A study of the correlation between migration and marginalworkers in Delhi using Chi-square test

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Abstract

This research paper deals with the study of the correlation between migration and the number of marginal workers in Delhi districts of India. These numbers of marginal workers include both males and females of all the districts of Delhi. Migration of marginal workers also includes a total number of males and females. The data used is taken from the Census of India website of the year 2011 which includes nine districts ofDelhi. Using these data, the district-wise rate of migration and number of marginal workers is calculated. Also, the correlation between migration and marginal workers is calculated by using the chi-square test.

Keywords- Migration, Marginal workers, Chi-square test

Introduction

Migration is defined as the movement of persons from one place to another for any reason it can be work, education, or marriage. It is considered as one of the components of population change. There are certain aspects for the temporary movement/migration of people that have been explained.

The migration of males/females in search of a job is high in India. Migration can be seasonal or permanent. People migrate from one place to other places for work in a particular season and come back to their usual place after some months (3 or 4). All such workers are considered migrants. Similarly, if a person moved to any other place for attending short-term courses (vocational or educational) for a while then that too is considered as a migrant. The reason for migration has been determined as applicable at the time of migration and not at any point of time after that.

The migration movements are of three types:

(i)   Migration within the state itself with its components, it can be within the district, or from one district of the state to another district of state.
(ii) Migration in the country from one state to another.
(iii) Migration from one country to another country.

The first two types together called internal migration, while the last type of movement is called international migration.

Work can be described as the participation of a worker in any economically productive activity with or without compensation, wages, or profit. Physical or mental participation is possible in work. The work encompasses not just actual work but also requires good managing and directing the work. It even includes part-time work may be paid unpaid work on the farm field, or in any other economic activities such as household work, work on construction sites, etc. All persons engaged in any of the 'work' as defined as a worker. Workers are the people who work on cultivation activities at farm fields or herders or who produce milk for domestic consumption.

The period for determining a person as worker and non-worker is one year preceding the date of enumeration. A 'marginal worker' is someone who has worked in any economic activity for less than six months (i.e. during the one year before the date of enumeration). (DCHB, 2019) Thus, those workers who had not worked for six months (183 days) or more of the year (i.e. those who had worked for less than six months in a year) are termed as marginal workers.

Delhi is India's National Capital Territory, and it is a Union Territory. It lies in the Northwest part of India on the banks of the Yamuna River. This UT is bordered by Haryana state on the three sides and Uttar Pradesh on one side. Delhi is home to 21.6 percent of the country's population. Due to covid-19, there are 1.3 million migrants left in Delhi. (Yadav, 2021) and it consists of 16.4% of migration out of its total population (16,753,235). India has 8.7% of marginal workers out of which there are 5% of marginal workers in the union territory of Delhi. (Economic survey, 2018-19)

The chi-square test is a hypothesis testing designed to test for a relationship between dependent or independent variables statistically. In other words, this test tells us whether two variables are independent or dependent of one another. It is a series of distributions that varies in shape according to their degrees of freedom. The chi-square value obtained summaries the difference between the frequencies observed in a bivariate table and the frequencies we would expect to see if the two variables were unrelated.

Objectives

The objectives of this study are as follows:

1. To analyze the correlation between migration and marginal workers in Delhi.
2. To create a thematic map of migration and marginal workers in Delhi.
3. To examine the rate of migration and the number of marginal workers in the districts ofDelhi.

Hypothesis

1. There is no relation between marginal workers and migration.
2. The level of migration in the New Delhi district is maximum.
3. The number of marginal workers is minimum in the New Delhi district.

Database

The study is completely based on the secondary source of data. In this study, various references are used. Some of the websites used for referencing the study are Shodhganga, Academia, and Jstor. These are the websites where various research papers/ articles are published by various authors and hence they are used in the study. To study the correlation between migration and the number of workers data is collectedfrom the official sources of the Government of India. The data is collected through the portal of the Census of India. It includes all types of population and related data of the states and districts. The collection of data is specifically from the population enumeration data which includes all data of all the states. The Collected data includes all the districts of Delhi as of 2011.

Methodology

There are various methods used in this research paper to find the correlation. To research the objectives, methods, data, and literature review some of the websites are used. These websites include Shodhganga and Academia.

To draw the map of Delhi, the software is used named Arc GIS (Geographical Information System). It is software which allows handling and analyzing the geographic information by visualizing geographical statistics through layer-building maps. Using this software a political map is drawn which depicts the political boundaries of the district of Delhi.

Also, Microsoft office software is used. To draw the bar diagrams of migration and number of marginal workers in the Delhi districts Microsoft Excel is used and to draw

the tables Microsoft PowerPoint is used. This software helps in making all types of charts, graphs, diagrams, and tables.

At last, the chi-square test is used to find out the correlation between Migration and the marginal workers. It is a test that measures which correlation is found out by calculating the difference between the expected and the observed value. It is represented by x2 and its formula is:

$$x^2 = \Sigma \ \frac{(Oi - Ei)^2}{Ei}$$

Where x2= Chi Square; Oi= Observed Value; Ei= Expected value

In this method, expected values are calculated first using observed values. After calculating the expected values further calculations are done and all the required values are put in the formula to find the final value. Thus, this final value of x^2 is compared with the table value at the significance of 0.05% and if the table value is greater than the calculated value, then it fails to reject the null hypothesis.

Study area

Physical Features of Delhi

Delhi has been divided into nine districts (refer to map-1). The latitudinal extension is and longitudinal extension are 28° 25' to 28° 53' north and 76° 50' to 77° 22' east. Delhi has an area of 1483 sq. Km and it is situated between the Himalayas and Aravalli ranges. It is surrounded by two States on North West and South by Haryana and in the East by Uttar Pradesh across the river Yamuna. The horizontal and vertical distances of Delhi are 48km and 53km. The altitude range of Delhi is between 213 – 305m above sea level. The slope of Delhi is from north to south. A major part of Delhi is plain and is most fertile for agricultural activities.
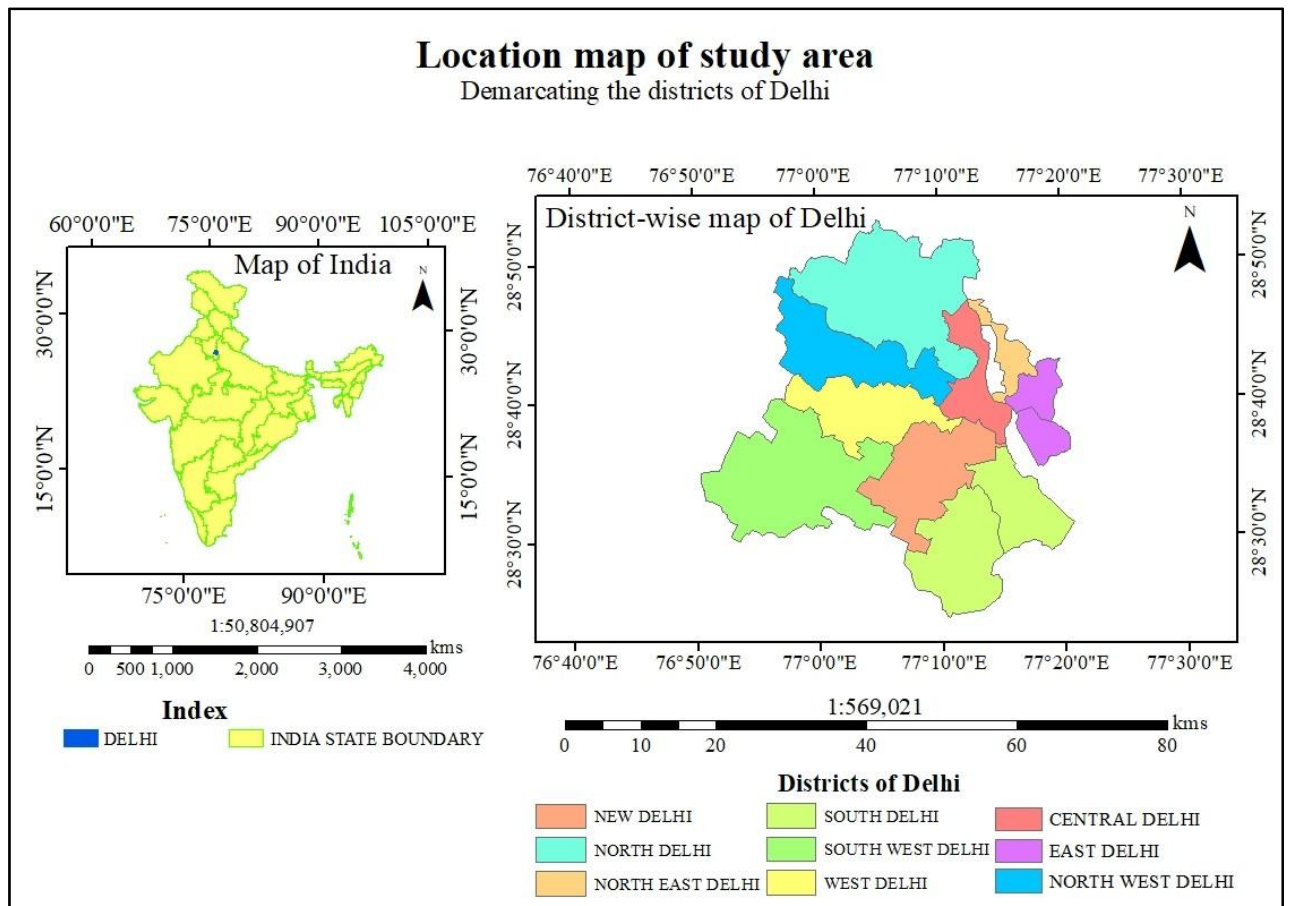
Map-1

Climate

The climatic condition of Delhi is hot and humid during most of the months of the year.It is mainly influenced by its geographical location and the air prevailing over most of the year around the globe. The mean daily temperature varies from a minimum of 8.9° C in January (winter) to 40.9° C in May (summer). The winter season starts in late November and extends up to March followed by the summer season which lasts till June. After that monsoon season starts in June and continues up to the end of September. The average annual rainfall of Delhi is 617mm and about 75% of rainfall occurs during the monsoon season.

Forest

The area covered under forest is 176.20 sq. km which is very low as compared to the total area of Delhi. The greater portion of the reserved forest of Delhi is located in New Delhi ridge (opposite Rashtrapati Bhawan at the backside of Birla Mandir). The

permanent vegetation of this area is mostly comprised of tree species (thorny type of trees), and a few shrub species.

Soil

The soils of Delhi are generally of moderate fertility. The soil formation is influenced by the river Yamuna, the ridge, and the south-westerly winds. The clay content generally varies from place to place and salinity is a great problem in the soil of the territory. The structure is mainly grained or weakly developed granular. They are sandy loamy in texture and they become slightly heavier with depth. The southern part of Delhi is formed of quartzite or sandstone and the alluvium brought by small streams.

Agriculture

The important crops grown in Delhi according to the year 2011-2012 are given in the following table (Table-1) are:

Crop	Production (metric ton)
Wheat	82142
Jowar	30328
Paddy	30297
Bajra	2689
Maize	834
Table-1	

Irrigation

The sources of irrigation in Delhi are Wells, Tube Wells, and Canals. The area irrigated by wells/tube wells was 19561 hectares, the area irrigated by canals was 2225 hectares and 980 hectares area was irrigated by other sources. The net irrigated area according to the year 2011-2012 was 22766 hectares.

Discussion

The important variables used in this research paper for calculating the correlation are the rate of migration and the number of marginal workers in different districts of Delhi. The Chi-square test is used to calculate the correlation between migration and marginal workers.

Migration can be described as the movement of people both male and female to another place for any reason. This movement can be within the districts, within the states, or the

country, or to another country. And it can be done because of work, job opportunities, marriage, education, and so on. The data on the rate of migration and the number of marginal workers in each district of Delhi can be given in the table below (Table-2). The South district (35132) has the highest migration rate, while New Delhi has the lowest (2357). The minimum number of marginal workers is also seen in New Delhi (2534) while the maximum is in the South district of Delhi (47371).
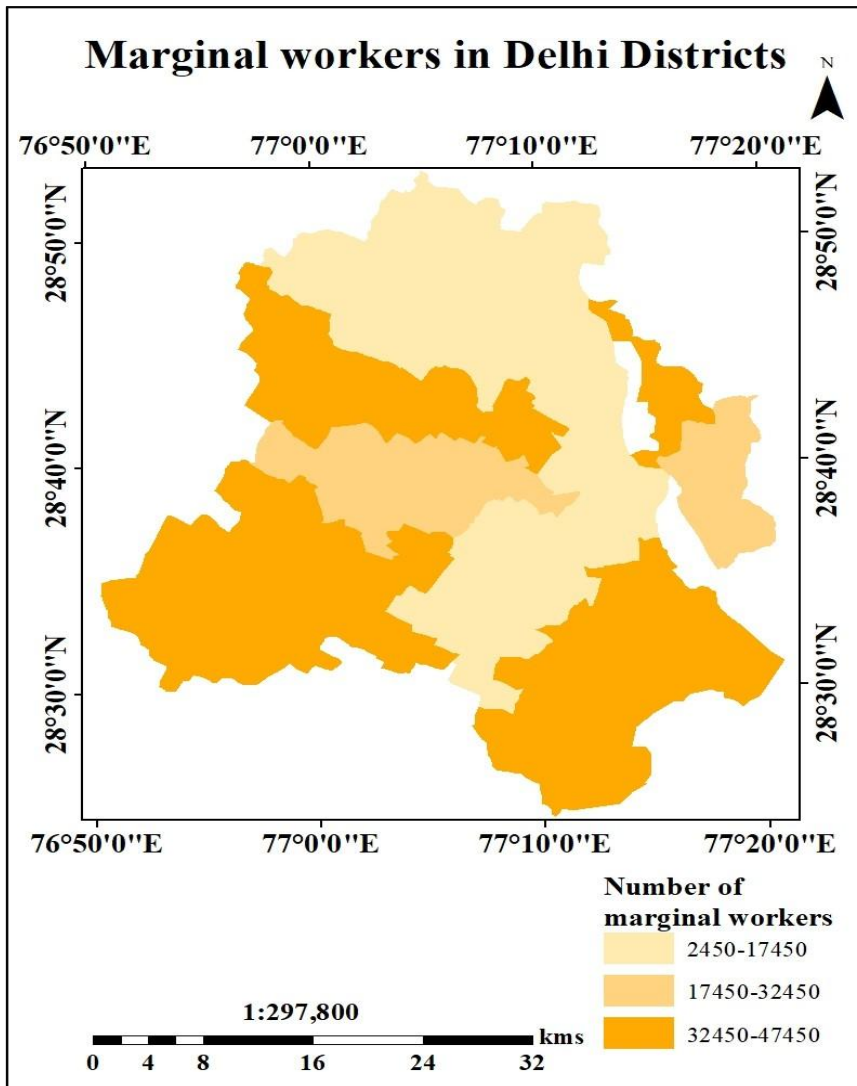
Districts	Migration	Number of Marginal workers
North West	30,971	43401
North	6,195	10420
North East	21,052	33082
East	13,573	21006
New Delhi	2,357	2534
Central	3,280	9938
West	18,702	28535
South West	29,024	38963
South	35,132	47371
Lowest Value		Highest Value
Table-2		

Map-2 illustrates the rate of migration in the districts of Delhi. In Map-2 the districts are divided into three categories based on the number of migrants. 2300-13300 represents the smallest number of migrants, 13300-24300 represents moderate, and 24300-35300 represents the maximum number of migrants. Map-2 has three shades of blue that are according to the rate of migration in each district of Delhi.
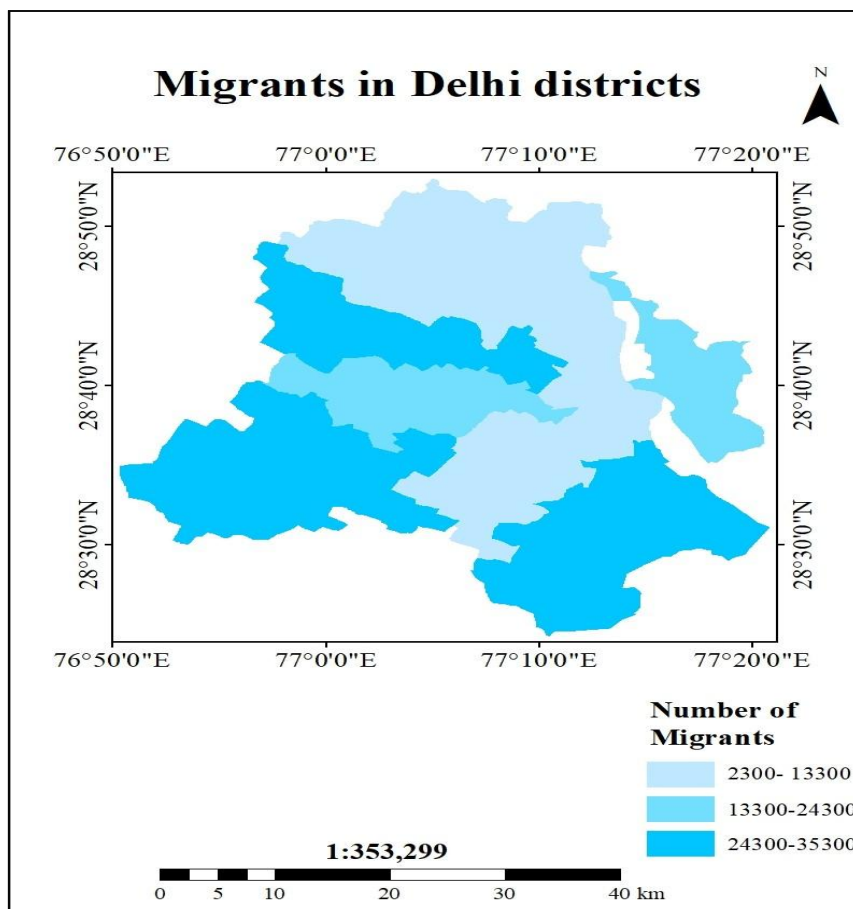

Map-2

The number of marginal workers in Delhi's districts is shown in Map-3. The districts on map-3 are categorized into three groups based on the number of marginal workers. The least amount of marginal workers seems to be between 2450-17450, the moderate number of marginal workers lies around 17450-32450, and the highest group of marginal workers lies between 32450-47450. The three tints of orange on Map-3 show the number of marginal workers in each Delhi district.

Map-3

Since a bar graph is a great way to compare data, it is also made to compare the rate of migration and the number of marginal workers in different Delhi districts. The bar graph has two colored bars where light blue represents the marginal workers while dark blue represents the migration data. On the y axis, the statement scale represents 5,000 people in each division. It clearly shows that the New Delhi district has the fewest migrants and marginal workers, whereas the South district has the most.
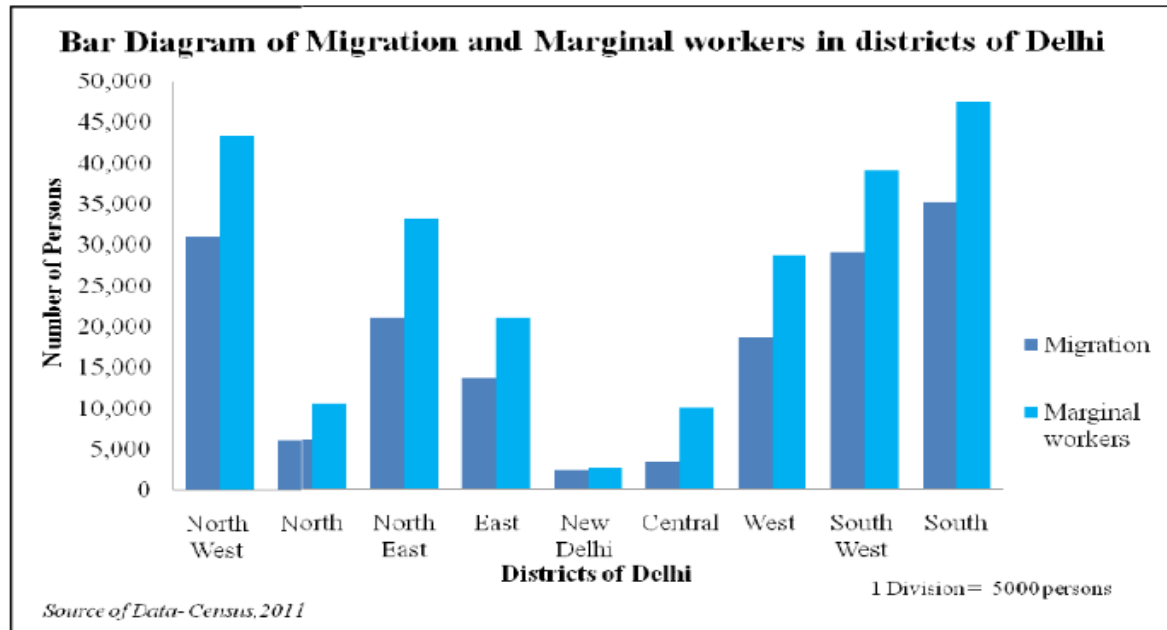
Diagram-1
Conclusion

The first objective was to look into the correlation between migration and marginal workers in Delhi. The first hypothesis was tested using the chi-square test, which gave a calculated value of 479317.6 and a table value of 15.507 at the 5% significance level, which is less than the calculated value. As a result, the hypothesis is rejected, whereas the alternative hypothesis is accepted. As a result, it's reasonable to conclude that migration and the number of marginal workers are correlated.

The second objective is to draw a thematic map of migration and marginal workers in Delhi, with the hypothesis that the New Delhi district has the highest level of migration. The thematic maps of migration and the number of marginal workers are drawn (Map-2 and Map-3). To test the hypothesis, Table2 is used, which shows the rate of migration in each district of Delhi. Thus, it can be concluded that the hypothesis has been rejected because the New Delhi district does not have the highest level of migration, however, the South Delhi district (35,132) does.

The third objective was to examine the rate of migration and the number of marginal workers in the various districts of Delhi, with the hypothesis that the number of marginal workers in the New Delhi district is the lowest. The pace of migration in Delhi is increasing day by day, according to the data given in Table-2. The map of marginal workers in Delhi (Map-3) illustrates that New Delhi has the lowest number of marginal workers, whereas the South district of Delhi (47371) has the highest number of marginal workers. Also observable in Map-3 is the fact that the New Delhi district falls into the low categories. The total number of marginal workers in this district is 2534, which is the lowest of all the Delhi districts. As a result, the hypothesis can be considered acceptable.

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