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# DIGITAL GEOGRAPHY-RURAL LITERACY AND INTERNET USAGE AMONG RURAL MEN AND WOMEN IN INDIA VIA NATIONAL FAMILY HEALTH SURVEY-5 (2019-2021)

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## ABSTRACT

*NFHS-5 survey for the first time includes the study of internet usage in India. Since the digital has altered all possible ways of human life with the internet as its fulcrum, its analysis in various forms is contemporary and relevant. But, geographical studies are less observed and studies on rural areas are further limited in nature. The current attempt is an analysis of the geographic distribution of internet services usage in India on the basis of gender and literacy in the rural scenario. It further diversifies theanalysis in these units through the Empowered Action Group (EAG) states and Non Empowered Action Group (Non-EAG) states and Union Territories classification of the Census of India. An all-India examination is insightful in examining the trends in digital geographies in the rural landscape of the country. The 2019-21 period of National Family Health Survey-5(NFHS-5) data makes the study contemporary as well as relevant.*

**KEYWORDS:** *Internet, India, Gender, Literacy, Rural*

## INTRODUCTION

The internet is observed to usher in a newer aspects to the world and in creating a newer one as wellwhile rapidly becoming a household name since its inception and life without the internet is unimaginable with the digital resources creating altered realities in space and time while creating newer patterns (Brunn, 1998; Dodge, 1999) **[1,2].** The geographies of the internet are called cyber geographies and involve the various dimensions of studying the internet through a geographical perspective (Dodge, 1999, Robine & Salamatian, 2014) **[2,3].** The geographies of the internet are, however, less done by geographers and more by data scientists (Kitchin & Dodge,n.d.) **[4]**; particularly in the lightof the fact that rural internet connectivity is difficult to achieve (James, 2010) **[5].** The current study is an attempt to bridge this kind of gap in literature. It attempts to observe the internet usage in the rural areas of the country on the basis of the recent NFHS-5 data and then diversifies to observe the geographical dimensions of this distribution on the basis of gender and the respective literacy rate of these groups. The NFHS is a huge survey initiative of the Ministry of Health and Family Welfare and Government of India (MOHFW) since 1992-93 with the International Institute for Population Sciences (IIPS) as the nodal agency to conduct it (India G. O., n.d.) **[6].**

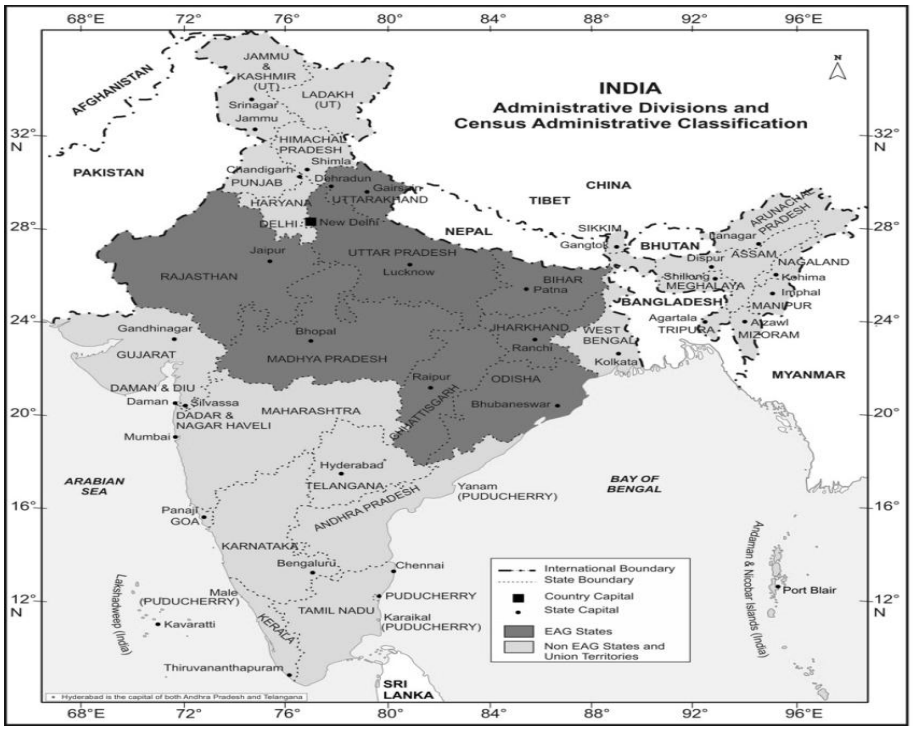
The focus is to highlight the variations of internet usage among men and women in the rural areas of the country through this data. Further, this aspect is examined on the basis of development level in the states wherein, the Census of India 2011 classification of Indian states as EAG and Non EAG states and Union territories is attempted. Studies have also indicated that by the year 2025, rural India will have more internet users than urban India with an increasing internet adoption rate as observed in the country (WARC, 2020; Today.In, 2021; IANS, 2021) **[7,8,9].** Further, gender gap is significantly visible in internet usage in India and the world (Fallows, 2005; OECD, 2018; ITU, 2021) **[10,11,12].** The digital gender gap is an observed gender divide and more than two thirds of nations experience it (OECD, 2018) **[11].**

The digital also creates geography (Ash, Kitchin, & Leszczynski, 2015) **[13]** and the social aspect is multi-dimensional and more relevant (Alibrandi & Baker, 2008) **[14].** The internet is highlighted to create immense and fresh opportunities for users (Owen, 2019) **[15**] and a group specific study brings out specific relevant characteristics of behavior (Dobler, 2003) **[16].** Reversely, the use of internet is also taken as an indicator of literacy itself (Birru, et al., 2004; Sinha, 2012) **[17,18].**This needs attention (OECD, 2018) **[11].** All these points make convincing case as presented in the current study.

The concept of literacy has particularly evolved in the 21$^{st}$ century from basic reading and writing skills to contemporary aspects of literacy, in which media literacy is a separate component. It is also important to mention in this regard that the traditional definition of literacy as reading and writing skills, has evolved and has acquired other dimensions (van Deursen & van Djik, 2014) **[19].** Literacy as a concept in this regard relates to two broad concerns- literacy on skills related to the internet and literacy on information on the internet (Kim & Yang, 2015) **[20].** The socio- demographic factors have a significant say in even the basic access to digital resources (Zickuhr & Madden, 2012; van Deursen & Helsper, 2015; Morueta, Gomez, & Gomez, 2018) **[21, 22, 23].** In the light of all these aspects, the study becomes relevant and the analysis adds to literature.

**Study Area-**The study area is India. It comprises of Indian States and Union Territories (UTs). The NFHS surveys these administrative units for data collection. The present examination of NFHS data for the category of for the states and UTs of the country tends to observe the category of men and women in the age group of 15-49 years who have ever used the internet through the data collected by NFHS-5 through primary survey. The NFHS covers all states and Union Territories and the results of 2019-2021 survey for these administrative units is taken for the study. The analysis is supplemented using the Census classification of Indian States into Empowered Action Groups (EAG) and non-EAG states and UTs. The study area is depicted in Figure 1. The basis of this classification is the high growth of population in these states as compared to the country. EAG states are- Bihar, Chattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, and Uttar Pradesh- states which lag behind in the demographic transition and also have a higher percentage of rural population as compared to the non EAG states and Union Territories (UTs) (India o. G., 2011; Home Affairs, 2011) **[24, 25].** Besides this, the data is segregated on the basis of EAG and Non EAG states and UTs category to check the differentials in the category (Home Affairs, 2011) **[25].**

**FIGURE 1. STUDY AREA**




**Source- Author, 2022**

These are the states which are below all India average in the demographic transition and also have a higher percentage of rural population as compared to the non EAG states and UTs (Home Affairs, 2011) **[25].** Chandigarh is excluded from the analysis as data for rural areas is not available in the survey.

**Database and Methodology**-The present examination is based upon NFHS-5 Survey conducted and conducted from 2019-2021 respectively. The survey is described as a national, multi round, large-scale survey which is conducted on data on a sample of households across the country. The MOHFW has given the responsibility to conduct this survey at the all India level to the International Institute for Population Sciences, Mumbai. Further, it is implemented by a group of survey organizations and Population Research Centres which are selected after a rigorous process of selection (NFHS, 2021) **[26].** NFHS-5 fieldwork for India was conducted in two phases from January to April by 17 Field Agencies with data collected from 636,699 households, 724,115 women, and 101,839 men(NFHS, 2021) **[26].** This data pertains to vast information collected on demography, health parameters, social dimensions, technology usage, maternal and child health, gender based violence and tobacco usage to mention broadly (NFHS, 2021) **[26].**

The current study is based on the category of 'Characteristics of Adults' (15-49 years), studying the indicators of – Women who have ever used the internet and Men who have ever used the internet; expressed in percentage. Information on rural literacy rate respectively for men and women is also taken from NFHS-5 data. Data for both these categories is provided separately for urban and rural scenarios for states and UTs in the survey sheets by NFHS. The aim is to analyse the geographical distribution of the percentage of men and women in rural areas who have ever

used the internet and find its correlation with respective male and female rural literacy levels of the respective administrative units. The methodology involves the an initial analysis of the descriptive statistics of internet usage in the country. It is then extended to examine the gender aspect of internet usage in the rural context followed by calculating the correlation of respective literacy rates with this usage. The methodology has been divided into the following categories:

**a.** Descriptive Statistics of rural literacy rate among men and women and Internet usage of men and women respectively for the states and UTs is attempted first with a specific analysis of same statistics for EAG and Non EAG states and UTs category.

**b.** Calculating the correlation between rural literacy rates and internet usage on the basis of gender respectively for the study area. The same analysis is conducted for EAG and Non EAG states and UTs category.

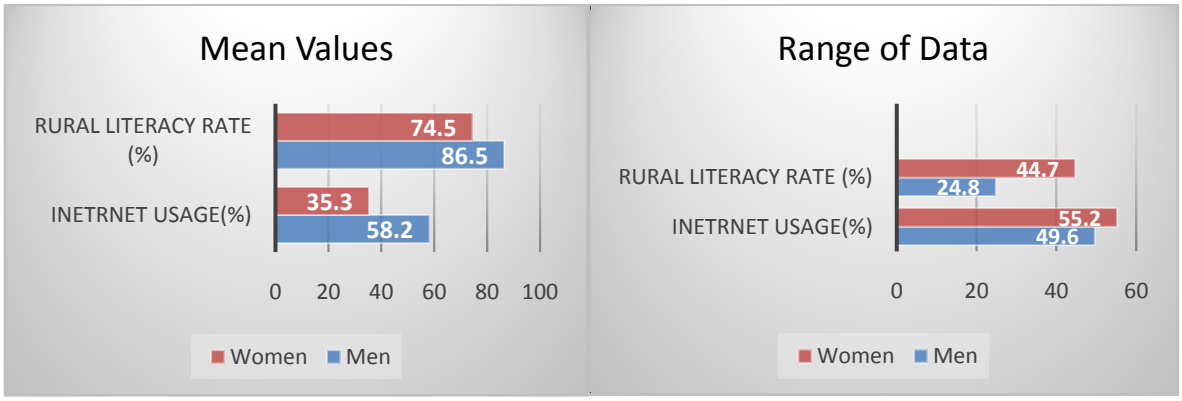
**c.** One Way Analysis of Variance (ANOVA) is calculated to observe the statistical difference in the means of literacy rates and internet usage categories respectively.

**d.** The results are tabulated and plotted as required.

## RESULTS AND DISCUSSIONS

The analysis has been initiated through descriptive statistics and the mean value of data for all categories is calculated. This is followed by the calculation of range of data for all categories to observe the differentials. As can be observed from Figure 2, mean internet usage among rural men is quite high than women using internet in these areas. Rural literacy rate is also higher among men.

**FIGURE 2. DESCRIPTIVE STATISTICS- MEAN AND RANGE**



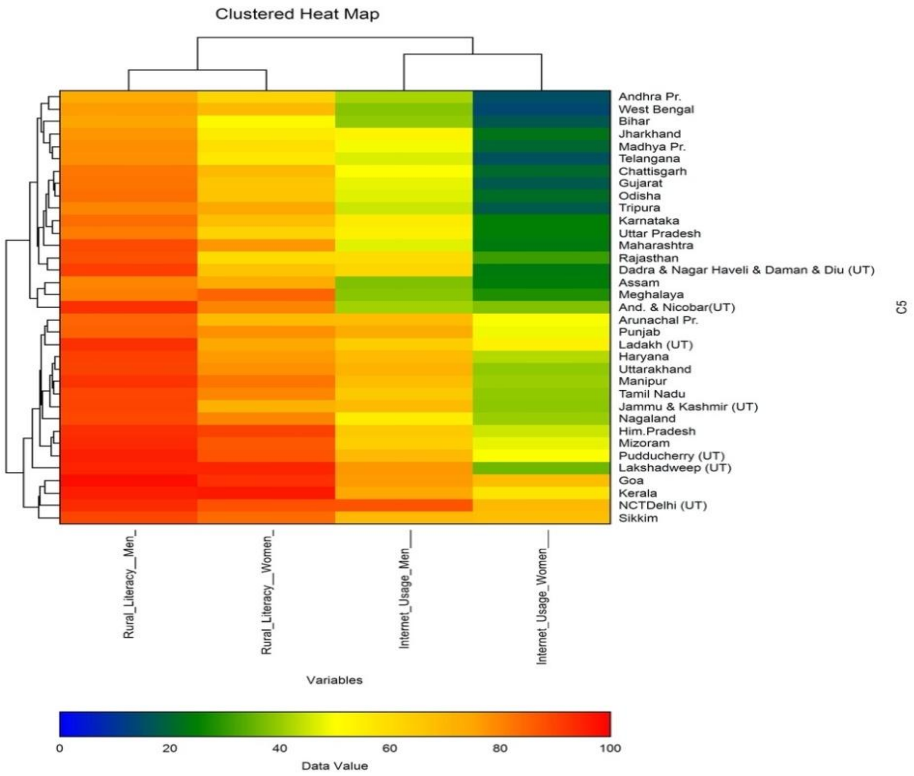

**Source- Author, 2022** (NFHS, 2021)

The data range also indicates that while there is a higher gap in rural literacy rate in women, there is also a higher gap in internet usage among women. However, for rural men, there is a comparatively lower gap in literacy range but a higher range in internet usage; even higher than rural women. The gap between the two parameters is more among rural men than rural women. This can be a probable indicator of internet usage availability and its geographic unavailability in rural areas.

This also highlights more variability among rural women in accessing the internet and also education. Thus, both access and availability of internet services and literacy are important

considerations in this regard. Extending the analysis to observe the correlation between internet usage and respective literacy rates at the geographic scale, Hierarchical Clustering using the Group Average method was attempted. This method yields clusters in which the distance between them is identified on the basis of average values of two clusters (Statistics.com, 2022) **[27].** Four clusters were targeted for creation and the observations are recorded in Figure 3.

**FIGURE 3. GEOGRAPHICAL ANALYSIS- CLUSTERING FOR RURAL INTERNET USAGE AND RURAL LITERACY RATES**



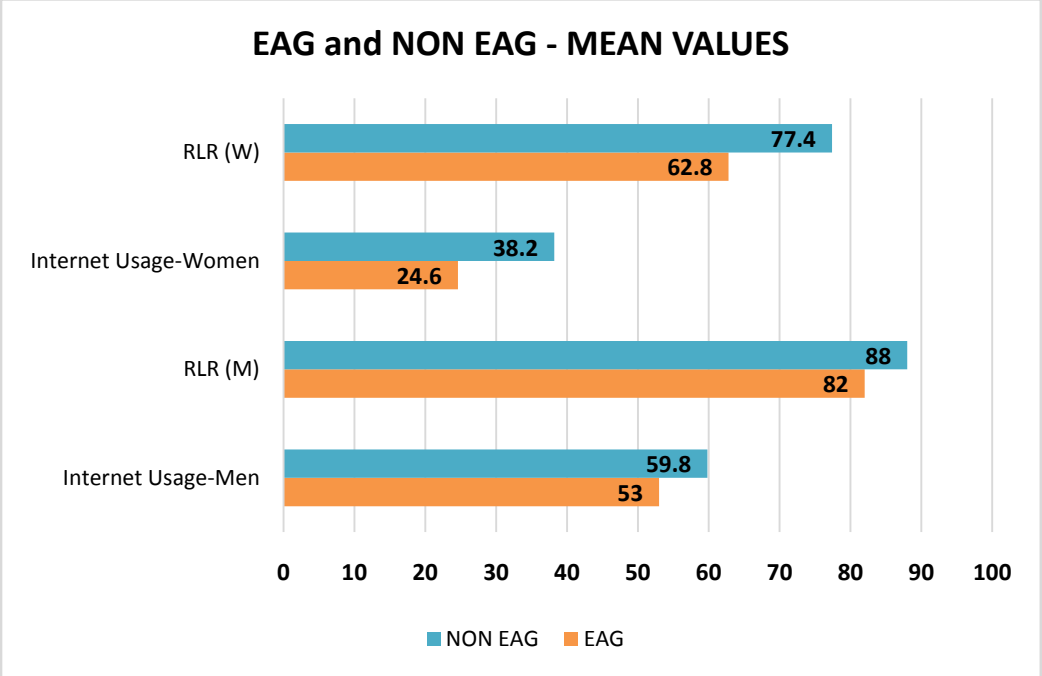

**Source- Author, 2022**

The dendrogam indicates that with a higher literacy levels in both men and women there is a higher internet usage. The state of Sikkim denotes the highest values in all categories, followed by NCT of Delhi. However, no clear geographic pattern is observed in this distribution.

However, high variance was observed for internet usage among both men and women in rural India at 176.9 and 260.6 respectively which is an indicator of more spreading of data from the mean (Good & Hardin, 2003) **[28].** It is also an indicator of more heterogeneity in the data which also indicates that there is quite a dissimilarity in the geographic spread of data. It can be forwarded that the availability of internet services is not uniform in nature in rural areas across the country. More variance has been observed for internet usage among rural women and also literacy rates among women. Extending this examination to the level of development and observations on literacy and internet usage, it is evident that while literacy rates are much higher for both categories of men and women, internet usage is much lower. This is a probable indicator of either unavailability or restricted availability of these services in these regions as well.

Besides, it can be forwarded that a regional patterning does not clearly exist for these categories. The details have been plotted in Figure 4.

**FIGURE 4. EAG AND NON EAG STATES AND UTs-DESCRIPTIVE STATISTICS**




**(Data is in %) Source- Author, 2022**

The rural literacy rate among adult women, RLR (W) and rural literacy rate among adult men, RLR (M) is lower than EAG states as compared to the Non EAG states and UTs. Similarly, internet usage is low in both the categories for EAG states which is an indicator of level of development and internet usage and literacy as well. Observations on correlation between literacy and internet usage have been attempted next respectively for both rural men and women categories through the Karl Pearson's Correlation Coefficient. Results indicate that in both cases there is a strong positive correlation between literacy and internet usage.

**TABLE 1.1. INTERNET USAGE AND RURAL LITERACY RATES (RLR) - EAG AND NON EAG STATES AND UTS**

| **EAG STATES** | | | | |
|---|---|---|---|---|
| | **Internet Usage Men (%)** | **RLR-M** | **Internet Usage Women(%)** | **RLR-W** |
| Bihar | 39.4 | 74.9 | 17 | 51.6 |
| Chattisgarh | 50.4 | 82 | 20.8 | 69.1 |
| Jharkhand | 53.2 | 77.4 | 22.7 | 55.6 |
| Madhya Pradesh | 49.3 | 78.7 | 20.1 | 59.2 |
| Odisha | 47.2 | 83.4 | 21.3 | 66.7 |
| Rajasthan | 59.4 | 88 | 30.8 | 59.9 |
| Uttar Pradesh | 54.2 | 81.2 | 24.5 | 62.4 |
| Uttarakhand | 71.2 | 90.1 | 39.4 | 78 |

**TABLE 1.2**

| **NON EAG STATES AND UTs** | | | | |
|---|---|---|---|---|
| | **Internet Usage Men(%)** | **RLR-M** | **Internet Usage Women(%)** | **RLR-W** |
| Andhra Pradesh | 41.5 | 73.2 | 15.4 | 62 |
| Arunachal Pradesh | 68.5 | 84.5 | 49.6 | 69 |
| Assam | 37.8 | 79.9 | 24.4 | 73.2 |
| Goa | 76.6 | 98 | 68.3 | 92.9 |
| Gujarat | 48 | 82.6 | 17.5 | 65.8 |
| Haryana | 68.8 | 90.6 | 42.8 | 76.7 |
| Himachal Pradesh | 65.1 | 93 | 45.2 | 90.2 |
| Karnataka | 55.6 | 83.6 | 24.8 | 67.7 |
| Kerala | 74.2 | 95.8 | 57.5 | 96.3 |
| Maharashtra | 47.2 | 88.6 | 23.7 | 76.9 |
| Manipur | 68.2 | 92.3 | 40.4 | 82.3 |
| Meghalaya | 38.5 | 80.9 | 28 | 84.9 |
| Mizoram | 63.9 | 94 | 48 | 87 |
| Nagaland | 55.2 | 89.3 | 40.3 | 79.8 |
| West Bengal | 38.3 | 76.2 | 14 | 69.2 |
| And. & Nicobar(UT) | 41.1 | 92.7 | 37.9 | 79.9 |
| Dadra & Nagar Haveli & Daman & Diu (UT) | 61.3 | 90.6 | 23.8 | 66.8 |
| NCTDelhi (UT) | 87.4 | 93.5 | 69.2 | 87.8 |
| Jammu & Kashmir (UT) | 68.8 | 89.9 | 38.9 | 71.6 |
| Ladakh (UT) | 64.3 | 92.8 | 54 | 74 |
| Lakshadweep (UT) | 77 | 94.5 | 36 | 94.6 |
| Pudducherry (UT) | 69.4 | 95.5 | 50.4 | 87.4 |
| Punjab | 73 | 85.5 | 48.8 | 78 |
| Sikkim | 69.5 | 89.4 | 68.1 | 83.8 |
| Tamil Nadu | 64.9 | 89.6 | 39.2 | 79.6 |
| Telangana | 46.7 | 78.4 | 15.8 | 56.6 |
| Tripura | 45.2 | 80 | 17.7 | 74.1 |

**Source- Compiled by Author, from NFHS- 5 ,** (NFHS, 2021)

**TABLE 2. KARL PEARSON'S CORRELATION COEFFICIENT**

| | Internet Usage Among Rural Men and Rural Literacy Rate Among Men | Internet Usage Among Rural Women and Rural Literacy Rate Among Women |
|---|---|---|
| | 0.76 | 0.72 |
| EAG States | 0.91 | 0.67 |
| Non EAG States and UTs | 0.74 | 0.64 |

**Source- Author, 2022**

Correlation analysis is also done for categories of EAG states and Non EAG states and UTs. Calculations indicate that in EAG states the value of Karl Pearson's correlation coefficient is very high at 0.91. However, for women in the same category, this value is comparatively lower at 0.67. For Non EAG states and UTs, positive correlation was observed in both the categories and was higher in rural men. Except the category of rural literacy rate and internet usage among men, all categories were with a similar range of correlation.

In EAG states, Uttarakhand has the highest percentage of internet usage with 71.2% and Bihar had the least percentage of internet usage among rural men at 74.9%. Odisha has the maximum range of literacy and internet usage for rural men. For rural women category, Uttarakhand has the highest rate of internet usage at 39.4% and literacy rate as well in both the categories for rural men at 74.9%. Bihar has the lowest rate in both categories for rural women. Bihar has the lowest internet usage among rural women at 17% and literacy at 51.6%. ANOVA analysis indicates that there is a statistical significance in the mean values of both the groups and that only chance cannot be attributed to this difference. It can be concluded that there does exist a significant correlation between literacy rates and internet usage among rural men and women.

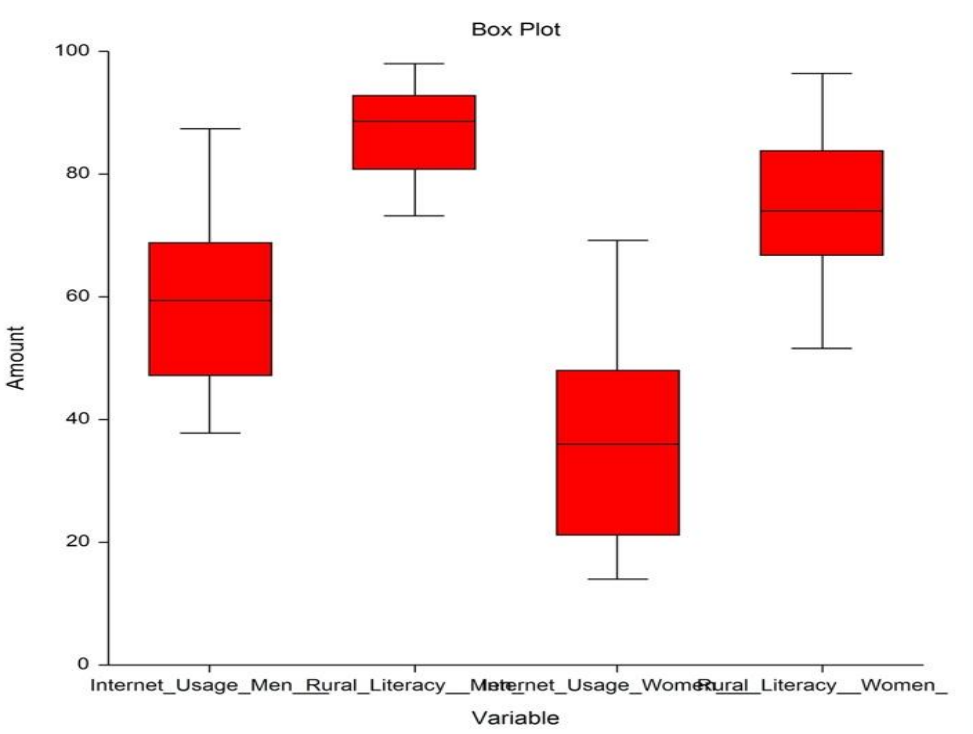
**TABLE 3. ANOVA TABLE AND F- TEST**

| F-Ratio | Probability Level | Reject Equal Means (alpha=0.05) |
|---|---|---|
| 42.2 | 0.00 | Yes |

**Source- Author, 2022**

More data is below the median value for both the categories as is visible in Figure 5. The box plot of internet usage among rural men is shorter that the box plot showing internet usage among rural women. This indicates that there is a statistically significant difference in the means of the groups. The long upper whiskers in both the cases there is more variation in the most positive quartile group. Similarly, rural literacy is higher among men but the range is higher in women than men.

**FIGURE 5. BOX PLOT ANALYSIS OF LITERCAY RATES AND INTERNET USAGE IN RURAL INDIA**




**(Data is in %) Source- Author, 2022**

This is an indicator of the differences in education level in women as compared to men. Outliers are also more in literacy among women Thus, it can be concluded that there is a clear difference between internet usage among rural men and women and literacy has a positive bearing on the usage in both the categories. More variations are observed for women which can be a probable indicator of accessibility constraints to the internet. Further, no clear geographic patterning is observed in this distribution.

**REFERENCES-**

**1.** Brunn SD. The Internet as 'the new world' of and for geography: speed, structures, volumes, humility and civility. Geo Journal, 1998;45(1): 5-15.

**2.** Dodge M. The Geographies of Cyberspace. Centre for Advanced Spatial Analysis working paper. May 1999. Retrieved 2022, from https://discovery.ucl.ac.uk/id/eprint/266/1/cyberspace.pdf

**3.** Robin J, Salamatian K. Envisioning Cyber-geography. Hérodote, 2014;152-153(1-2);123-139.

**4.** Kitchin R, Dodge M. Cybergeography. Retrieved 2022, from https://kitchin.org/wp-content/uploads/2019/04/Cybergeography-2008.pdf

**5.** James J. Mechanisms of access to the Internet in rural areas of developing countries. Telematics and Informatics, 2010; 27(4): 370-376.

**6.** India GO. (n.d.). National Family Health Survey, India. Retrieved 2022, from http://rchiips.org: http://rchiips.org/nfhs/about.shtml

**7.** WARC. Internet usage in rural India overtakes urban areas. May 2020. Retrieved 2022, from https://www.warc.com: https://www.warc.com/newsandopinion/news/internet-usage-in-rural-india-overtakes-urban-areas/43588

**8.** BussinessToday.In By 2025, there'll be more internet users in rural India than urban areas: report. June 2021. Retrieved 2022, from https://www.businesstoday.in/latest/economy-politics/story/by-2025-there-will-be-more-internet-users-in-rural-india-than-urban-areas-report-298066-2021-06-03

**9.** IANS. India's active Internet population to hit 900 million by 2025: Report June 2021. Retrieved 2022, from https://www.business-standard.com: https://www.business-standard.com/article/technology/india-s-active-internet-population-to-hit-900-million-by-2025-report-121060300444_1.html

**10.** Fallows D. How Women and Men Use the Internet. Dec 2005. Retrieved 2022, from https://www.pewresearch.org: https://www.pewresearch.org/internet/2005/12/28/how-women-and-men-use-the-internet/

**11.** OECD. Bridging the Digital Gender Divide. 2018. Retrieved 2022, from https://www.oecd.org: https://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf

**12.** ITU. Bridging the gender divide. July 2021. Retrieved 2022, from https://www.itu.int: https://www.itu.int/en/mediacentre/backgrounders/Pages/bridging-the-gender-divide.aspx

**13.** Ash J, Kitchin R, Leszczynski A. Digital turn, digital geographies? Progress in Human Geography, 2016;42(1).

**14.** Alibrandi M, Baker T. A Social History of GIS in Education, 1985-2007. In: Milson AJ, & Alibrandi M. (Eds). Digital Geography: Geospatial Technologies in the Social Studies Classroom. Charlotte: Information Age Publishing, Inc. 2008. pp. 3-38.

**15.** Owen J. Has the internet helped or hindered literacy skills? (2019, June). Retrieved 2022, from https://edtechnology.co.uk/: https://edtechnology.co.uk/comments/has-the-internet-helped-or-hindered-literacy-skills/

**16.** Dobler ES. Reading on the internet: The link between literacy and Technology. Journal of Adolescent & Adult Literacy, 2003;47(1):80-85.

**17.** Birru MS, Monaco VM, Charles L, Drew H, Njie V, Bierria T, Detlefsen E, Steinman RA. Internet usage by low-literacy adults seeking health information: an observational analysis. J Med Internet Res. 2004 Sep 3;6(3):e25.

**18.** Sinha MK. Internet literacy skills and internet usage patterns to access e-resources by Assam university library users: an evaluative study. (2012, January). Retrieved 2022, from https://www.researchgate.net/publication/264423472_Internet_literacy_skills_and_internet_usage_patterns_to_access_e-resources_by_Assam_university_library_users_an_evaluative_study

**19.** Van Deursen AA, van Djik JG. Modelling traditional literacy, internet skills and internet usage: An empirical study. Interacting With Computers. Oxford University Press, 2014.

**20.** Kim EM, Yang S. Internet literacy and digital natives' civic engagement: Internet skill literacy or Internet information literacy? Journal of Youth Studies, 2015;19(4): 438-456.

**21.** Zickuhr K, Madden M. Older adults and internet use (2012, June). Retrieved 2022, from https://www.sainetz.at/dokumente/studien/Older_adults_and_internet_use_2012.pdf

**22.** Van Deursen AJ, Helsper EJ. A nuanced understanding of Internet use and non-use among the elderly. European Journal of Communication, 2015; 30(2):171-187.

**23.** Morueta RT, Gomez JI, Gomez AH. The socio-demographic divide in Internet usage moderated by digital literacy support. Technology in Society, 2018;55: 47-55.

**24.** India OG. Census of India (2011). Provisional Population total. Retrieved 2022, from https://censusindia.gov.in: https://censusindia.gov.in/2011-prov-results/paper2/data_files/india/paper2_1.pdf

**25.** Home Affairs MO. (2011). Retrieved 2022, from https://censusindia.gov.in: https://censusindia.gov.in/2011-prov results/paper2vol2/data_files/Meghalaya/CHAPTER_IV.pdf.

**26.** NFHS. National Family Health Survey 2019-20. (2021). Retrieved 2021, from http://rchiips.org: http://rchiips.org/NFHS/NFHS5/pdf/NFHS%20data%20quality%20assurance.pdf

**27.** Statistics.com. Average Group Linkage (2022). Retrieved 2022, from https://www.statistics.com/glossary/average-group-linkage/

**28.** Good PI, Hardin JW. Common Errors in Statistics and How to Avoid Them. Wiley. 2003.