which link adverse or poor human development with area development than individual or household characteristics.

As per our knowledge and literatures accessed, it is post 80s that a new approach for area based quantitative studies mainly in developed world started raising voice to address area effect on different indices of human development, called *neighbourhood approach*[2]. Although studies on neighbourhood approach are not very new and have long history in sociological arena as community based qualitative studies, but a growing interest of quantitative studies in the effects of neighbourhoods on individual social and economic outcomes emerged in 1980s only (Luption, 2003). But, in addressing inequality or disparity in a broader context, research on neighbourhood effect has emerged as the main method in the past decade (Pickett and Pearl, 2001). Neighbourhood approach explains their effects on human development and outcomes linked with development and quality of the neighbourhood (Kawachi & Berkman, 2003). In developed world, mostly in UK and USA, place effect on individual development is very much linked with neighbourhood development.

A large number of research studies have examined neighbourhood effects on employment and earnings, child development, educational and health outcomes, teen pregnancy, delinquency, peace and crime etc., usually finding evidence of significant although small neighbourhood effects (Lupton, 2003; Blackman, 2006). In Britain, the research has happened, mainly in the second half of the 1990s, looking at a range of outcome measures like labour market engagement, entry into jobs, non-monetary poverty measures and flows in and out of poverty against a range of individual variables, local unemployment rates and area deprivation scores (Buck 2001). There has also been a specific body of work focusing on health inequalities and the effect of place, again demonstrating that both area effects and individual effects matter (Blackman, 2006).

It can thus indicate the likely impact of neighbourhood focused policy interventions, relative to those focused on individuals (Luptan, 2003). Poor neighbourhoods can be seen as having systematically disadvantaged their residents, isolating them from opportunity structures (Wilson, 1987). Poor people are systematically disadvantaged by living in areas which are under-resourced and have weak comparative advantages (Buck, 2001). The increasing evidences of neighbourhood development will also be a new mechanism for explaining unequal area or locality development in a country like India where still more than two third of its total population is concentrated in villages, and development of villages can be seen as neighbourhood development and their extended evidence found in changed caste group distribution in rural India. Scheduled caste (SCs) and scheduled tribes (STs) are highly disadvantaged groups than the rest of caste groups in rural India, which finds reflection in their poor social and economic development which directly or indirectly hampers the level of human development in India as a whole.

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[2] Neighbourhood is a combination of compositional (individual) and contextual (place) attributes.

Defining and Measuring Neighbourhood Development in India

The term *neighbourhood, community* and *area* have often been used to refer to a person's immediate residential environment, having both physical and social characteristics potentially. But, clear distinctions between the terms are usually not made well (Diez-Roux, 1998). More precisely, neighbourhoods are the combinations of attributes of the place and the people living there. The former is termed as contextual and later as compositional (Blackman, 2006). '*Who is individual*' matters, and developmental indicators like income, education, employment, health etc. have been found responsible for their unequal status. Further, '*where he/she lives*' also matter. It matters more for specific population groups according to age, caste, class and so on (Kawachi & Berkman, 2003). Individual's attributes is compositional characteristics of the neighbourhood whereas place attributes is contextual characteristics of neighbourhood.

Theoretical aspect of contextual characteristics of neighbourhood are linked with development of area based physical and social characteristics at aggregate level which make them affluent or poor, although the inclusion of characteristics for measuring neighbourhood depends upon relevance of those characteristics. Physical characteristics include availability of infrastructure and services in the area followed by social interaction and relationship in terms of social capital under social characteristics. Social capital is a resource stemming from the structure of social relationships which in turn facilitate the achievement of specific goals. Overwhelmingly three approaches- ecological studies, contextual studies using multilevel analysis and comparative study of well defined neighbourhood is widely used to study neighbourhood effect (Pickett & Pearl, 2001).

The place effect is not very much new but the cross disciplinary dialogue on concepts, methods and evidences about the area effect on various dimensions of human development like education, employment, health, income generation and even peace and conflicts which eventually moves them on scale of socio economic development (Kawachi & Berkman, 2003) and which used quantitative methods for analysis is not very old. On the other hand, variety of models have been proposed to explain the possible causal influences of neighbourhood effects on physical model, structural model, social capital model, environmental model and so on, but the many studies using these models have not explained the possible causal pathways of neighbourhood effect (Pickett and Pearl, 2001). Furthermore, most studies do not include variables pertaining to physical or institutional or basic services characteristics of areas because of lack of data on those characteristics, but wherever data is available on those composite indices of aggregate measurement they are widely used to measure the level of neighbourhood development.

Method and Materials

Data Source

The availability of data on village indicators is sparse across the country. However, in 90s NCAER[3] and IIPS[4] had collected the data on village level indicators during surveys related to human development,

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[3] NCAER had collected data on village level indicators during a survey in 1994 for profiling human development in rural India.

demographic and health outcomes. The latest nationwide data available in this regard is through India Human Development Survey (IHDS)[5] conducted in 2004-05, which is used for this study.. IHDS is a nationally representative survey of 41,554 urban and rural households and include 215,754 individuals. As the study is concerned with rural India, a total of 1, 43,374 individuals have been interviewed from 26,734 households located in 1,503 villages across the country. But the village level data are not available for all the indicators, so the number of sample villages considered varies from one component to another component, but for aggregate level development, 984 sample villages have been selected.

Analytical Framework

The central argument of the study is that neighbourhood development and extent of their development are linked to caste group distribution in rural India. The analysis is done considering village as neighbourhood and so the level of development of village reveals neighbourhood development. Based on selected infrastructural development parameters available within or nearby the village, level of neighbourhood development is measured. It is assumed that as the distance of availability of any indicator increases, the level of village development decreases correspondingly. It is mainly due to the fact that as the availability reduces, accessibility and affordability of the said services also reduces (in terms of increasing distance) for the population residing in those villages. Therefore, availability of a particular development indicator will be measured in terms of the availability of the indicator within the neighbourhood which also impacts human development indices in the community. First, based on a set of indicators development level of different component is measured, then using the aggregate score of those components, aggregate neighbourhood developments has been measured.

Lastly, neighbourhood development is linked with caste groups' location or distribution in those neighbourhood or villages to examine whether the notion of better off caste group people living in well developed neighbourhoods and high concentration of poor caste people in poorly developed neighbourhoods, is factual or not. The government of India classification of caste group into scheduled caste (SC), scheduled tribe (ST), other backward classes (OBC) and *Others* is followed throughout the analysis. Most existing studies support the view that *Others* are highly developed caste groups whereas SC and ST are poor to poorest caste groups (Nayar, 2007). It may be the case that, lack of physical and institutional characteristics tend to be strongly correlated with concentrated poverty and poor performance of other development measures among them. Supporting this view Wilson (1987) stated that poor or disadvantaged neighbourhoods have been seen as systematically disadvantaging their residents and isolating them from opportunity structures.

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[4] IIPS had collected village level data during second round of National Family Health Survey (NFHS) in 1998-99 across the country.

[5] IHDS data are cross sectional and collected during 2004-05 jointly by the University of Maryland, USA and National Council for Applied Economic Research (NCAER), India across 28 states and 5 Union Territories except Andaman & Nicobar, and Lakshadweep islands. It covered 384 districts, 1,503 villages and 971 urban blocks, located in 276 towns and cities.

Table 1: Inclusion of Variables to Measure Neighbourhood Development in Rural India

Infrastructural Components	Indicators/Variables
Communication & Services Component	Distance to nearest Town
	Distance to district headquarters
	Distance to pucca road
	% HH not electrified in the village
	% HH having any kind of phone
	Distance to STD booths
	Distance to bus stop
	Distance to the closest Market/Bazaar shop
	Distance to bank branch
	Distance to post office
Health Institutions Component	Distance to health sub centre
	Distance to primary health centre
	Distance to community health centre
	Distance to district hospital
	Distance to govt. maternity centre
	Distance to govt. communicable disease facility
	Distance to private clinic-trained doctor
	Distance to private hospital
	Distance to private pharmacy
	Distance to private maternity centre
Educational Institutions Component	Distance to primary school
	Distance to middle school
	Distance to secondary school
	Distance to higher secondary school
	Distance to college
	Distance to vocational/technical institute
	Distance to *Madarsa*
	Distance to *anganwadi* or other child care centre

Source: IHDS Survey Data: 2004-05.

Measuring Neighbourhood Development

Neighbourhood development is the composite index of development based on selected infrastructural indices of the neighbourhood's contextual characteristics. Those contextual characteristics are related to a set of indicators like communication & service availability, health, and educational institutions separately (Table 1). These development indicators are related to availability indicators (goods/services) within or nearby the village. In case of availability of the indicator within the village, distance is assigned as zero km except for electricity and phone facilities; these two indices are measured in terms of the percentage of household in the particular village not having electricity connection or any kind of telephone facility. Since development is multidimensional, a choice of a composite index is better

representation than representing each of the variables by different single indices. Hence, to develop composite index of village development, factor analytic approach[6] has been employed.

Factor analysis is a method that simplifies complex and diverse relationships that exists among a set of observed variables by uncovering common dimensions or factors that link together the seemingly unrelated variables, (and) consequently provides insight into the underlying structure of the data (Dillon & Goldstein, 1984). Here, factor analysis is undertaken using the principal component method of extraction with Varimax rotation criterion. The principal factor method extracts factors in such a way that each factor accounts for the maximum possible amount of the variance contained in the set of variable being factored. The extraction is different from principal component analysis, in that, principal component method replaces each diagonal element of the correlation matrix by the respective variable's communality (*ibid*). The communality of the variable is the portion of a variable's total variance that is accounted for by the common factors.

The number of factors is restricted to the Kaiser's criterion of the Eigen (E value) values greater than unity. In the first stage, aggregate component score using a set of variables for particular component is generated. In the second stage using aggregate component scores, neighbourhood development score are generated. In the third stage, using neighbourhood development score, neighbourhood development index is generated using the aggregate score with cut off ±2. The villages having scores less than minus (-) 2 is categorised as highly developed villages; -2 to +2 as moderately developed, and village having score more than +2 as poorly developed. This criterion is followed for component development index also apart from neighbourhood development index. At each stage during aggregation of scores, Eigen value is used as weight. The component indexes are neighbourhood communication & services index, neighbourhood educational institution index and neighbourhood healthcare institution index as generated first, whereas village development index is the aggregation of the above these three indices.

Result of the Study

Structural Linkages among Neighbourhood Development Indices

Structural Linkages among various Communication & Services infrastructure within the Neighbourhood

Within the framework of neighbourhood development based on communication & services indices at village level, all the selected variables are measured based on distance from the village except for electricity availability and any kind of phone facility to the HH. Descriptive statistics (Table 2) of these indices delineates that in rural India, the nearest town is located at an average distance of 14 Kms from the village, and the distance varies from a minimum of three to a maximum of 25 Kms, whereas the distance to the district head-quarters is at average distance of 44 Kms and varies from a maximum of 72 Kms and a minimum of 17 Kms. Regarding access to electricity and any kind of telephone facility, it is seen that the HHs with these facilities in rural India ranges between a minimum of 66 percent and a maximum of 100 percent. Other service indices like closest bus stop, STD booth, post office, etc. are

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[6] See, Basic model of factor analysis and their equational notation in Appendices at last of the paper.

within a maximum of 8 to and minimum of 2 km from the neighbourhood. Another important connectivity indicator of rural development i,e, *pucca* road or all weather road, and the distance from the neighbourhood to these service indicators is found to be within a minimum of 2 and maximum of 7 kms.

Table 2: Descriptive Statistics of Communication & Service Indices (Distance in Km)

Communication & Services Variables	Mean	Std. Dev.
Distance Nearest Town	14.22	11.12
Distance to District HQ	44.39	27.09
Distance from *Pucca* Road	1.63	4.17
% HH not having Electricity in the village	86.23	19.92
% HH not having any kind of phone in the village	86.23	19.92
Distance to the Closest Bank Branch	4.55	5.36
Distance to the Closest STD Booth	2.41	4.90
Distance to the Closest Bus Stop	1.86	3.27
Distance to the Closest Market	6.39	6.88
Distance to the Closest Post Office	1.55	2.57
N	1449	

Table 3: Factor Structure of Neighbourhood Communication and Service Indices

in Rural India

	Factors Loadings*			Communalities
	F-I	F-II	F-III	
Distance Nearest Town	0.011	0.044	0.639	.411
Distance to District HQ	-0.026	0.238	0.584	.398
Distance from Pucca Road	0.682	0.063	0.080	.476
% HH not having Electricity	0.144	0.975	0.117	.985
% HH not having any kind of phone	0.144	0.975	0.117	.985
Distance to the Closest Bank Branch	0.521	0.058	0.535	.562
Distance to the Closest STD Booth	0.551	0.095	0.354	.438
Distance to the Closest Bus Stop	0.681	0.187	-0.089	.507
Distance to the Closest Market/Bazaar	0.151	-0.033	0.704	.520
Distance to the Closest Post Office	0.672	0.012	0.040	.453
Eigen Value	**2.98**	**1.54**	**1.21**	
Variance Explained	57.35			
*Based on Varimax Rotation Criteria with Eigen Value >1				

Looking at the underlying structural linkages among those selected variables that contribute to the neighbourhood development, it is seen that there is more than 50% communalities for most of the indicators (Table 3). The indices of communication & services availability have generated three factors with varying loads. The distance of village from *pucca* or all weather roads is highly linked with distance to bus stop and shows a factor load of 0.682; STD booths, 0.551; post office, ,0.672; and bank branch, 0.521. (All extracted on first factor (F-I). Second factor is linked with percent households having some

kind of phone facilities (factor load 0.975) with percent households having electricity facility (factor load 0.975) in their households. Distance to nearest town and district head quarters is linked with distance to bank branch and market in rural India and is extracted from factor three (F-III). This explains that the distant villages in rural India are still facing the problem of basic services and communication facility, and keeps them underdeveloped. The apt explanation of the inter dependency of availability of infrastructural services depicts the development of one indicators leads to other one.

Structural Linkages among Various Education Institutions within Neighbourhood

Availability of educational institution in rural India and their mean distance from the neighbourhood has been provided in table 4, and the underlying linkages in the form of distance or agglomeration of these educational institutions is provided into table 5. It can be seen from Table 4 that the basic education provider institutional infrastructure namely primary school and *anganwadi* centre is located in most of the villages within the one kilometre of range. But as we move upward from middle school to colleges and technical or vocational institutions, the distance increases simultaneously. While colleges are available at 16 km distance on an average, vocational or technical institutions are available at27 km distance on an average. An interesting point to add here is that *madarsa*, which provides basic education to Muslims is found at much more distance from neighbourhoods in rural India.

Table 4: Descriptive Statistics of Educational Institutions Indices (Distance in Km)

	Mean	Std. Dev.
Distance to Primary Schools	0.07	0.76
Distance to Middle Schools	1.28	2.77
Distance to Secondary Schools	3.69	4.95
Distance to Higher Secondary Schools	7.24	7.13
Distance to Colleges	16.96	14.06
Distance to Vocational Institutes	27.34	23.78
Distance to *Madarasa*	30.16	32.87
Distance to *Anganwadi* Centre	0.19	0.98
N	1245	

Table 5 explains the underlying relationship of establishment and availability of different types of educational institutions across the neighbourhoods in rural India. The different types of educational institutions are explaining communalities of about 50-70% in rural India. Factor loadings of these different types of education intuitions have been extracted on three factors. Distance or availability (proximity) of primary, secondary and higher secondary schools from the village is extracted on first factor (0.644 to 0.834); that of colleges, technical institutes and *madarasa* is extracted on second factor; and that of primary school and *anganwadi* centre is extracted on third factor. Here, it is also notable that *madarsa* has a negative relationship with the availability of basic educational institutions like primary and middle schools. This factor loading very clearly shows that educational institutions cluster together at some prominent spot probably to benefit from each other's presence. So, in villages

where primary school is available, *anganwadi* centre is also available; similarly the technical institutions are found established close to the colleges.

Table 5: Factor Structure of Neighbourhood Educational Institutions in Rural India

	Factors Loadings*			Communalities
	F-I	F-II	F-III	
Distance to Primary Schools	0.022	-0.002	0.789	.623
Distance to Middle Schools	0.644	-0.106	0.295	.513
Distance to Secondary Schools	0.834	0.073	0.048	.704
Distance to Higher Secondary Schools	0.743	0.233	-0.049	.609
Distance to Colleges	0.355	0.641	-0.141	.557
Distance to Technical Institutes	0.067	0.792	-0.030	.633
Distances to Madarasas	-0.110	0.622	0.307	.493
Distance to Anganwadi Centre	0.147	0.068	0.756	.598
Eigen Value	**2.16**	**1.35**	**1.21**	
Variance Explained	59.20			
*Based on Varimax Rotation Criteria with Eigen Value >1				

Structural Linkages among Various Health Institutions within Neighbourhood

Availability and accessibility constraints of health institutions in rural India are a major stumbling block in providing universal healthcare services to the rural population. Their availability and their mean distance from the neighbourhood is captured in table 6, whereas table 7 provides their underlying linkages in the form of distance or agglomeration of these health institutions. Table 6 delineates that the first contact place between people and three tyre government health care system at grass root level is health sub centre (HSC) which is found on average 3 kms away from the village or neighbourhood, and often as far away as of 8 kms. Their accessibility and healthcare service delivery are also a major concerns, but beyond scope of this study. Regarding distance to primary health centre (PHC), community health centre (CHC) it is found that on average these are located at distances ranging between 8 and 16 kms. Availability of other institutions of government healthcare service delivery like maternal healthcare facility and government maternity centre is much less in rural India, and found, on an average, 20 kms away from the neighbourhood/village. This might also be contributing to high maternal and child mortality and poor number of institutional deliveries in rural India. Also, Government institutional support to control communicable disease is not available within a mean distance of 23 kms from the village/neighbourhood.

Table 6: Descriptive Statistics of Health Institutions Indices (Distance in Km)

	Mean	Std. Dev.
Health Sub Centre	3.09	5.16
Primary Health Centre	7.90	7.29
Community Health Centre	16.06	12.34
District Hospitals	42.59	25.54
Government Maternity Centre	20.29	17.74
Govt. Communicable Disease Facility	23.51	20.13
Private Clinic-Trained Doctor	8.27	10.11
Private Hospitals	16.25	15.53
Private Pharmacy	8.61	10.22
Private Maternity Centre	18.78	19.28
N	994	

Regarding the role of private healthcare service providers at neighbourhood level, this study takes into account private clinic with trained doctors, private hospitals, private maternity centres and private pharmacies, etc for analysis. Although IHDS survey has collected information on availability of private clinic with untrained doctors, untrained birth attendants and other untrained healthcare service providers, due to the unauthentic nature of their services, such institutions are not considered for this study, even though a major part of private healthcare services is dominated by them currently. Table 6 shows that private clinics with trained doctors and private hospitals are available at an average distance of 8 km and 16 km respectively from the neighbourhood, whereas private maternity was found at a distance of 18 kms.

Coming to the factor structure of health facilities in rural India, table 7 shows that private health facilities like private hospitals, private clinics, private pharmacy and private maternity centres are found established close to one another (clusters), and gets a factor correlation coefficient of 0.585 to 0.767. Second extracted factor is found linked with district hospital, community health centre, and govt. maternity centre, and government communicable disease facilities in rural India.

Third extracted factor is found linked with health sub centre and primary health centre and negatively linked with government and private maternity centre. These extracted factors clearly show that the factor load of healthcare infrastructure decreases with an increase in distance from district hospitals or community health centre. Even private healthcare facilities are contributing significantly to health care delivery at village/neighbourhood level in India, though they are mostly located in clusters (in close proximity to each other). This study arrived at the above conclusion by studying the structural linkages of their availability. It can be very clearly stated that as the distance increases from the district hospitals the service availability decreases in rural India and this is consistent with the findings of other studies (Gulati et al, 2010). The third extracted factor (F-III) on health sub centre and primary health centre have correlation coefficient of 0.775 and 0.805 respectively. Extraction of third factor on health sub centre and primary health centre delineate that the rural areas where primary health centre is available or functioning better, health sub centre also contributes more.

	Factors Loadings*			Communalities
	F-I	F-II	F-III	
Distance to Health Sub-Centres	0.121	0.042	0.775	.617
Distance to Primary Health Centres	0.023	0.103	0.805	.660
Distance to Community Health Centres	0.134	0.578	0.119	.366
Distance to District Hospitals	0.024	0.684	0.065	.472
Distance to Government Maternity Centres	0.390	0.658	-0.008	.585
Distance to Govt. Communicable Disease Facility	0.253	0.723	0.011	.587
Distance to Private Clinic-Trained Doctors	0.721	0.108	0.108	.543
Distance to Private Hospitals	0.767	0.183	0.069	.627
Distance to Private Pharmacy	0.585	0.225	0.109	.405
Distance to Private Maternity Centres	0.736	0.143	-0.043	.565
Eigen Value	**3.16**	**1.22**	**1.05**	
Variance Explained	54.30			
*Based on Varimax Rotation Criteria with Eigen Value >1				

Structural Linkages among various infrastructural components at Neighbourhood

At second stage, based on component score of the selected indices of neighbourhood development, all have extracted in same direction of mean value of 0.03 to 0.09 with standard variation of 2.61 to 3.37. One important point to observe here is that the development of one indices are highly linked with development of others but the speed and magnitude of their development varies as we move from one component to other component (Table 8).

Table 8: Descriptive Statistics of factor scores of Neighbourhood components

	Mean	Std. Dev.
Village communication movement & services Score	-0.09	2.61
Village Educational Institutions Score	-0.09	2.61
Village Health Institutions Score	-0.03	3.57
N	**914**	

Further, considering the said indicators of village development, table 9 clearly depicts the structural linkages of their establishment in rural India as these have a direct impact on neighbourhood development. The underlying relationship of their availability through factor structure in the study shows very high inter-linkage with each other and almost 80% variance is explained by those three infrastructural components. Like, communication & services availability affect more to education institutions than availability of health institutions in rural India. It has found that the increasing distance of one component automatically leads to increase in distance of other component or may be said that they are agglomerated near to each other.

Table 9: Factor Structure of Neighbourhood Development Indices in Rural India

	Factor Loading*	Communalities
	F-I	
Neighbourhood communication & services	0.966	.933
Neighbourhood Educational Institutions	0.966	.933
Neighbourhood Health Institutions	0.714	.509
Eigen Value	**2.376**	
Variance Explained	79.20	
*Based on Varimax Rotation Criteria with Eigen Value >1		

Source: Author's Calculation based on IHDS data

Neighbourhhod Development and Caste Group Distribution in India

Level of Neighbourhood Development in Rural India

At the country level, the issue of neighbourhood development matters more for two reasons. First, for its relevance for micro policy and planning and second, because a very high proportion of the population live in these rural neighbourhoods compared to urban areas. As per the latest information (RGI, 2011) more than two third the population in India still live in rural areas, and development of those areas is directly linked with indicators of human development. In view of this, three major indices, namely village connectivity & services availability indicators, availability of educational institutions and availability of health institutions for neighbourhood development are considered here for these are the basic parameters of development apart from the individual's socio-economic status, and lack or unavailability of these factors can be considered as inequality of opportunity.

Table 10: Neighbourhood Development in Rural India

Level of Development	Total
Highly Developed	26.7
Moderately Developed	52.1
Poorly Developed	21.2
N	921
Figures in table represent bivariate relationship are statistically significant based on Chi-square test (p>0.05).	

Source: Author Calculation based on IHDS data

The extent of inequality of opportunity can be gauged from the level of development of the neighbourhood in rural India. Table 10 shows that just above one fourth of the neighbourhoods or villages in India are highly developed while more than half are moderately developed or on the way to achieving significant development in these selected components or parameters of development. Twenty-one percent of neighbourhood are still poorly developed, and more attention needs to be paid to bettering human development and reduction of inequality of opportunity for the people living in these villages to ensure acceptable outcomes in regard to education, health and equality of opportunity.

Regional Variation in Neighbourhood Development in Rural India

The pattern of neighbourhood development in rural India shows much variation across regions. For example, about 9 percent of neighbourhoods are highly developed in north east as against of 33 percent in the north region. In contrast, in the poorly developed neighbourhoods, these percentages vary widely, i.e. from 14 percent in west region to 64% in north east region (Table 11). A comparison of the proportion of highly developed neighbourhoods across regions shows that it is north region that holds the highest proportion of highly developed neighbourhoods, followed by south and west regions. It is the point of observation that as north India is poorly developed on many indicators of socio economic development compared to south India, there is the possibility of neighbourhoods or villages in north India also being less developed compared to neighbourhoods in south India. But, as the study has found, the highest percentage of highly developed neighbourhoods are found in the north region because of the higher development of neighbourhoods in Punjab, Haryana and western Uttar Pradesh and also to some extent in the national capital territory of Delhi. If we exclude the neighbourhoods of these states the proportion of highly developed neighbourhoods will automatically be less than proportion of highly developed neighbourhoods in south India.

Table 11: Regional Distribution of Neighbourhood Development in Rural India

	Highly Developed	Moderately Developed	Poorly Developed	Total
North	33.3	46.8	19.9	216
North East	9.1	27.3	63.6	22
East	21.4	52.0	26.5	98
West	28.0	58.4	13.6	125
Central	21.2	52.5	26.3	236
South	28.8	55.9	15.3	229
Total	**26.6**	**52.2**	**21.3**	**926**

Figures in table represent bivariate relationship are statistically significant based on Chi-square test (p>0.05).

Source: Author Calculation on IHDS Data

Now, let us take up the issue of poorly developed villages. It is the west and south India that account for the lowest 14 percent and 15 percent respectively of poorly developed neighbourhoods. This is because these regions account for the highest percentage of moderately developed neighbourhoods. The possible explanation is that in west and south regions consist mostly of Maharashtra and Kerala which are comparatively developed states than others, and this could also be due to the higher percentage proportion of developed rural neighbourhoods abutting urban neighbourhoods in these states. It is east and central regions contain the highest percentage of poorly developed neighbourhoods in rural India. Moderately developed neighbourhoods are mostly concentrated in rural India as is 45-55 percent in most of the region except for in north east region (27 percent). Regional pattern of neighbourhood development has been found highly significant (p>0.005) also.

Figure 1: Caste Group distribution in different type of neighbourhood in rural India
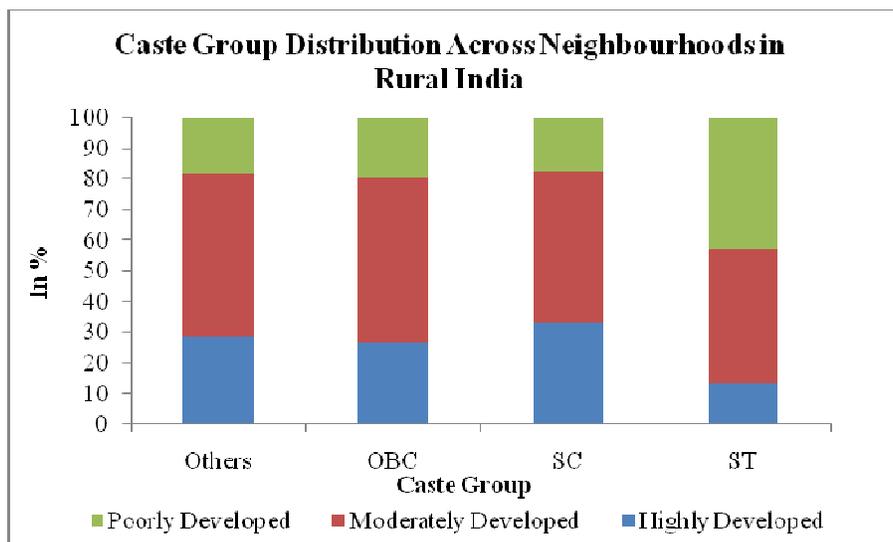
Caste Groups Domination and Neighbourhood Development:

Inter-linkages

This section analyses level of neighbourhood development and their linkages with social disparity by locating caste groups in these neighbourhoods at the aggregate level and also tries to find the contribution of each of the components separately. The logic behind inclusion of cast groups is that the performance of poor castes on many indicators of human development is very poor. On the one hand it may be linked to lack of the required infrastructure and services & amenities required to make use of the opportunity. On the other hand, poor capabilities to access the opportunity and to excel on the outcomes keep them poorly developed at individual level. Moreover, as of now there is no provision for construction of separate caste group wise human development index for the country as a whole in order to compare their development level. However, this issue is beyond the scope of this study, but herein we have however tried to observe location or distribution of caste groups in differently developed neighbourhood and also tried to examine the validity of the notion of 'poor castes lives in poorly developed neighbourhoods'.

First, we look at village development at aggregate level. Figure 1 delineates that around 29 percent of *Others* caste group population live in highly developed villages as against of only 13 percent ST population. It is pertinent to add here that around 33 percent SC population are now found in highly developed villages, thus equating the issue of development of SCs with neighbourhood development. In contrast, in poorly developed villages, only 19 percent *Others* caste group population live as against of 43% ST population. The highest proportion of all caste groups are found concentrated in moderately developed villages, i.e. 43 percent of ST to 53 percent of *Others* and OBC population. This shows that in rural India, most of the people are living in moderately developed villages or neighbourhoods where infrastructure and services are not available within their villages but are not very distant, but in case of

ST dominated villages/neighbourhoods the situation is just opposite, as most of the services and infrastructures here are available at significant distance, which results in inequality of opportunity.

Table 12: Neighbourhood Development and Caste Group Domination in Rural India

	Others	OBC	SC	ST	Total
On Communication and Services					
Highly developed	34.9	28.1	24.9	8.0	27.5
Moderately Developed	46.9	53.3	56.6	43.1	50.4
Poorly Developed	18.2	18.5	18.5	48.9	22.1
N	478	583	189	174	1424
On Education Institutions					
Highly developed	22.1	19.1	19.0	9.0	18.8
Moderately Developed	65.2	66.8	65.2	57.7	64.9
Poorly Developed	12.7	14.1	15.8	33.3	16.3
N	411	497	158	156	1222
On Health Institutions					
Highly developed	32.5	32.5	36.6	16.0	31.4
Moderately Developed	50.0	49.6	47.2	42.6	48.8
Poorly Developed	17.5	17.9	16.3	41.5	19.8
N	348	419	123	94	984
Figures in table represent bivariate relationship are statistically significant based on Chi-square test (p>0.05).					

Source: Author Calculation on IHDS Data

The neighbourhood can be categorised based on the development on selected components of services and infrastructural development. For a better understanding of the distribution of caste group, a disaggregated table on each of these components is provided into table 12. In terms of neighbourhood communication and services index, a little above one fourth (27 percent) of the neighbourhoods are found highly developed; around half (50 percent) of the neighbourhoods are moderately developed and rest are poorly developed. Further, in terms of linkages, the highest (35 percent) of *Others* population live in highly developed neighbourhoods as against of only 8% ST population living in highly developed neighbourhoods. The percentage for OBC and SC population are 28 percent and 25 percent respectively in these neighbourhoods. In contrast, in poorly developed neighbourhoods, only around 18% of *Others*, OBC and SC are living as against of 49% ST population. It is important to point out here that the maximum number of OBC and SC are residing in neighbourhoods which are moderately developed on indicators of communication and services component.

A correlation of distance/proximity of educational institutions with caste group distribution in neighbourhoods shows almost the same pattern as communication and services infrastructure, although in varying proportion but health institutions shows some different patterns, as can be observed from the data in table 12. In regard to development of neighbourhood based on availability of educational institutions components, it can be seen that around 19 percent villages are highly developed, 16% are poorly developed, and the rest are moderately developed. As the development of neighbourhood is linked with distance of selected educational institutions from the neighbourhood, it does not signify the

quality of education provided by those institutions. In regard to the proportion of different caste group people living is these neighbourhoods, it is seen that 22 percent of *Others* live in highly developed neighbourhoods on educational institution index as against of only 9 percent of ST people. In contrast, in poorly developed neighbourhoods, the population consists of 13 percent of *Others* people to 33 percent of ST. The percentage of OBC and SC population in these villages is 14 percent and 16 percent respectively.

Coming to the linkages between availability of different type of health institutions and proximity to neighbourhoods in rural India, 31 percent neighbourhoods are found highly developed, 20 percent least developed and the rest somewhere between the two extremes. Moving on to social disparity, it is found that the highest (37%) of SC population live in neighbourhoods that are highly developed in terms of health facilities indicator, followed by *Others* and OBC (32.5 percent each) whereas the highest percentage of ST population still live in least developed neighbourhoods on health facilities. Due to the high concentration of health facilities in SC dominated neighbourhoods, the highest proportion of SC people are been found living in highly developed neighbourhoods at the aggregate level. However, the IHDS does not contain data on service delivery or available healthcare services in those health institutions; therefore it cannot be said that the availability of higher number of health institutions/health facilities automatically assures better health outcomes among SC people, as their economic status plays an important role in health care behaviours. Even with assured availability of these institutions in the areas where poor people live, quite often their accessibility on one hand and the quality of healthcare services on the other hand, provided to poor people in those health institutions would be questionable.

Discussion and Conclusion

Rural Development still remains focused on the sustained growth of rural economy and bringing improvements in the well being of the people in rural areas, but without developing the rural areas, it is not possible to improve their well being. This study focuses on measuring the development of villages as evidenced by neighbourhood development in terms of availability of three important infrastructural components like communication & services, educational institutions and health institutions. Availability of communication and services infrastructure in any locality may increases the accessibility and possible affordability of access to other services like access to education and healthcare and hence other opportunities. Education and healthcare are two basic components of human development throughout the world; contribution of these factors have been significant in India also where over 69 percent of the population still live in rural areas, according to Census data, 2011. An explanation for the high level of education, health and higher life-span in urban areas than in rural areas can possibly be found in the more easy availability of these components in urban areas. The high rural to urban migration rate is one of the possible explanations for the high availability of these basic components in urban areas than the rural ones. Therefore, a relook look at villages/ neighbourhoods in rural India is much needed in our endeavour to globalize the notion of development.

The study reveals that a almost half (49 percent) of the neighbourhoods in rural India are moderately developed, and around one fifth are poorly developed. Considering different selected

components like communication & services indicators, educational and health institutions, their availability at village level is highly correlated with each other. For instance the level of services & communication indicators and educational institutions explain about 97 percent variance in human development scores, whereas health institutions explained around 71 percent variance in rural neighbourhood or village development. The earlier studies on village development have recorded the contribution of several indicators to human development in rural India. Shariff (1999) in his study on human development in India had highlighted the low rates of birth and death, high literacy rate and low morbidity rates in villages which were within the two kms from *pucca* road. Several studies of neighbourhood in developed countries have highlighted the positive and significant relationship of neighbourhood development with educational and health outcomes (Kawachi & Berkman, 2003). However, here our prime concern is not to measure the linkages of neighbourhood development with human development outcomes but to measure caste group disparity and their spatial concentration.

In rural India, most of the indices under study have been found linked with development of other indices. For example, government maternity centre, government communicable disease prevention centre, etc mostly are located in the district hospitals or at very close distance from the district hospitals. As the distance to the district head quarters or district hospital increases, their availability also decreases correspondingly. The highest contribution to healthcare in India is provided by private healthcare providers, but most of these facilities like private clinics, private maternity centres, private pharmacies and private hospitals are located close to one another other clusters and not spatially distributed. Almost the same is the case of educational institutions. In economic jargon it is known as 'agglomeration effect' whereby development of one of the indices leads to development of others. There are currently very few studies on the 'agglomeration effect' and the area or place where are they are agglomerated, whether in affluent areas or in deprived areas.

Having observed the underlying structural relationship of village neighbourhood development and caste group distribution in these neighbourhoods on all the pertinent components, it can be concluded that high percentage of *Others* caste group people live in highly developed neighbourhoods (also with higher concentration of health care institutions) as against the lowest percentage of ST followed by SC and OBC. Overall, it can be stated that the neighbourhood development has an inverse relationship with the development of settlements containing different caste group populations. Here, it can be stated very clearly that it may be possible that the poor caste people remain poor due to unavailability of possible developmental infrastructure in their neighbourhoods and this adversely impact their development. It might not be wrong to argue that inequality of opportunity leads to inequality of outcomes (Desai & Dubey, 2011). It can also be argued that the highest proportion of ST and SC population are found living in poorly developed neighbourhoods whereas highest proportion of *Others* or OBC are found living in highly or moderately developed neighbourhoods.

As pointed out in the preview of this study, there is need to study the relationship of village or neighbourhood development with human development indicators than only to measure the level of human development in rural India. This study provides insights on the possible gaps in research arena as well as on micro level policy issue. It is well known that rural areas perform poorly on many more indices of human development; however, within the rural areas the fruits of development are not

equally distributed. From the findings of the study, it becomes clear that the performance of SC and ST people is very poor on many indicators of development outcomes like health, education etc. It could be due to residence in the villages where infrastructural development is very poor, or are located very far away from their locality, making them less accessible. A recent study (Raushan & Mutharayappa, 2014) has found that in villages with good road connectivity, the number of ST children who underwent curative care increased by 25 percent on an average. In rural India, people generally depend on government healthcare facilities for curative care services and great distances often separate them from health care/curative facilities.

Most Indian studies on caste structure and developmental linkages have been based more on sociological and political perspectives. These issues need to be investigated from another perspective, i.e., perspective of development in rural India with focus on neighbourhood development rather than human development. There is also a need to create a caste group based human development index at state level rural urban framework. Only a few states in India, have prepared state level human development indices. In this context more effort is needed with special focus on the states having poor human development index values. Further, needful infrastructure at village should be made available in order to reduce the inequality of opportunity in availing and accessing the services by villagers. It is essential to mitigate past inequality of outcomes and also to ensure that the dynamism is injected in them to sustain the progress in human development indices. So, the prime focus of micro level planning and policy formulation centred on rural India should be focused on areas where high concentration of poor people is found and also in villages which are lagging behind on infrastructural development.

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Appendices

The Basic Model of Factor Analysis

The basic common factor analytic model is usually expressed as

X = Λf + e ----------------------------**1**

Where,

X = p-dimensional vector of observed responses i.e., $X' = (x_1, x_2, ..., x_p)$,

f = q-dimensional vector of unobservable variables called common factors i.e.,

$f' = (f_1, f_2, ..., f_p)$,

e = p- dimensional vector of unobservable variables called unique factors i.e.,

$e' = (e_1, e_2, ..., e_p)$,

Λ = p x q matrix of unknown constant called factor loadings,

$$\Lambda = \begin{matrix} \lambda_{11} & \lambda_{12} & . & . & \lambda_{1q} \\ & \lambda_{21} & \lambda_{22} & . & . & \lambda_{2q} \\ . & . & . & . & . \\ . & . & . & . & . \\ & \lambda_{p1} & \lambda_{p2} & \lambda_{p3} & \lambda_{p4} & \lambda_{pq} \end{matrix}$$

Extending the equation **1** i.e, linear factor model:

$X_i = \lambda_{i1} f_1 + \lambda_{i2} f_2 + \lambda_{i3} f_3 + . . . + \lambda_{iq} f_q + e_1$ -------------------------- **2**

For factoring of different variable (i= 1,2,3,4...........p) would be illustrated as

$X_1 = \lambda_{11} f_1 + \lambda_{12} f_2 + \lambda_{13} f_3 + . . . + \lambda_{1q} f_q + e_1$

$X_2 = \lambda_{21} f_1 + \lambda_{22} f_2 + \lambda_{23} f_3 + . . . + \lambda_{2q} f_q + e_2$

.

.

$X_p = \lambda_{p1} f_1 + \lambda_{p2} f_2 + \lambda_{p3} f_3 + . . . + \lambda_{pq} f_q + e_p$

Here, λ_i are the coefficients of X-s and are called factor loadings. Factor loadings would be chosen in such a way that principal components are uncorrelated to each other. It also has to be ensured that first principal components would absorb a maximum possible proportion of total variation of X-s and out of the remaining variation, maximum proportion would be absorbed by the second principal component and the process will be continued again for remaining variations like third, fourth principal components and so on. The total contribution of factor f_j to the total variance of the entire set of variable is given by the Eigen value of factor f_j.

Table A1: Correction Matrix of Indices of Services & Amenities Variables at Village Level in India

Services & Amenities Indices	Nearest Town	District HQ	*Pucca* Road	HH not having Electricity	HH not having any phone	Closest Bank Branch	Closest STD Booth	Closest Bus Stop	Closest Market	Post Office
Distance Nearest Town	1									
Distance to District HQ	0.2238	1								
Distance from *Pucca* Road	0.1547	0.1288	1							
% HH not having Electricity	0.1165	0.2139	0.1593	1						
% HH not having any kind of phone	0.1165	0.2139	0.1593	1.0000	1					
Distance to Closest Bank Branch	0.1896	0.2187	0.3057	0.2137	0.2137	1				
Distance to Closest STD Booth	0.1691	0.1635	0.2956	0.2109	0.2109	0.3542	1			
Distance to the Closest Bus Stop	0.0624	0.0936	0.3511	0.2196	0.2196	0.2304	0.2530	1		
Distance to Closest Market	0.2067	0.1750	0.0746	0.1178	0.1178	0.4050	0.2547	0.0674	1	
Distance to Closest Post Office	0.0539	0.0294	0.2440	0.1405	0.1405	0.3263	0.2670	0.2517	0.1469	1

Table A2: Correction Matrix of Indices of Educational Institutions at Village Level in India

Educational Institutions	Primary Schools	Middle Schools	Secondary Schools	+2 Schools	Colleges	Vocational Institutes	*Madarasas*	*Anganwadi* Centres
Primary Schools	1							
Middle Schools	0.1216	1						
Secondary Schools	0.0671	0.3968	1					
Senior Secondary Schools (+2)	0.0475	0.2312	0.4950	1				
Colleges	-0.0042	0.0841	0.2377	0.3229	1			
Vocational Institutes	-0.0173	0.0444	0.1197	0.1593	0.3513	1		
Madarasas	0.1082	0.0592	0.0560	0.0789	0.1302	0.2390	1	
Anganwadi Centres	0.3312	0.2018	0.1282	0.0959	0.0481	0.0685	0.0994	1

Table A3: Correction Matrix of Indices of Health Institutions at Village Level in India

	HSC	PHC	CHC	DH	Govt. Maternity Centre	Govt. Communicable Disease Facility	Pvt. Clinic-Trained Doctor	Pvt. Hospitals	Pvt. Pharmacy	Pvt. Maternity Centre
Health Sub-centre (HSC)	1									
Primary Health Centre (PHC)	0.2885	1								
Community Health Centre (CHC)	0.0684	0.1379	1							
District Hospitals (DH)	0.0710	0.1061	0.2471	1						
Govt. Maternity Centre	0.1291	0.0773	0.2467	0.2826	1					
Govt. Communicable Disease Facility	0.1227	0.0820	0.2682	0.2589	0.5518	1				
Pvt. Clinic-Trained Dr.	0.1012	0.1240	0.2317	0.1800	0.2879	0.2311	1			
Pvt. Hospitals	0.1480	0.0946	0.2288	0.2109	0.3831	0.2868	0.4454	1		
Pvt. Pharmacy	0.1362	0.0956	0.1843	0.1574	0.3079	0.3291	0.3627	0.3326	1	
Pvt. Maternity Centre	0.0736	0.0568	0.1987	0.1730	0.3516	0.2513	0.3536	0.4916	0.2929	1