Analysis of the Demographic Change in India from 1952 to 2020

Leonard Umoru, Dhruva Dadhaniya, Wamungu François Bizimana, Marieme Ba,
BISI
Algonquin College
Ottawa, Canada

***Abstract*—This research assesses India's population development from 1952 to 2020, highlighting trends in growth, gender distribution, age structure, migration, and mortality rates. Based on data from the"WPP2022_Demographic_Indicators" dataset, the analysis shows the historical changes and creates pathways for sustainable development. Some other findings are persistent gender imbalance, the aging population, and improved life expectancy, providing recommendations to meet these challenges successfully.**

Keywords—Demographics, India, Population Growth, Gender Balance, Aging Population, Migration Trends, Mortality Rates.

I. INTRODUCTION

The study examines the demographic trend of India from 1952 to 2020, focusing attention on changes in population size, gender ratios, age distribution, death rates, and migration trends. In addition to providing insights into how this change has influenced the evolution of India, the historical analysis will identify such challenges as population growth, gender imbalance, and aging population. Addressing these very challenges will be crucial to achieving sustainable development and improving resource allocation, urbanization strategy, and social equity. It's intended that the findings will help inform both policymakers and stakeholders as they gain an understanding of India and its changing demographic dynamics.

A. Background

From 1952 to 2020, great changes have been encountered in terms of the Indian population due to industrialization, improving health care, and also urbanization. Such developments have created avenues for economy expansion while posing challenges such as resource management, urban congestion, and social inequalities. It is through understanding the dynamics of population growth, gender balance, and aging demographic that policies for sustainable development would be fashioned.

B. Existing System

India's demographic data are usually monitored and analyzed by government and international organizations, including the United Nations and Census of India. Current systems rely on data from the World Population Prospects (WPP) for maintaining indicators like population size, sex ratio, and death rate. However, these systems are limited by their scope in analyzing historical trends and focusing on future consequences. These complexities of demographic transition definitely warrant integrated and interactive tools for efficient policy-making.

C. Related Studies

Numerous studies have reviewed the demographic trends in India. Previous research focuses on aspects of rapid population rise from the 1970s onward, advancement of healthcare in reference to diminishing mortality rates, the mutation in life expectancy, and age distribution. Studies have also highlighted ever-steadfast sex selectivity, contributing to cultural and social norms. According to migration studies, internal migration has increased, albeit not to a sufficient extent for it to influence the overall population growth. Drawing on these studies, the project fuses the historical analysis with interactive visualizations to extract additional insights.

II. ANALYSIS AND METHODOLOY

A. Methodology

1) Dataset: The study employed the "WPP2022_Demographic_Indicators" dataset from Kaggle, which includes demographic data such as population size, age distribution, gender ratios, mortality rates, and migration trends from 1952 to 2020.

2) Tools Used:

a) Python: Used for data cleaning, manipulation, and statistical exploration (libraries: pandas, seaborn).

b) Power BI: Utilized for creating interactive visualizations and dashboards.

3) Data Preparation: The dataset was refined by extracting relevant features such as population growth, median age, mortality rates, and migration trends. The records were filtered to focus on India between 1952 and 2020, aligning with the project's objectives. This streamlined dataset enabled a focused analysis of key demographic indicators and historical trends.

B. *Analysis*

1) *Population Growth*

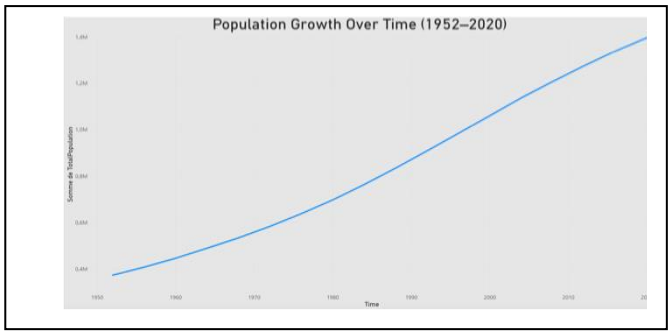

Fig. 1. Population growth Over Time (1952-2020).

a) Insight: Rapid growth post-1970, highlighting demographic expansion.

b) Findings: Accelerated growth since 1970 reflects urbanization and development.

2) *Age Distribution*

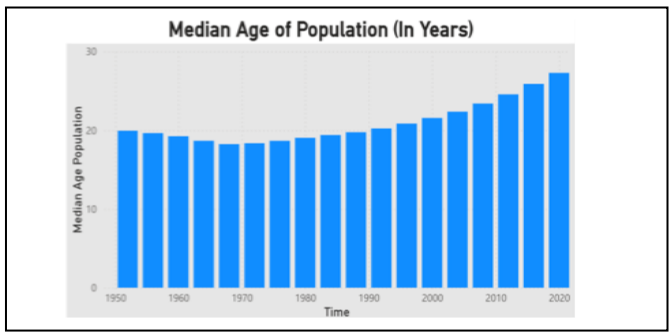

Fig. 2. Median Age of Population.

a) Insight: Rising median age reflects an aging population.

b) Findings: Aging population suggests declining birth rates and better life expectancy.

3) *Gender Ratio*

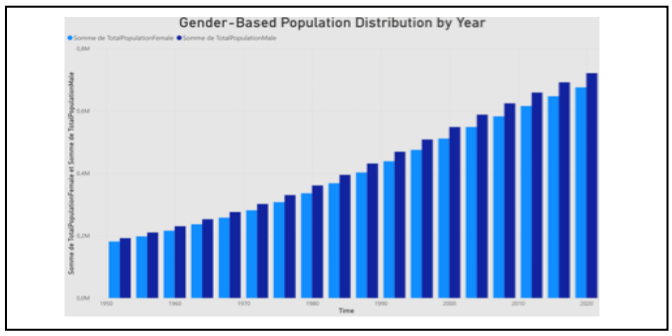

Fig. 3. Gender Based Population distribution.

a) Insight: Persistent male-dominant population ratio.

b) Findings: Aging population suggests declining birth rates and better life expectancy.

4) *Mortality Rates*

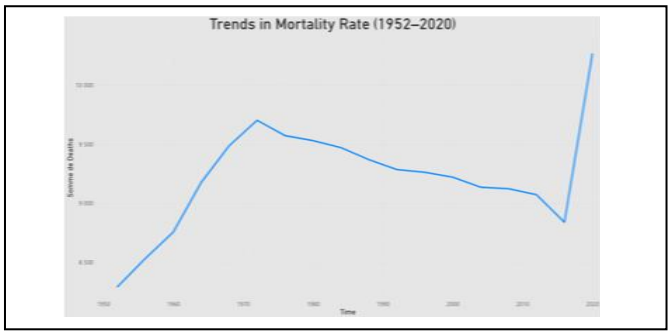

Fig. 4. Mortality Rate.

a) Insight: Steady decline over decades, with a spike in 2020 due to health crises.

b) Findings: Improvement in healthcare shown by declining rates.

5) *Migration Trends*

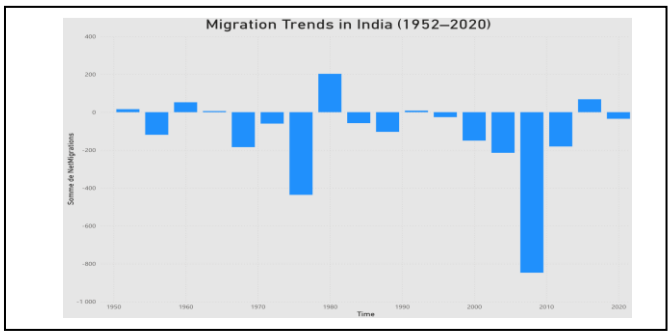

Fig. 5. Migration Trends.

a) Insight: Increased net migration during the late 20th century.

b) Findings: Significant net migration rise in late 20th century.

III. Conclusion & Recommendations

India's demographic changes present both challenges and opportunities. Addressing gender imbalances requires enhanced social programs to promote equality. Robust healthcare policies and retirement systems are crucial for managing an aging population. Sustainable urban planning can accommodate growth while minimizing environmental impact. Additionally, investments in healthcare infrastructure and preparedness for future crises will ensure long-term resilience.

References

[1] D Kaggle. (2022). *WPP2022 demographic indicators*. Retrieved from https://www.kaggle.com/datasets/abmsayem/wpp2022-demographic-indicators?select=WPP2022_Demographic_Indicators.csv