ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 12, Issue, 06, pp.11951-11955, June, 2020

DOI: https://doi.org/10.24941/ijcr.38400.06.2020

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

GEOSPATIAL APPROACH TO MEASURE RURAL INFRASTRUCTURE AND DEVELOPMENT: A CASE STUDY IN COOCHBEHAR DISTRICT, WEST BENGAL

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ARTICLE INFO

Article History:
Received 20th March, 2020
Received in revised form
09h April, 2020
Accepted 17th May, 2020
Published online 29th June, 2020

Key Words:

Rural Infrastructure,
Village,
Development, Village development Index.

ABSTRACT

In India most of the people almost 70% of the total population inhabits in rural villages. Rural development depends on rural infrastructural facilities. Poverty can be elevated from society by improving rural basic infrastructural facilities. Despite several Government initiatives, the development in rural villages in terms of rural basic infrastructure facilities shows unsatisfactory results. The article evaluates rural infrastructure facilities in 125 villages of Tufanganj C.D Blocks of Coochbehar District. The village development index has been prepared on the basis of six basic indicators education, health, transport, communication, access to drinking water and electricity. The result suggests that Government should give more priority for the investments in the rural infrastructure development in terms of health, transport, educational institute, communication and drinking water facility.

Citation: ***Kundu, P.*** **2020.** "Geospatial approach to measure rural infrastructure and development: a case study in Coochbehar District, West Bengal", *International Journal of Current Research*, 12, (06), 11951-11955.

INTRODUCTION

In recent few decades' rural development has been used in broad sense. Before the 1970s the term only used for the agriculture purpose, but recently it includes income, productivity and production (Shaik 2017). Many empirical studies reveal the strong relationship among economic growth, infrastructure and rural development (Chakraborty & Guha 2009, Sahoo *et al*. 2010, Carlsson *et al*. 2013). Improving rural basic infrastructure such as education, road, health, communication, drinking water facility and electricity, is essential for the development and well being of rural lives. Through the development of rural infrastructure the economic growth and standard of living of the rural population can be obtained (Sahoo *et al*. 2010). It is also helpful for the reducing poverty in the nation, providing access to basic goods and services and improving health and other physical conditions to rural population (Howe & Richard 1984, Chatterjee 2005, NCAER 2007). In spite of pressing importance, rural infrastructure is found to be lacking behind in rural areas all over India. Unlike urban area, due to the low population density and low income, rural areas are facing challenges in the expansion of infrastructure both in quantity as well as quality. Rural areas do not sync with the urban area due to its low connectivity which results into the segregation from rural to urban.

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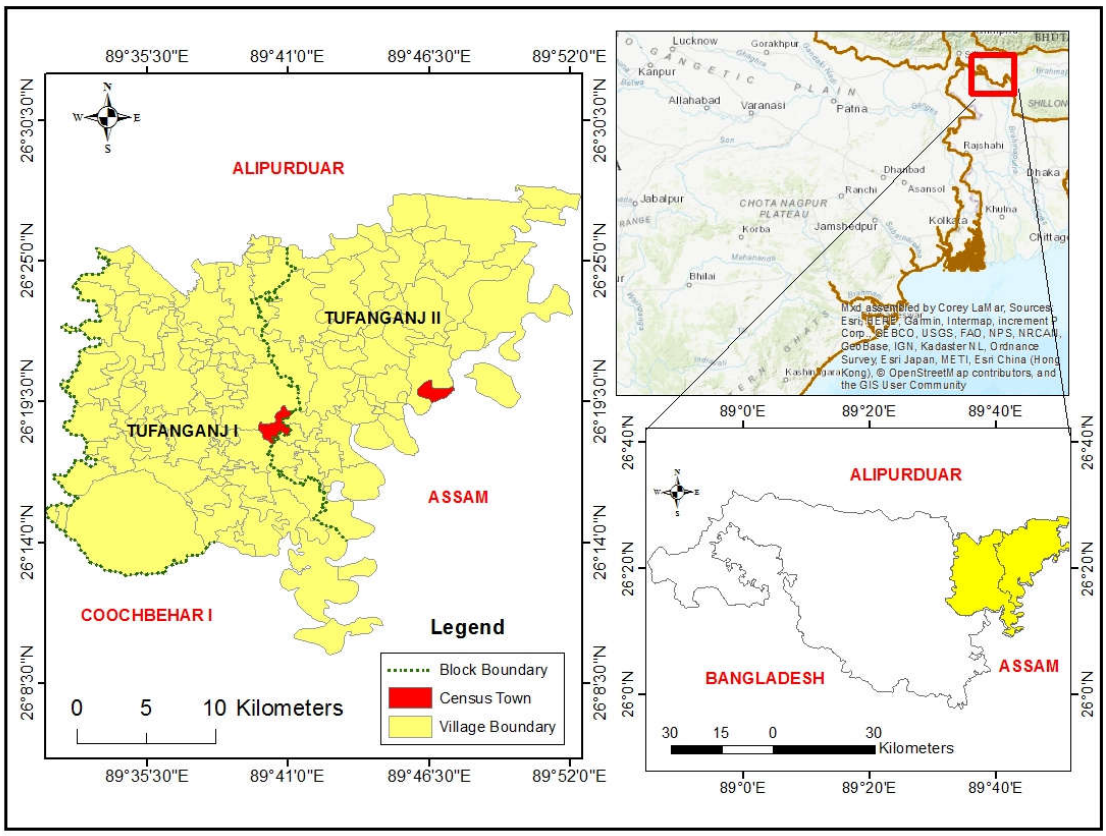
The Spatial database (SDB) is an important feature of GIS which comprises both spatial and graphical database (point, line and polygon) as well as attribute information (Bhatta 2009, Bhatta 2011). Many research studies from different disciplines reveal the importance of the application of GIS platform to analyze the rural development pattern (Neogi 2010, Sarkar 2015). The present study evaluates the present status of rural infrastructure in the villages of Tufanganj C.D Blocks of Coochbehar district as rural development is a process of improving the standard of living and economic condition of rural population.

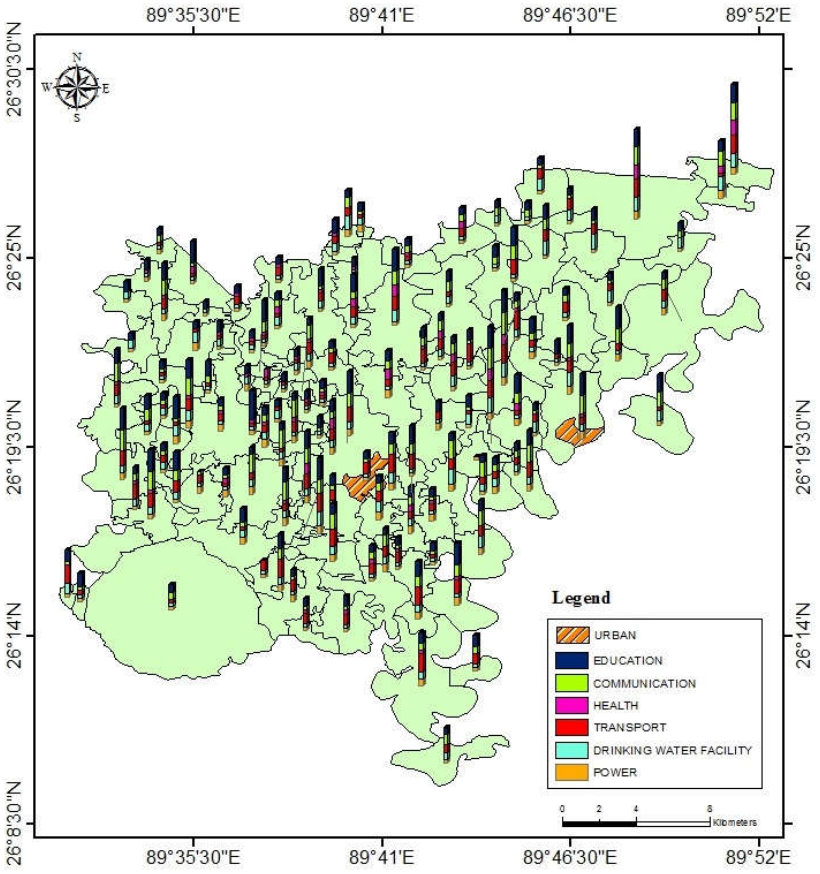
Study area: The study area encompasses 127 villages of Tufanganj I and Tufanganj II CD blocks in Coochbehar District, situated on the eastern border of West Bengal with a latitudinal and longitudinal extension of 26°9′22″N to 26°27′36″N and 89°31′55″ E to 89°52′48″ E bordered by Assam in East, Aipurduar district of West Bengal in the north, Dinhata block of the Coochbehar district in the south and Coochbehar I and Coochbehar II in the west (Fig 1). Among them Kamat Phulbari in Tufanganj I and Chota laukuthi in Tufanganj II C.D Blocks are the Census Towns (Census of India 2011)

Objectives: The main objective of the present study is to focus on the pattern of rural infrastructure development spatially at village level. Within the frame of this prime objective the detailed objectives are as follows:



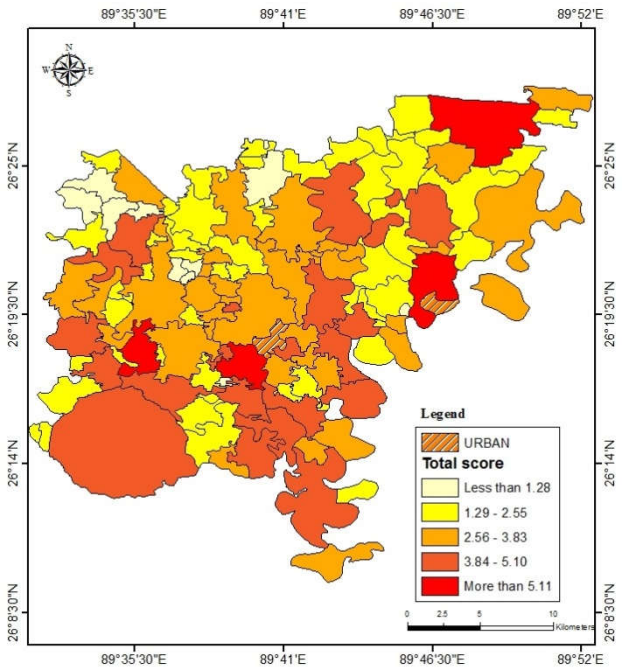
Source: Data extracted from PS map and compiled by researcher

Figure 1: Study area



Source: Census of India 2011 and compiled by researcher

Figure 2. Availability of rural infrastructure facilities



Source: Census of India 2011 and compiled by researcher

Figure 3. Village development index

- To analyze the intra-village variations in terms of rural infrastructure with the help of indicators related to education, health, drinking water facility, electricity, transport and communication.
- To identify the backward villages in terms of rural infrastructure with regard to other villages.

MATERIALS AND METHODS

The present work is mainly based on available secondary data and relevant information from Census of India, District Statistical handbook and many Government reports and publications. The police station map, toposheets (73F/11, 1:50,000; 1:2, 50,000) from Survey of India have been used to generate base layer. For the present study education, health, transport, communication, power and drinking water facility are considered as indicators of rural infrastructure of Tufanganj C.D Blocks.

In education the availability of educational institute such as pre primary both Government and private, primary school both Government and private, middle school both government and private, secondary school including Government and private and public library have taken into consideration. Availability of maternity home and child welfare center, primary center, family welfare center, ASHA and TB clinic, are grouped into health indicator. In a transport indicator van, public bus, private bus, cycle- rickshaw pulled by man, cycle- rickshaw pulled by machine and public modified by auto have been considered. Tap water, well water, hand pump and tube well are grouped into drinking water facility whereas domestic, agriculture and others are grouped into power indicator. In communications newspaper, telephone connections, post office, mobile phone, telegraph office, internet café and public call office (PCO) are considered as indicators of rural infrastructure development. A composite index has been prepared using six indicators to analyze the village development pattern in terms of infrastructure in Tufanganj C.D. Blocks of Coochbehar district.

Through principal component analysis individual score of each indicator has been calculated and then a composite score of all indicators in 125 villages of Tufanganj C.D Blocks has been prepared to determine intra-village variance on the basis of availability of basic infrastructure. All the maps have been prepared using Arc GIS 10.8 software.

RESULTS AND DISCUSSION

Education: Education transforms the society from underdeveloped to socially and economically developed one (Pattanaik 2000). As it is the backbone of societal development, the availability of educational institute is one of the significant indicators of village development in Tufanganj C.D Blocks. The analysis of spatial data reveals Natabari, Chhat Rampur Pratham Khanda, Amlaguri, Chilakhana, Maradanga, Chamta, Krishnapur, Balabhut in Tufanganj I and Bara Salbari, Mahishkuchi, Bhanukumari, Bhandijalas in Tufanganj II are the developed ones comparatively on the basis of availability of educational institute than other villages in Tufanganj C.D Blocks whereas Chhat Deocharai, Gobindapur and Chaat Balakuthi are under developed villages in Tufanganj C.D blocks due to the absence of educational institute (Fig 2).

Health: Health infrastructure and rural development are interrelated with each other. An analysis of health infrastructure reveals that the only Rampur village is the developed comparatively than others. 56% villages show the lowest health infrastructure. The Primary health center covers only 6.4% of the villages, whereas ASHA covers 25.6%. Only 9.6% villages cover maternity and child health, welfare center and 5.6%of the villages cover the TB clinic.

Transport and communication: Infrastructure of transport and digital communication accelerates the economic growth of any rural society by reducing the cost of trade, facilitating economies of scale and accumulation of knowledge (Carlsson *et al*. 2013). To demonstrate the rural infrastructure the importance of transport and communication cannot be ignored. On the basis of availability of vehicles Shikarpur, Chamta, Dwiparpar, Nakkatigachi, Dhadial, Rajarkuthi, Rampur, Bajrapur, Turkanirkuthi, Bhanukumari and Chhat Bara Laukuthi are the most developed compared. Almost 8.8% villages have access to good transport facilities whereas 10.4% villages have low access. Cycle- rickshaws pulled by man are found in major number in the villages of Tufanganj C.D Blocks i.e. 80%. The variation also found in these rural areas in terms of communication. Chilakhana in Tufanganj I show the highest communication, whereas 17.6% has the lowest communication in terms of the availability of medium of tele-communications. A newspaper which is the prime most mediums of communication covers only 11.2%. The access to telephone connections covers only 26.4%, whereas mobile coverage is found 72.8% of the villages. But only 12.8% of the total rural areas have access to internet café facilities.

Drinking water facility: Drinking water is essential for the human survival. The access to drinking water is considered as one of the important basic infrastructure for rural development as village level study. Among tube well, hand pump, well and tap water the hand pump is the major source of drinking water which is found in 58.4% of the villages. Tap water and tube well have also found in some portion of villages respectively 28.8% and 21.6%. The well is found in 14.4% villages in the region.

Table 1: Classification of villages according to the village development index

Village score	Number of villages	NAME OF THE VILLAGES
Less than1.28 (Very low)	11	Panisala, Dwarikamari, Purba Chikliguri, Sikderkhata, Debottar Charaljani, Bhuchungimari, Bilsi Dwitia Khanda, Genduguri, Chhat Chilakhana Pratham Khanda, Chhat Balakuthi, Chhat Deocharai
1.29-2.55 (Low)	53	Chhat Bara Chowki, Khasbas, Chhat Rampur Dwitia Khanda, Chikliguri Dwitia Khanda, Dorko, Chengtimari, Atiamochar, Paglirkuthi, Khagribari, Madhurbasa, Chhat Bhalka, Gorbhanga, Jaldhoa, Takomari, Rasikbil, Bashraja Dwitia Khanda, Guriarpar, Chhat Chilakhana Dwitia Khanda, Chhat Genduguri, BajeJama chilakhana Pratham Khanda, Dhopguri, Chhatoa, AmlaguriDwitia Khanda, Moamari, Bajejama Chilakhana Dwitia Khanda, Balapukhari, Uttar Chhat Jaigir Chilakhana, Bakla, Palika, Dhaldabri, Chhat Bhareya, Noakhuli, Gobindapur, Chhat Bhelakopa, Soladanga dwitia Khanda, Chhat Panisala, Nandi Chhechura, Balaghat, Mantani, Nakarkhana, Boalimohan Dwitia Khanda, Boalimohan Prathan Khanda, Shilghagri, Sauerkhata, Dhanmatia, Nepalerkuthi, Santoshpur, Jhaljhali, Gopalerkuthi
2.56-3.83 (Medium)	36	Natabari, Dhalpal, Najiran Deutikhanda, Singimari, Salbari, Chhat Rampur Pratham Khanda, Airani Chaitalia, Amlaguri, Jaigir Chilakhana, Mugabhog, Bilsi, Chhalapak, Turkanirkuthi, Basraja Pratham Khanda, Falimari, Atra, Andaran Phulbari(P), Dakshin Chhat Jaygir Chilakhan, Khorarpar, Ghogarkuthi Dwitia Khanda, Ghogarkuthi Pratham Khanda, Bhelakopa Dwitia Khanda, Haripur, Purba Jhaukuthi, Balakuthi, Bhareya, Begarkhata, Debgram, Chhat Bara Laukuthi, Rajarkuthi, Jhaukuthi, Chengmari, Mechkoka, Bicchandai, Jirati Salbari, Bajrapur
3.84-5.10 (High)	21	Bara Salbari, Charaljani, Bhelapeta, Taterkuthi, Chhat Phulbari, Mahiskuchi, Bhandijalas, Moradanga, Bhelakopa Pratham Khanda, Balarampur, Deocharai, Shikarpur, Langalgram, Barakodali, Jhingapuni, Mansai, Dwiparpar, Nakkatigachi, Krishnapur, Dhadial, Balabhut
More than 5.11 (Very High)	4	Rampur, Bhanukumari, Chilakhana, Chamta

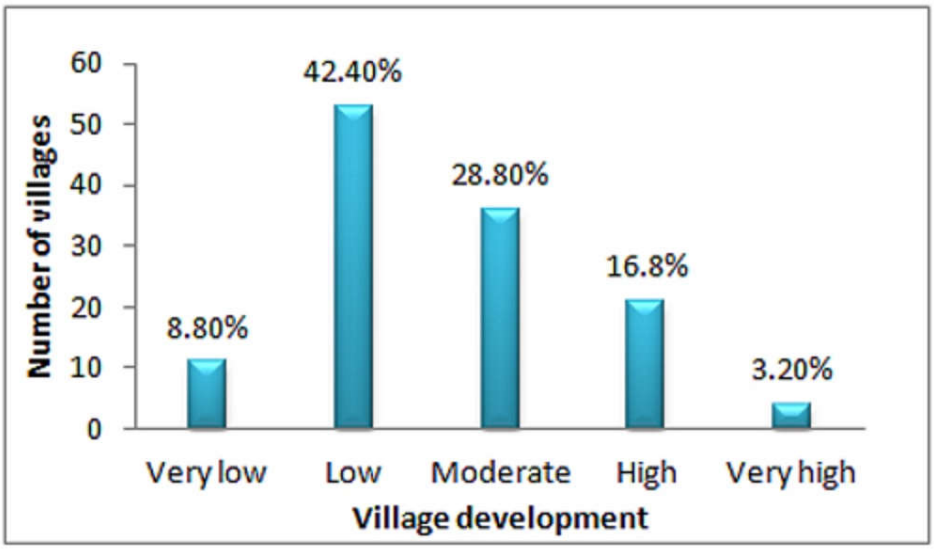


Figure 4. Patterns of integrated village development

Jaigir Chilakhana, Chamta, Chhat Bhalka, Narjiran Deutikhanda, Singimari, Jaldhoa, Bhanukumari, Langalgram and Barakodali are the developed one on the basis of availability of drinking water facility. All the sources for drinking water are found in these villages. 42.4% villages have access to drinking water either hand pump or tube well, whereas in Chhat Balakuthi in Tufanganj II C.D Block there is no access to drinking water.

Electricity: Electricity is a crucial component triggering the village development. Rural electrification is intrinsically interlinked with sustainable development. A power infrastructure plays an essential role for both industry and agriculture other than rural social services. According to the availability of electricity on domestic purpose 100% villages are electrified but only 38% villages have been electrified agriculture purpose.

Village development index: Village development index (Fig 3) reveals the intra-village variations of development in terms of rural basic infrastructures. Based on the total score of availability of basic infrastructures i.e. education, health, transport, communication and power supply the villages are classified into five categories i.e. very highly developed, highly developed, moderately developed, low developed and very low developed (Table 1). Chilakhana and Chamta in Tufanganj I, Rampur and Bhanukumari in Tufanganj II Block are the very highly developed villages on the basis of rural infrastructure. On the other hand 8.8% villages are found in very low category, namely Panisala, Dwarikamari, Purba Chikliguri, Sikderkhata, Debottar Charaljani, Bhuchungimari, Bilsi Dwitia Khanda, Genduguri, Chhat Chilakhana Pratham Khanda, Chhat Balakuthi, Chhat Deocharai. Almost 53% villages in Tufanganj C.D Blocks fall into low level development category (Fig 4). Higher the index score in the village development index indicates the high village development, whereas a lower score indicates the reverse.

Conclusions

In India in spite of taking both Government and public initiatives the progress in rural infrastructure is unsatisfactory. The rural infrastructure and village development are correlated with each other.

The inadequacy of rural infrastructure has serious implications for agricultural productivity, rural poverty and human development. Village development index and the basic indicators of rural infrastructure show the intra-village variations in Tufanganj C.D Blocks of Coochbehar district. The study reveals that the villages are the underdeveloped than urban area which indirectly affect the economic growth of this region. The progress of education and health infrastructural facilities among all basic indicators are found unsatisfactory. Education and health can improve agricultural productivity and output by improving the literacy rate and reducing poverty. The Electricity, transport and communication infrastructural facilities also have crucial importance for agricultural productivity and economic growth, poverty reduction by improving health and education. In spite of much planning and proposals for the rural development the rural areas are lacking behind. So, the proper implementation shall be needed to access the basic rural infrastructure facilities for all villages.

REFERENCES

Bhatta, B. 2009. Analysis of urban growth pattern using remote sensing and GIS: a case study of Kolkata, India. International Journal of Remote Sensing, 30(18), 4733–4746. https://doi.org/10.1080/01431160802651967

Bhatta, B. 2011. Remote Sensing and GIS, Oxford University Press. Second Ed.

Carlsson, R., Otto, A., & Hall, J. W. 2013. The role of infrastructure in macroeconomic growth theories. Civil Engineering and Environmental Systems, 30(3-4), 263–273. https://doi.org/10.1080/10286608.2013.866107

Chakraborty, D., & Guha, A. 2009. Infrastructure and Economic Growth in India. Journal of Infrastructure Development, 1(1), 67–86. https://doi.org/10.1177 /09 7493060900100105

Chatterjee S. 2005. Poverty reduction strategies—Lessons from the Asian and Pacific region on inclusive development. Asian Development Review, 22(1), 12–44.

Government of West Bengal: Census of India, Coochbehar District 2011

Howe, J., & Richards, P. 1984. 8. Conclusions - Rural Roads and Poverty Alleviation. Rural Roads and Poverty Alleviation, 163–168. https://doi.org/10.33 62/97817804 43157.008

NCAER. 2007. India Rural Infrastructure Report. New Delhi: SAGE Publications and National Council of Applied Economic Research.

Neogy, D. 2010. Disparity in Socio-Economic Development and Its Implications on Communal Conflicts: A Study on India's North-Eastern Region, International Science Index, Humanities and Social Sciences Vol:4, No:3, 2010 waset.org/Publication/9141.

Pattanaik K. 2011. Sarva Siksha Abhiyan and Inclusive Education, Kurukshtra, 58 (8), p. 17

Sahoo P., Dash R.K., & Nataraj G. 2010. Infrastructure development and economic growth in China. IDE Discussion Paper No. 261, Chiba, Japan: Institute of Developing Economies-JETRO

Sarkar, S. 2015. Spatial Database for Rural Infrastructure Development & Planning – A Geospatial Analysis", International Journal of Remote Sensing and GIS, Volume 4, Issue 2.

Shaik, K. B. 2017. A Conceptual Analysis on Development of Rural Villages with Scarcely Resources in Prakasam District, Andhra Pradesh State. International Journal of Economics & Management Sciences, 06(04). https://doi.org/10.4172/2162-6359.1000439

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