ISSN 0024-5623

# Local Government Quarterly

**April - June 2024**

*A Journal of the*
***All India Institute of Local Self-Government***

## About All India Institute of Local Self-Government (AIILSG)

All India Institute of Local Self-Government (AIILSG), established in 1926 has been actively working in the field of urban development management and is a diligent partner in promoting the cause of local governance in India and overseas.

The Institute has been the steadfast friend, philosopher and guide to Urban Local Bodies (ULBs) across the Country. For more than eight decades it has contributed to the principles and practice of urban governance, education, research and capacity building. It has designed and developed a vast array of training literature and courses and trained more than 1.5 million stakeholders in diverse areas of urban governance and urban services delivery.

These activities of the AIILSG are practiced through 30 regional centres located in different regions of the Country. The Institute anchors the Regional Centre for Urban and Environmental Studies (RCUES) of the Ministry of Urban Development, Government of India for Western India region. This Centre is actively involved in building capabilities of municipal officials, staff and elected members from the States of Goa, Gujarat, Maharashtra, Rajasthan and the Union Territories of Diu, Daman, and Dadra & Nagar Haveli by upgrading their knowledge and skills required for effective administration and implementation of various urban development programmes.

With a view to cater to the growing requirement of ULBs in regard to services, the AIILSG runs specialized capacity building institutions such as the National Fire Academy, the Nrupur Institute of Nursing Science and Research and the Centre for Environment & Disaster Management at Vadodara, PRUDA at Ahmedabad, National Resource Centre for Urban Poverty, International Centre of EQUI-T, the Disaster Management Cell and the Centre of GIS at Pune. It runs the Solid Waste Management Cell of the Government of Maharashtra. In recent years, AIILSG has ventured into rural and tribal capacity building and hand holding of rural institutions of self-governance.

In addition to the domestic activities, the Institute organises several tailor-made capacity building programmes for various countries in South Asia, viz, Bangladesh, Nepal, Sri Lanka and in other regions, including South Africa, Ethiopia, Indonesia, Malaysia, China, etc. The Institute has linkages with renowned international organizations including UNCHS (Habitat), UNDP, UNICEF, UNFPA, WHO, DFID, CITYNET, CLGF, US-AEP and the Ford Foundation. It is the anchor institution for Urban Management Programme (UMP-UNCHS-Habitat) for South Asia.

Vol : XCIV, No. 2 April - June, 2024

## Contents



**Local Government Quarterly**
Published by the
**All India Institute of Local Self-Government**

**All India Institute of Local Self-Government**
M. N. Roy Human Development Campus, Plot No.6, 'F' Block,
TPS Road No.12, Bandra (E), Mumbai – 400051.
Tel : +91 86576 22550 / 51 / 52 / 54
E-mail : dg@aiilsg.org Website : www.aiilsg.org



# Local Government Quarterly





*Printed by Dr. Jairaj Phatak I.A.S. (Retd.), The Director General, All India Institute of Local Self-Government, at Copytronics, Bandra (E), Mumbai - 400 051 and published by him at the All India Institute of Local Self-Government, 11, Horniman Circle, Mumbai - 400 023.*

## *Editorial*

**Population and gender justice**

Rapidly growing population across the globe, especially in the less-developed countries presents significant all round challenges from putting pressure on natural resources including food, impacting the environment adversely, creating water stress in large parts of the world, affecting public health outcomes, and so much more. These impact the well-being of all; but hurt the more vulnerable sections of the population like the poor, women and children in a disproportionate way. This subject of population therefore requires much attention and appropriate action by policy makers and civil society everywhere.

July 11 is observed as **World Population Day** to highlight and create awareness on issues related to population. World Population Day was instituted by the Governing Council of the United Nations Development Programme (UNDP) in 1989. Thereafter it has been celebrated annually for over three decades now. Interestingly this step was encouraged by the 'Five Billion Day' on July 11, 1987, the approximate date when the global population reached 5 billion. Population and its accelerated growth is closely linked with public health, poverty, gender equality, education, livelihoods, and the general well-being of human, animal, plant, and marine life on earth. The environment is being impacted in a major way due to the rising global population and its seemingly insatiable demands upon nature. Global warming, ocean degradation, deforestation, and air pollution are some dimensions of the impacts on the environment. Populations are rising in spite of falling fertility rates; because people are living longer in all parts of the world. Another dimension of the issue in India is the age profile. While most of the advanced world has an ageing population, India's population is very young with a median age of 28.2 years. What's more, 50% of the population is below 25; and 65% below 35. The big challenge is to productively deploy so many hands and minds, while the positive is a huge working (providing) population rather than an ageing (dependent) one.

Women and girls are at the centre of this phenomenon of overpopulation. These are the segments which are, mostly unwillingly, becoming the agents of delivering population growth; yet women and girls are also the victims of overpopulation and bear the huge burden of early and frequent childbirth. Expanding population brings to the fore the extreme hardships and health issues faced by women – related to pregnancy and childbirth. The related issues are those of exacerbated poverty, inadequate food, poor nutrition, domestic disharmony and violence, child abuse, etc. Gender inequality is at the core of the injustice to women and girls. They are usually ignored while making decisions about family planning within the home. They thus have little or no control over factors that impact their reproductive health. This sadly keeps girls and women out of school, out of the workforce and away from positions of responsibility and leadership in the community. This in turn enhances their vulnerabilities and exposes them to health issues with data suggesting that a woman dies every two minutes due to pregnancy or childbirth. All this must change.

Girls must get an equal opportunity on par with boys to education at all stages. The school drop-out among girls paints a dim picture. As soon as the girl child is grown up enough to assist in domestic chores she is made to drop out of school/college and turn towards home duties. Thereafter she may be married off soon too, and then domestic life starts in another setting. Thereby all opportunities are snatched out of her hands and she is deprived of her future. All this after we have seen, year after year, that girls outshine boys in the annual board examinations of Class X and Class XII, and elsewhere. Those that get past these hurdles and pursue higher studies have excelled in competitive public examinations, sports, and science & technology courses; in short, everywhere. Another social ill faced in many parts of the world is the persisting preference for a male child. This leads to increased child births and unwanted pregnancies. While this is changing for the better in many parts of the world, we believe that such reformist thinking has largely eluded the less developed world due to lingering old social biases.

Governments are doing their bit. For example, many social sector and poverty alleviation programmes direct the grants and aids towards the female head/member of the household. This will help empower women financially. Reservations for women in village panchayats, and some legislative assemblies will enable broad base the legislative framework and provide women with the opportunity to occupy positions of responsibility. We can then expect the legislative agenda to truly reflect the concerns of women and thereby to enable a more just, fair, and sustainable future.

Population control is a crying need as we have seen above to ensure a more sustainable future and to ensure the well-being of coming generations. Gender justice is a theme closely related to the challenge of population growth in the developing world. World Population Day is an annual opportunity to bring greater focus and commitment by all to this theme. We must use the 2024 edition effectively. The following words of the UN Secretary General can serve to guide our actions: *"Gender-based discrimination harms everyone – women, girls, men, and boys. Investing in women uplifts all people, communities, and countries."*

❐ ❐ ❐

# Population Characteristics, Climate Vulnerability and Resilience Measures: Top 10 Populous World Countries

**Manjamuthu Viruthambal Vaithilingam**

**Abstract**

This paper focuses on population characteristics, climate vulnerability, and resilience in the top 10 populated countries in the world using the data from the Population Reference Bureau's World Population Data Sheet 2023. The basic results obtained from the bi-variate analysis reveal that the world population was 8,009 million in 2023, which is to reach 8,901 million in 2035 and 9,796 million in 2050. India tops among the world countries with a population of 1,429 million, and China, the USA, Indonesia, Pakistan, Nigeria, Brazil, Bangladesh, Russia and Mexico occupy the subsequent 9 positions. Among the regions, more developed, high income, Europe, and East Asia regions, found to be desirable in most of the indicators, as compared to the least developed, low income, Africa, and South Asia regions. The countries such as the United States, China, Russia, Mexico found to be desirable and countries such as Nigeria, Pakistan, India, Bangladesh, Indonesia and Brazil undesirable. The reasons for the regions and countries with undesirable population characteristics, climate vulnerability and resilience are many such as higher in natural increase of the population, fertility and mortality rates, percentage of child population, percentage of the total population estimated to be experiencing difficulties in obtaining sufficient, safe, and nutritious food for healthy living; and lower in percentage of women who use family planning- all methods and modern methods, GNI per capita, expectation of life at birth, percentage of elderly population, and percentage of currently married or in union women of reproductive age who are currently using any form of contraception. Such regions and countries require integrated, innovative and multifaceted pragmatic approach, including improvements in gender and economic equality through education, employment, healthcare, and sustainable development through

population-environment equilibrium with the help of implementation of the proven existing family welfare policies and programmes and introducing new ones.

**Keywords:** Characteristics, climate, population, resilience, vulnerability, etc.

## 1.0 Introduction

The study of population characteristics and their effect on various socio-economic, cultural, health, developmental, and environmental aspects of humanity, keeps attracting the attention of experts and organizations in various disciplines locally, nationally, and internationally. Population stabilization and a sustainable environment are the two-fold important components that receive prominent attention from most of the experts in human development. Growing population changing characteristics imply adversely on the physical environment, especially climate, which subsequently affects the socio-economic and health conditions of human life. Most of the world's countries strive against the adverse effects of population growth and climate change with all possible efforts and measures through various government and voluntary organizations both nationally and globally. There have been many studies on climate change, but very few studies have focused on climate vulnerability and resilience measures resulting from growing populations and changing population characteristics. Considering these observations, this paper focuses on population characteristics, climate vulnerability, and resilience in the top 10 populated countries in the world using the data from the Population Reference Bureau's World Population Data Sheet 2023.

## 2.0 Literature review

There have been some studies on population characteristics, climate vulnerability and resilience in various countries of the world. But, the comparative studies of various groups like top 10 populous countries, economic and geographic regions, and sub-regions are very rare.

Population characteristics include vital statistics, and socio-economic characteristics such as age, gender, caste, religion, education, marriage, occupation, employment, residence, etc. Demography, statistical study of human populations, especially with reference to size and density, distribution, and vital statistics such as births, marriages, deaths, etc. (Encyclopedia Britannica). Climate change vulnerability is defined as the "propensity or predisposition to be adversely affected" by climate change. It can apply to humans but also to natural systems (ecosystems), and both are interdependent. Vulnerability is a component of climate risk.

Vulnerability will be higher if the capacity to cope and adapt is low (IPCC, 2022). Resilience is the ability to cope with and recover from setbacks. People who remain calm in the face of disaster have resilience. A resilient person is someone who has strong coping skills and is able to marshal one's available resources, ask for help when needed, and find ways to manage the situation one is facing (Cherry, 2023). Resilience measurement frameworks are scales that report resilience according to a particular definition of what resilience is. Resilience measurements vary in scope, in target demographic, and in their conceptual understanding of resilience (Erieau, 2021).

The links between population growth and climate vulnerability are visible around the world. In Pakistan, population pressures have led to land clearing, which exacerbates flooding at the same time that more people have been crowded into flood-prone areas (O'Sullivan, 2013). In Afghanistan, multi-year droughts have compounded the ongoing stresses of conflict and economic collapse, forcing millions of people from their homes (Sayed and Sadat, 2022). Low levels of education, gender inequality, and a significant unmet need for family planning information and services together lead to high levels of unplanned pregnancies. Globally, close to half of pregnancies are unintended (Baker, et. al., 2022). In low- and middle-income countries alone, some 218 million women want to avoid pregnancy but are not using any form of modern contraceptives (Sully, et al. 2020). Around the globe, climate change is increasing the variability of precipitation patterns, making water management more difficult (Tabari, 2020). High population growth rates compound the challenge as they shrink water supplies available per person. Water withdrawals from rivers and underground sources can outpace natural replenishment. Currently, people in 25 countries, totaling a quarter of the world's population, live with extremely high-water stress. Many are in the Middle East and North Africa, where annual average population growth of 1.5% is nearly double the global average rate of 0.8% (World Resources Institute, 2023). While a warmer world will experience more water scarcity in some regions, flooding is also a threat, both inland and along coastlines, which also face rising sea levels and increased storm surge. Many of the world's floodplains and coastlines are densely populated. Low-elevation coastal zones represent 2% of the world's land area but contain well over 10% of the world's population (Neumann, et. al., 2015). Of the world's 31 megacities, 21 are along a coastline, and migration to the coasts is increasing (Daigle and Singh, 2018). As coastal and riverine populations grow, more people are at risk (Guzmán, 2009). The World Resources Institute projects that the

number of people affected by flooding will double between 2010 and 2030 (Kuzma and Luo, 2020).

Sub-Saharan Africa is expected to double in population by 2050—accounting for half the world's population growth (United Nations, 2023). The region is home to many of the countries most threatened by the impacts of climate change. People in Niger, the Democratic Republic of the Congo, Mali, Somalia, and Chad are among those facing more frequent droughts, severe floods, extreme heat, and soil erosion, all amidst rapidly growing populations (ND-GAIN, 2022). In Malawi, where 95% of agriculture is rainfed, severe droughts and floods hamper food production. Climate change is expected to deliver more extreme weather events there, including both flooding and droughts (World Bank, 2021). An extreme example can be found in sub-Saharan Africa's Sahel region, where tens of millions of people already face food insecurity (World Food Program, 2023). The Sahel population grew from 31 million in 1950 to 100 million in 2013. Projections show it reaching 300 million by 2050 and more than 600 million by 2100. Scientists project a temperature increase of 3–5°C by mid-century and by as much as 8°C by 2100 (Potts, M., et al., 2013). Temperatures in the Sahel are rising 1.5 times faster than the global average. As a result, increasingly frequent droughts and floods threaten to further impair food production in a region where over 80% of farmland is already degraded and growing populations are shrinking the pastureland available to each family (Muggah and Cabrera, 2019). Hundreds of millions of people could lack sustainable food supplies in future decades.

In India, the world's most populous country, water shortages pose a significant threat to the country's 1.4 billion inhabitants. India encompasses nearly 18% of the global population but holds less than 4% of the world's freshwater resources. Agriculture in the densely populated country is heavily dependent on irrigation; however, rivers have been diverted and wells have been overdrawn to meet the food and water needs of the growing population. Groundwater depletion or contamination affects more than half of Indian districts, and underground water levels are falling by between 1-3 meters a year in key food producing states (Arcanjo, 2019). As climate change alters the patterns of the monsoon rains and the frequency of droughts, tens of millions of people could be forced to migrate in search of fresh water (Temple, 2019).

**3.0 Objectives:**

This paper has the major objectives such as: (1) to understand the population characteristics of the world

economic and geographic regions, Asian regions, and top ten world populous countries in 2023; and (2) to examine the nature and level of climate vulnerability and resilience measures in the respective regions and countries.

**4.0 Data and Method:**

The data for this study has been collected from the Population Reference Bureau 2023 World Population Data Sheet. The relevant variables on population characteristics, climate vulnerability and resilience measures were used. The data has been analyzed and interpreted with the help bivariate tables and figures.

**5.0 Results and Discussion:**

The results obtained from the data have been analyzed and interpreted under population characteristics and climate vulnerability and resilience measures.

**5.1 Population Characteristics**

Population growth and density: The world population was 8009 million in 2023 which is expected to grow to 8901 million in 2035 and to 9796 million in 2050. Until 2022, China topped in the population, but in April 2023, India has occupied the position with its population of 1429 million followed by China (1411 million), the United States (335 million), Indonesia (279 million), Pakistan (241 million), Nigeria (224 million), Brazil (204 million), Bangladesh (174 million), Russia (147 million), and Mexico (131 million) (Figure 1a, Table 3). Some studies have found the reasons for high growth of India's population. India's total fertility has reached replacement levels, which means that two children replace two parents. Having a large young population can be seen as an advantage, perceived by Poonam, Executive Director of the Population Foundation of India (Chatterjee, 2023). At the same time, among the reasons for shrinking of China's population is that China's population declines happened due to decades of strict laws to bring down the country's booming birth rate. The reasons for high natural growth rate of population in Nigeria are - under control, including the introduction of a one-child policy in the 1980s. This includes fines for having extra children, forced abortions and sterilizations (Ellis-Petersen, 2023). As far as the natural growth of the population is concerned, Nigeria has higher growth rate (2.5%) followed by Pakistan (2.0%), Bangladesh (1.5%), Indonesia (1.1%), India (1%), Mexico (0.6%), Brazil 90.4%), and United States (0.1%), whereas China (-0.1%) and Russia (-0.5) have shown the negative growth (Figure 1b). The reasons for higher natural growth rate of population in Nigeria have been revealed by some studies. Nigeria has a high population

growth rate at 2.4%, which is sustained by high fertility at about 5.2 children per woman compared with 3.6 in Ghana and 3.3 in Kenya. Most of these births are unplanned, unwanted, and burdensome to the mothers (Akinyemi, 2023). Population of Nigeria is increasing rapidly. Rapidly increasing population may result because of three important factors such as birth rate, death rate and higher net migration. Migration has played a negligible role in Nigerian population increase (Kolawole). The reasons for higher population growth in Pakistan in the words of Mahmood and Rehman (2023), "Several factors contribute to the high population growth in Pakistan including high birth rates, limited access to family planning services, cultural norms, and religious beliefs. According to the UN, Pakistan's population is projected to reach 403 million by 2050 if the current growth rate continues unchecked." There are various reasons for negative growth of population in Russia. Russia's population decrease and loss of about 700,000 to 800,000 citizens each year is due toa high death rate, low birth rate, high rate of abortions, and a low level of immigration (Rosenberg, 2019). Contributing factors to Russia's demographic crisis include low fertility rates, aging, decreasing life expectancies for males, rising incidence of heart disease, HIV/AIDS and alcoholism (Ghosh, 2022). The country would see sustainable population growth only in 2030 (Russia Monitor, 2020). In 2020, Russia experienced the largest drop in its population since 2005, driven largely by COVID-19 deaths (Vacroux, 2022). Through the 1990s, various factors - ranging from a large number of abortions to a low birth rate combined with a high death level and decreased life expectancy- contributed to the Russian demographic decline (Sofuoglu).

Population density is the concentration of individuals within a species in a specific geographic locale. It is used to quantify demographic information and to assess relationships with ecosystems, human health, and infrastructure (National Geographic). Detailed maps of population density are important for the study and characterization of urban areas, urban and infrastructure planning and management, disaster risk assessment and mitigation, social policies, and analysis of quality of life and well-being (wisdomanswer.com). Population density allows for broad comparison of settlement intensity across geographic areas. The global average population per sq. km is 2,203. The population density is highest in Bangladesh (2,139 population) followed by China (1,296), Indonesia (1,060), India (925), Pakistan (788), Mexico (652), Nigeria (607), Brazil (350), United States (212) and Russia (121 population per sq. km of arable

land among top 10 world populous countries (Figure 3a, Table 1) (Population Reference Bureau, 2023). The reason for highest population density in Bangladesh is that the country only has the 92nd largest land area which means population density is high. With a high birth rate and a low death rate, as shown in the graph below, the population growth rate is around 1.04%. The result of this is over-population because Bangladesh has more people than its resources can support (internetgeography.net).

*Births and deaths, and family planning:* The crude birth and death rates at global level are 17 births and 8 deaths per 1000 population respectively in 2023. The crude birth rate was highest in Nigeria (37) followed by Pakistan (27), Bangladesh (21), India (18), Indonesia (17), Mexico (15), Brazil (12), United States (11), Russia (9), and China (7), and the crude death rate is highest in Russia (14) followed by Nigeria (12), United States (10), Mexico (9), Brazil and India (8), Pakistan and China (7), Indonesia (6) and Bangladesh (5) respectively among top-10 populous countries in the world (Figure 2a). The total fertility rate at global level in 2023 was 2.2 births per married woman in the reproductive age group (15-45 years). It was highest in Nigeria (5.1) followed by Pakistan (3.4), Bangladesh (2.3), Indonesia (2.2), India (2.0), Brazil and Mexico (1.8), United States (1.7), Russia (1.4) and China (1.1) (Figure 2b, Table 2). The use of family planning has significant impact on childbearing of the couples. A woman's ability to choose whether and when to become pregnant directly affects her health and well-being. Voluntary family planning saves lives and accelerates sustainable human and economic development (Cleland, et. al., 2006). It leads to the realization of human rights and promotes the empowerment of women and adolescent girls, enabling them to complete their education, seize better economic opportunities, and fulfil their capabilities. Figure 2c and Table 2 portray that the percentages of women who use family planning- all methods and modern methods at global level are 63 and 55 respectively. The percentages of women who use all methods and modern methods are highest in China (85 and 81 respectively) and lowest in Nigeria (only 22 and 18 respectively) among top-10 populous countries in the world. There are some evidences showing China's higher performance of family planning. China's one-child policy, implemented in 1979, significantly impacted family planning practices. The policy aimed to control population growth by limiting most families to having only one child (Li and Che, 2023). Factors associated with the low contraceptive prevalence level include; cultures that are highly supportive of large family size, myths

and misconceptions about contraception, gender inequity, inadequate access to FP services, poor quality of services and inadequate demand creation efforts have been attributed as the reasons for low performance of family planning in Nigeria (Nigeria Family Planning Blueprint, 2020).

*Economic situation, health and development:* GNI per capita PPP, or Gross National Income per capita at Purchasing Power Parity, is an important economic indicator. It represents the average income of a country's residents adjusted for the cost of living and inflation rates of different countries. This measure is expressed in international dollars, which have the same purchasing power over GNI as the U.S. dollar has in the United States. The importance of GNI per capita PPP lies in its ability to provide a more accurate comparison of economic well-being between countries. Unlike nominal GNI per capita, which can be distorted by exchange rate fluctuations, GNI per capita PPP accounts for the differences in price levels between countries. This means that it reflects what residents can actually afford to buy with their income in their local economies (Ortiz-Ospina and Marco, 2017). The GNI per Capita, PPP was 20,510 at global level. It was highest in the United States (77350), followed by Russia (35,770), China (21,250), Mexico (21060), Brazil (17,260), Indonesia (14,250), India (8,210), Bangladesh (7,690), Pakistan (6,350) and Nigeria (5,650) (Figure 3b, Table 1). The U.S. has long been one of the wealthiest countries in the world thanks to its massive cache of natural resources, huge swaths of fertile farmland, strong infrastructure and innovation, and productive workforce. The U.S. also benefits from a thriving entrepreneurial culture and world-class research universities. The U.S. is the world's leading producer of oil and also natural gas (United Nations, 2024).

Infant mortality is the death of an infant before his or her first birthday. The infant mortality rate is the number of infant deaths for every 1,000 live births. In addition to giving us key information about maternal and infant health, the infant mortality rate is an important marker of the overall health of a society (Centre for Disease Control and Prevention). The infant mortality rate at global level was 29 deaths under one year per 1000 live births (CDC, 2024). It was highest in Nigeria (63) followed by Pakistan (56), India (28), Bangladesh 25), Indonesia (15), Brazil (10), Mexico (10), China (6), the United States (5.6) and Russia (4.6 infant deaths under 1 year) (Figure 4b, Table 2). The main causes of death in Nigeria in 2019 were neonatal disorders. More specifically, 12.25 percent of all deaths were caused by neonatal disorders. Other common

causes included malaria, diarrheal diseases, and lower respiratory infects (Statista Research Department, 2019).

The higher proportion of child population to the total population implies the higher dependency rate. A pyramid diagram is commonly used to depict age structure. An ideal pyramid consists of the following: 0 -14 age group should account for 25-30% of the population. There must be less than 10% of the population over the age of 65. 60 % of the population must be between the ages of 15 and 65 (Prepp.in). The percentage of child population (0-15 years) was 25 at global level. It was highest in Nigeria (43%) followed by Pakistan (38%), Bangladesh (26%), higher than the world average, and India, Mexico, Indonesia, Brazil, United States, Russia, and China (17%-25%). The percentage of elderly was higher in the United States of America (17%) followed by Russia (16%), China (15%), more than the global average, and Brazil, Mexico, Indonesia, India, Bangladesh, Pakistan and Nigeria (3%-10%), less than the global average (Figure 4c, Table 2). The reasons for higher child population in Nigeria are due to higher fertility rate, socio-cultural norms, economic factors, religious beliefs, government policy and education (Conversation, 2021), child marriage (Onagoruwa and Wondon, 2023), and health access (UNICEF, 2021).

### 5.2 Climate Vulnerability and Resilience

The number of projected deaths per 100,000, due to temperature change, 2040-2050, annual average is highest for Pakistan (42) followed by Bangladesh (14), Nigeria (6), India (4), and Mexico (2). The number of internally displaced persons due to disasters is 8,660,000 at global level. It is highest in Pakistan (1,025,000) followed by Nigeria (854,000), the United States (543,000), China (146,000), Brazil (44,000), India (32,000), Bangladesh (8,600), Mexico (3,600), and Russia (28) among the top-10 most populous countries.

The percentage of the total population living in areas termed urban by that country or by the United Nations ranges among top ten world populous countries. The percentage of urban population at global level is 57%, and it ranges from a high of 82% in high income regions and 50% in more developed regions to a low of 35% in low income regions and 36% in least developed regions; 82% in Americas region to 45% in Africa region among world geographic regions; from 70% in Western Asia to 38% in South Asia among Asian regions; and from 88% in Brazil to 36% in India among top ten most populous countries. The percentage of the urban population living in slum households may be examined. A slum

household is defined as a group of individuals living under the same roof lacking one or more of the following conditions: access to improved water, access to improved sanitation, sufficient living area, housing durability, and security of tenure. While the term slum has a derogatory connotation, it continues to be used in data collection categories such as this one. Data are for the most recent year available since 2018 and are from UN-HABITAT. The percentage of the urban population living in slum households ranges from a high of 56% in Pakistan to a low of 18% in Mexico.

The percentage of the total population estimated to be experiencing difficulties in obtaining sufficient, safe, and nutritious food for healthy living is an important indicator. Moderate food insecurity implies compromised food quality and quantity, accompanied by concerns about food access due to financial constraints. Severe food insecurity extends to individuals who have entirely depleted their food supply, even going without meals for days. Among the top ten world populous countries, the percentage of the total population estimated to be experiencing difficulties in obtaining sufficient, safe, and nutritious food for healthy living ranges from a high of 70% in Nigeria to a low of 5% in Indonesia and Russia.

The proportions of child population and elderly population determine the level of dependency in a population. The age structure of a population has a significant impact on fertility behavior and economic productivity of a country. The ideal age structure of a population appears to be 25-30% of child population (0-14 years), 60% of working population (15-65 years) and 10% of elderly population (65 years and above) (Patel, 2024). The average global percentages of child population and elderly population are 25-30 % and 10% respectively according to the Population Reference Bureau 2023 Data Sheet. In terms of world regions by development, the percentage of child population ranges from a high of 42% in low income region and 39% in least developed region to 16% in high income and more developed regions; among world geographic regions from 40% in Africa to 16% in Europe; among Asian regions from 31% in Central Asia to 16% in East Asia; and among top world populous countries, from 17% in China to 43% in Nigeria. As far as the percentage of elderly population is concerned, it ranges from a high of 19% in high income region and 20% in more developed region to a low of 3% in low income and 4% in least developed regions; among world geographic regions from 19% in Europe to 3% in Africa; among Asian regions from 24% in South Asia to 16% in East Asia; and among top world populous countries, from 17% in the United States to 3% in Nigeria.

Demand for FP satisfied by modern methods refers to those with a demand for family planning, the percentage who have their demand met by modern methods. The percentage who have demand met by modern methods among top 10 world populous countries, ranges from a high of 83% in Mexico to a low of 40% in Nigeria. Ratio of female to male unemployment ranges from a high of 2.2 in Nigeria to 0.8 in India (Table 2).

**6.0 Conclusion:**

The world population was 8,009 million in 2023, which is to reach 8,901 million in 2035 and 9,796 million in 2050. India tops among the world countries with a population of 1,429 million, and China, the USA, Indonesia, Pakistan, Nigeria, Brazil, Bangladesh, Russia and Mexico occupy the subsequent 9 positions. Among the regions, more developed, high income, Europe, and East Asia regions, found to be desirable in most of the indicators, as compared to the least developed, low income, Africa, and South Asia regions. The countries such as the United States, China, Russia, Mexico found to be desirable and countries such as Nigeria, Pakistan, India, Bangladesh, Indonesia and Brazil undesirable. The reasons for the regions and countries with undesirable population characteristics, climate vulnerability and resilience are many such as higher in natural increase of the population, fertility and mortality rates, percentage of child population, percentage of the total population estimated to be experiencing difficulties in obtaining sufficient, safe, and nutritious food for healthy living; and lower in percentage of women who use family planning- all methods and modern methods, GNI per capita, expectation of life at birth, percentage of elderly population, and percentage of currently married or in union women of reproductive age who are currently using any form of contraception. Such regions and countries require integrated, innovative and multifaceted pragmatic approach, including improvements in gender and economic equality through education, employment, healthcare, and sustainable development through population-environment equilibrium with the help of implementation of the proven existing family welfare policies and programmes and introducing the new ones.

**References**


1. Akinyemi, Akanni Ibukun. 2023. Nigeria's growing population can be an advantage, with better data and a policy focus on young people. The Conversation, 11 July.

2. Arcanjo, M. 2019. The future of water in India. Washington: Climate Institute.

3. Baker, D., et al. 2022. Seeing the unseen: The case for action in the neglected crisis of unintended pregnancy, in State of World Population 2022. 2022, UNFPA. https://www.unfpa.org/swp2022 5 Feb. 2024.

4. Chatterjee, Ritu. 2023. India's population passes 1.4 billion- and that's not a bad thing. NPR, 8 June.

5. Cherry, Kendra. 2023. How reslilience helps you cope with life's challenges. 3 May. <https://www.verywellmind.com/what-is-resilience-2795059> 13 June 2024.

6. Cleland C, Bernstein S, Ezeh A, Faundes A, Glasier A, Innis J. Family planning: the unfinished agenda. The Lancet Sexual and Reproductive Health Series, 2006;368 (9549):1810-27.

7. Daigle, K. and M. Singh. 2018. As waters rise, coastal megacities like Mumbai face catastrophe. Science News, 2018.

8. Ellis-Petersen, Hannah. 2023. India overtakes China to become world's most populous country. The Guardian, 24 April.

9. Encyclopedia Britannica. <ttps://www.britannica.com/topic/demography> 13 June 2024.

10. Erieau, Chelsea. 2021. How to measure resilience scales and assessments. 29 June <https://home.hellodriven.com/articles/how-to-measure-resilience-resilience-scales-assessments>. 13 June 2024.

11. Ghosh, Palash R. 2022. Russia's existential crisis. No signs population drop will end. International Business Times, 3 December.

12. Guzmán, J.M., et al. 2009. Population dynamics and climate change. <https://www.unfpa.org/sites/default/files/resource-pdf/pop_dynamics_climate_change_0.pdf> 5 Feb. 2024.

13. Internetgeography.net. A country which is over populated-Bangladesh. 2024 Global threat report.

14. IPCC- Intergovernmental Panel on Climate Change. 2022. Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge

University Press, Cambridge, UK and New York, NY, USA, 3056 pp., doi:10.1017/9781009325844.

15. Kolawole, Odusina Emmanuel. Implications of rapidly growing Nigerian population: a literature review.

16. Kuzma, S. and T. Luo. 2020. The number of people affected by floods will double between 2010 and 2030. World Resources Institute. <https://www.wri.org/blog/2020/04/aqueduct-floods-investment-green-gray-infrastructure> 5 Feb. 2024.

17. Li, Yu-Yan and Yan Che. (2023). Unmet need for postpartum family planning and influencing factors in China. China population and development studies, 7: 48-62.

18. Muggah, R. and J. Cabrera. 2019. The Sahel engulfed by violence, climate change, food insecurity and extremists are largely to blame. in World Economic Forum. <https://www.weforum.org/agenda/2019/01/all-the-warning-signs-are-showing-in-the-sahel-we-must-act-now> 5 Feb. 2024.

19. National Geographic. Population Density (nationalgeographic.org). Population Density (nationalgeographic.org).

20. ND-GAIN (University of Notre Dame's Global Adaptation Initiative). 2022. ND-GAIN country index. <https://gain.nd.edu/our-work/country-index/rankings> 5 Feb. 2024.

21. Neumann, B., A.T. Vafeidis, J. Zimmermann, and R.J. Nicholls. 2015. Future coastal population growth and exposure to sea-level rise and coastal flooding-a global assessment. PloS one, 2015. 10(3): p. e0118571.

22. Nigeria Family Planning Blueprint. Family Planning 2030 (fp2030.org)

23. O'Sullivan, J.N. 2013. Population growth as a variable providing the single most powerful lever for minimising the extent of climate change and the negative impacts of climate change. Submission to UNFCCC Secretariat from Sustainable Population Australia. <https://unfccc.int/files/science/workstreams/the_2013-2015_review/application/pdf/spa_submission_

24. Ortiz-Ospina, Esteban and Marco Molteni. 2017. What are PPP adjustments and why do we need them? What are PPP adjustments and why do we need them? - Our World in Data.

25. Potts, M., et al. 2013. Crisis in the Sahel: Possible solutions and the consequences of inaction. A report

following the OASIS Conference (Organizing to Advance Solutions in the Sahel) hosted by the University of California, Berkeley and African Institute for Development Policy on September 21, 2012. <http://oasisinitiative.berkeley.edu/publications/2016/2/20/crisis-in-the-sahel-possible-solutions-and-the-consequences-of-inaction> 5 Feb. 2024.

26. Rosenberg, Matt. 2019. Population decline in Russia. Population Decline in Russia (thoughtco.com). 2 September.

27. Russia Monitor. 2020. As Russian population declines rapidly, Kremlin faces demographic crisis. Russia Monitor, 19 October.

28. Sayed, N. and S.H. Sadat. 2022. Climate change compounds longstanding displacement in Afghanistan. Migration Policy Institute. <https://www.migrationpolicy.org/article/climate-change-displacement-afghanistan> 5 Feb. 2024.

29. Sofuoglu, Murat. Numbers don't lie: How Russia is battling a crippling demographic decline. <trtworld.com> 16 Feb. 2024.

30. Sully, E.A., et al. 2020. Adding it up: Investing in sexual and reproductive health, 2019. New York: Guttmacher Institute. <https://www.guttmacher.org/report/adding-it-up-investing-in-sexual-reproductive-health-2019> 5 Feb. 2024.

31. Tabari, Hossein. 2020. Climate change impact on food and extreme precipitation increase with water availability. Scientific reports, 10: 13768. <file:///C:/Users/VAITHILINGAM/Downloads/s41598-020-70816-2.pd> 13 June.

32. Temple, J. 2019. India's water crisis is already here. Climate change will compound it. MIT Technology Review 24 April.

33. United Nations. 2023. World Population Prospects database. <https://population.un.org/wpp> 5 Feb. 2024.

34. United Nations. 2024. World population by country 2024. <world Worldpopulationreview.com> 13 June 2024.

35. Vacroux, Alexandra. Russia's discouraging demographics shouldn't change U.S. approach. Davis Centre for Russian and European Studies, Harvard University. 3 January.

36. Wisdomanswer.com Why is understanding population density important? Why is understanding population density important? – WisdomAnswer.

37. World Bank. 2021. Malawi. Climate Change Knowledge Portal 2021. <https://climateknowledgeportal.worldbank.org/country/malawi/vulnerability> 5 Feb. 2024.

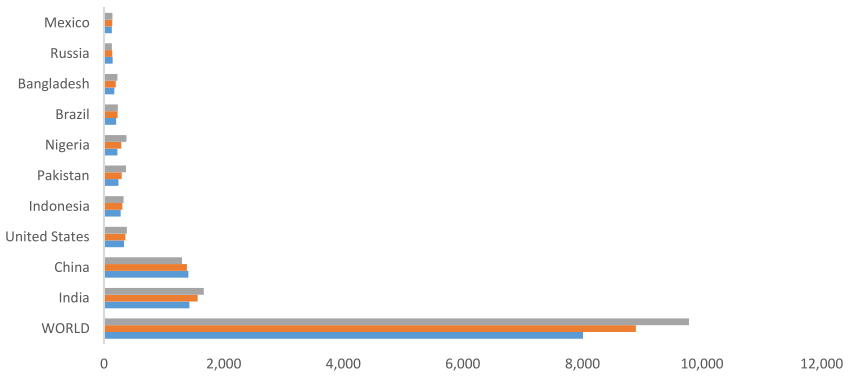
38. World Food Programme. 2023. Food insecurity and malnutrition in West and Central Africa at 10-year high as crisis spreads to coastal countries. <https://www.wfp.org/news/food-insecurity-and-malnutrition-west-and-central-africa-10-year-high-crisis-spreads-coastal> 5 Feb. 2024.

39. World Resources Institute. 2023. Aqueduct Water Risk Atlas (Aqueduct 4.0). <https://www.wri.org/aqueduct> 5 Feb. 2024.

❐ ❐ ❐

**FIGURES**

Fig. 1a: Population (millions), World and top 10 populous countries, 2023, 2035 and 2050




| | WORLD | India | China | United States | Indonesia | Pakistan | Nigeria | Brazil | Bangladesh | Russia | Mexico |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2050 | 9,783 | 1,671 | 1,304 | 384 | 329 | 368 | 378 | 231 | 224 | 133 | 144 |
| 2035 | 8,896 | 1,568 | 1,387 | 360 | 308 | 298 | 292 | 228 | 199 | 139 | 138 |
| 2023 | 8,009 | 1,429 | 1,411 | 335 | 279 | 241 | 224 | 204 | 174 | 147 | 131 |

Axis Title

****

Figure 1b: Rate of natural increase (%), World and top-10 populous countries, 2023

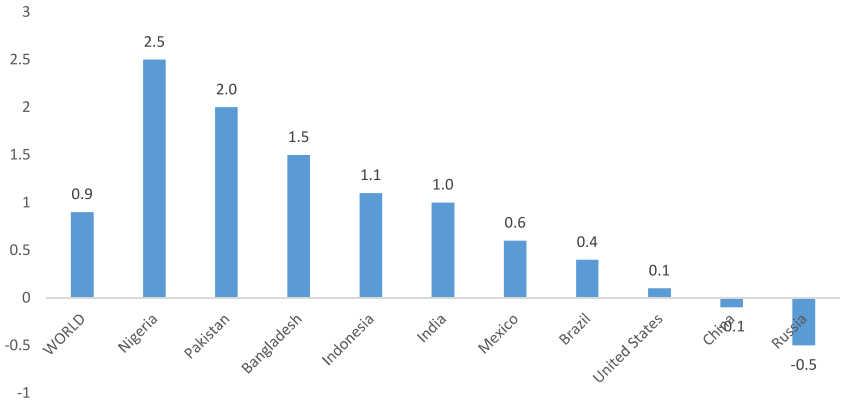
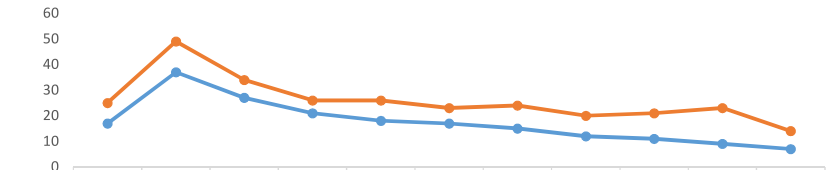


Figure 2a: Number of births and deaths per 1000 population, World and Top-10 populous countries, 2023




| | WORLD | Nigeria | Pakistan | Bangladesh | India | Indonesia | Mexico | Brazil | United States | Russia | China |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CDR | 8 | 12 | 7 | 5 | 8 | 6 | 9 | 8 | 10 | 14 | 7 |
| CBR | 17 | 37 | 27 | 21 | 18 | 17 | 15 | 12 | 11 | 9 | 7 |

****

Figure 2b: Total Fertility Rate, World and Top-10 populous countries, 2023

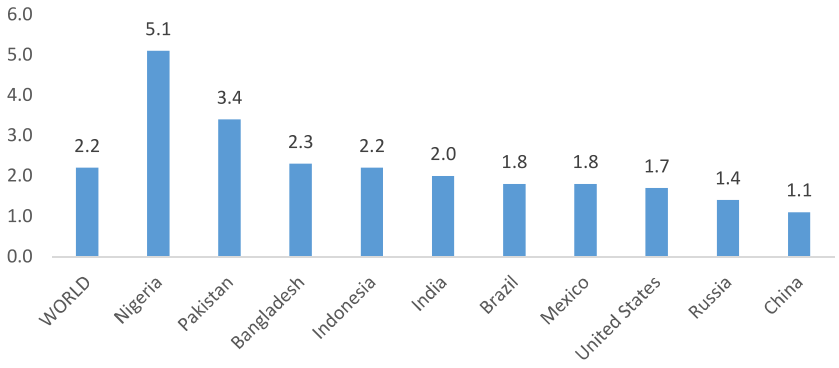
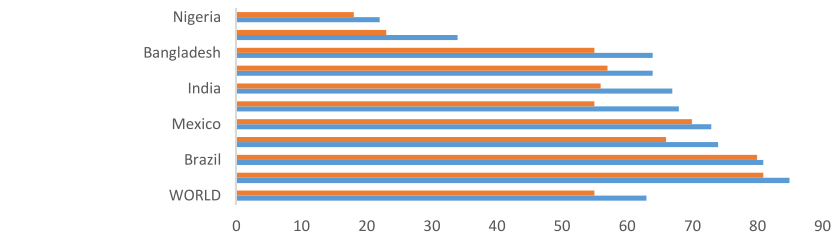


Figure 2c: Percentage of women who use family planning- all methods and modern methods, World and Top-10 populous countries, 2023

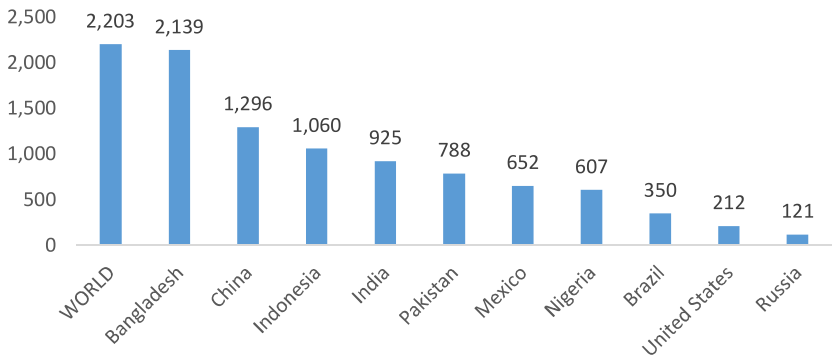


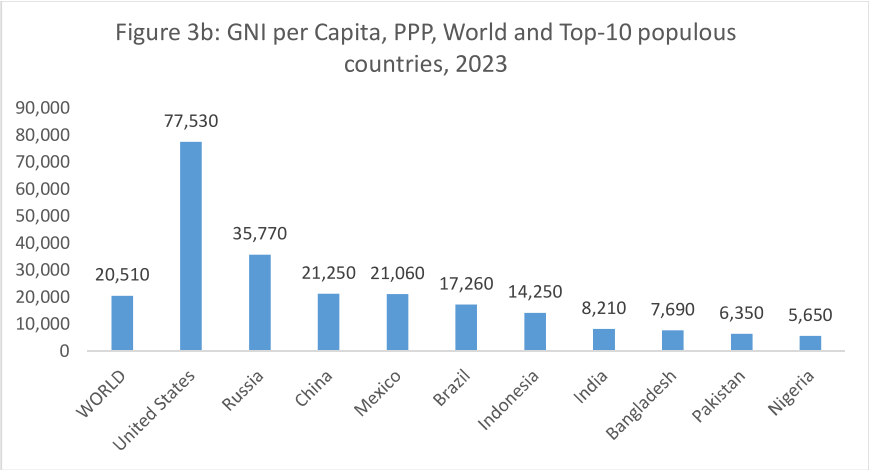

| | WORLD | China | Brazil | United States | Mexico | Russia | India | Indonesia | Banglades h | Pakistan | Nigeria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Married women using FP- Modern methods | 55 | 81 | 80 | 66 | 70 | 55 | 56 | 57 | 55 | 23 | 18 |
| Married women using FP- All methods | 63 | 85 | 81 | 74 | 73 | 68 | 67 | 64 | 64 | 34 | 22 |

Axis Title

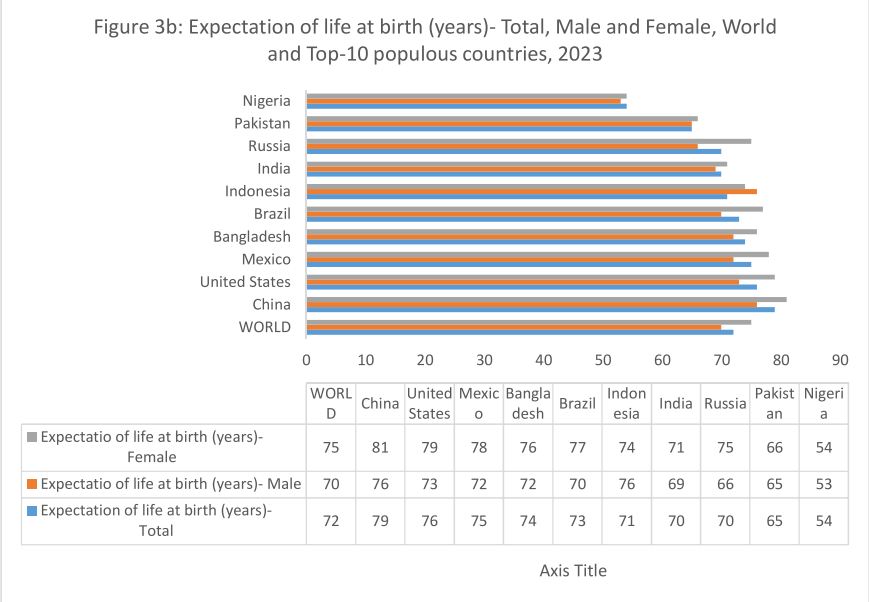
****

Figure 3a: Population per sq.km of arable land, World and Top-10 populous countries, 2023






****




| | WORLD | China | United States | Mexico | Bangladesh | Brazil | Indonesia | India | Russia | Pakistan | Nigeria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Expectatio of life at birth (years)- Female | 75 | 81 | 79 | 78 | 76 | 77 | 74 | 71 | 75 | 66 | 54 |
| Expectatio of life at birth (years)- Male | 70 | 76 | 73 | 72 | 72 | 70 | 76 | 69 | 66 | 65 | 53 |
| Expectation of life at birth (years)- Total | 72 | 79 | 76 | 75 | 74 | 73 | 71 | 70 | 70 | 65 | 54 |

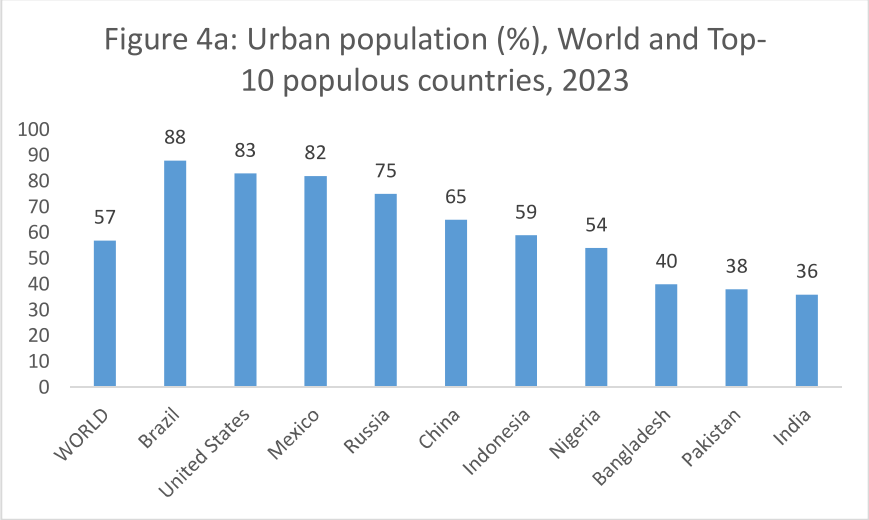


Figure 4a: Urban population (%), World and Top-10 populous countries, 2023
100
90
80
70
60
50
40
30
20
10
0
57
88
83
82
75
65
59
54
40
38
36
WORLD
Brazil
United States
Mexico
Russia
China
Indonesia
Nigeria
Bangladesh
Pakistan
India

****

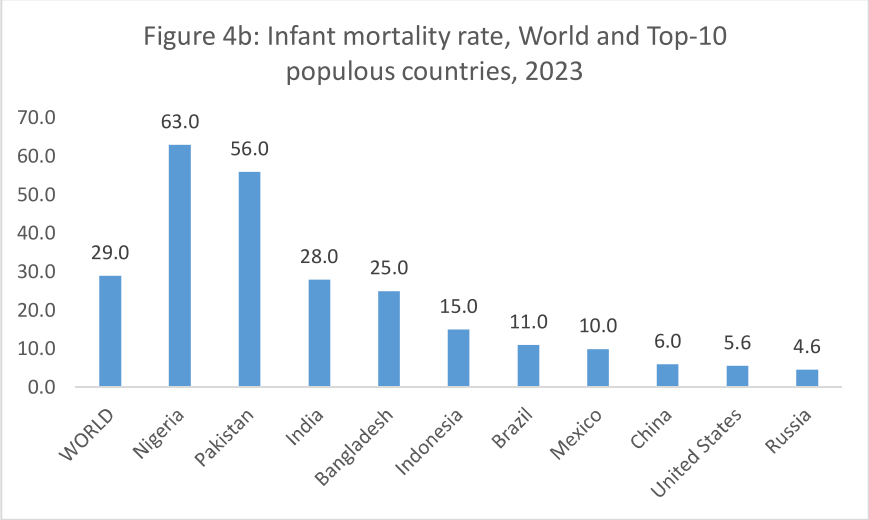
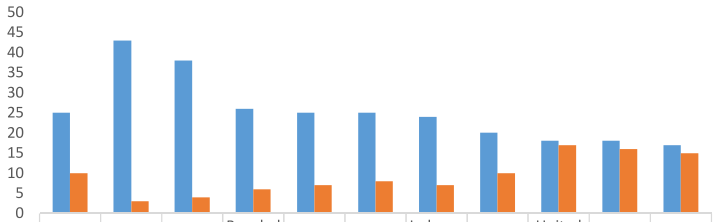


Figure 4b: Infant mortality rate, World and Top-10 populous countries, 2023
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
29.0
63.0
56.0
28.0
25.0
15.0
11.0
10.0
6.0
5.6
4.6
WORLD
Nigeria
Pakistan
India
Bangladesh
Indonesia
Brazil
Mexico
China
United States
Russia

Figure 4c: Percent of population ages <15 years and 65+ years, World and Top-10 populous countries, 2023




| | WORLD | Nigeria | Pakistan | Bangladesh | India | Mexico | Indonesia | Brazil | United States | Russia | China |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pop. ages <15 (%) | 25 | 43 | 38 | 26 | 25 | 25 | 24 | 20 | 18 | 18 | 17 |
| Pop. ages 65+ (%) | 10 | 3 | 4 | 6 | 7 | 8 | 7 | 10 | 17 | 16 | 15 |

****

## TABLES

| Table 1: Population Characteristics, World, Global Regions, Asian Regions and Top 10 Populous Countries, 2023 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| World/ Regions/ Countries | Population | Births per 1,000 pop. | Deaths per 1,000 pop. | Rate of Natural Increase | Net Migration Rate | Pop. (millions) | | Total Fertility Rate |
| | | | | | | 2023 | 2050 | |
| **WORLD** | 8,009 | 17 | 8 | 0 | 0 | 8,901 | 9,796 | 2.2 |
| **World Regions** | | | | | | | | |
| I. More Developed | 1,276 | 9 | 12 | -0.2 | 2 | 1,299 | 1,306 | 1.5 |
| II. Less Developed | 6,733 | 18 | 8 | 1.1 | -0 | 7,602 | 8,491 | 2.4 |
| III. Least Developed | 1,152 | 32 | 7 | 2.5 | -1 | 1,500 | 1,970 | 4.1 |
| 1. High Income | 1,252 | 9 | 10 | -0.1 | 6 | 1,297 | 1,325 | 1.5 |
| 2. Middle Income | 6,003 | 16 | 8 | 0.9 | -1 | 6,593 | 7,116 | 2.1 |
| 3. Low Income | 722 | 35 | 8 | 2.7 | 0 | 973 | 1,315 | 4.6 |
| | | | | | | | | |
| **World Regions** | | | | | | | | |
| 1. Africa | 1,453 | 32 | 8 | 2.4 | -0 | 1,896 | 2,487 | 4.3 |
| 2. Americas | 1,027 | 13 | 9 | 0.4 | 2 | 1,121 | 1,182 | 1.8 |
| 3. Europe | 744 | 9 | 12 | -0.4 | 0 | 740 | 725 | 1.4 |
| 4. Oceania | 45 | 15 | 7 | 0.8 | 12 | 53 | 63 | 2.1 |
| 5. Asia | 4,739 | 14 | 7 | 0.7 | 0 | 5,086 | 5,325 | 1.9 |
| | | | | | | | | |
| **Asian Regions** | | | | | | | | |
| 1. Western Asia | 299 | 19 | 5 | 1.4 | 2 | 355 | 411 | 2.5 |
| 2. Central Asia | 80 | 24 | 5 | 1.8 | -0 | 93 | 111 | 3.2 |
| 3. South Asia | 2,029 | 20 | 7 | 1.2 | -1 | 2,277 | 2,503 | 2.2 |
| 4. South East Asia | 682 | 15 | 7 | 0.8 | 0 | 745 | 786 | 2.0 |
| 5. East Asia | 1,648 | 7 | 8 | -0.1 | 0 | 1,616 | 1,514 | 1.1 |
| | | | | | | | | |
| **Top-10 Countries** | | | | | | | | |
| **WORLD** | 8,009 | 17 | 8 | 0 | 0 | 8,901 | 9,796 | 2.2 |
| India | 1,428.6 | 18 | 8 | 1.0 | -0 | 1,567.8 | 1,670.5 | 2 |
| China | 1,411.3 | 7 | 7 | -0.1 | 0 | 1,387.2 | 1,303.5 | 1.1 |
| United States | 335.0 | 11 | 10 | 0.1 | 4 | 359.9 | 383.6 | 1.7 |
| Indonesia | 278.7 | 17 | 6 | 1.1 | -0 | 308.4 | 328.9 | 2.2 |
| Pakistan | 240.5 | 27 | 7 | 2.0 | -1 | 298.4 | 367.8 | 3.4 |
| Nigeria | 223.8 | 37 | 12 | 2.5 | 0 | 291.6 | 377.5 | 5.1 |
| Brazil | 204.0 | 12 | 8 | 0.4 | 0 | 227.7 | 230.8 | 1.8 |
| Bangladesh | 173.5 | 21 | 5 | 1.5 | -2 | 198.6 | 223.5 | 2.3 |
| Russia | 146.9 | 9 | 14 | -0.5 | 11 | 139.2 | 133.1 | 1.4 |
| Mexico | 131.0 | 15 | 9 | 0.6 | -0 | 138.2 | 143.8 | 1.8 |

Source: Population Reference Bureau (2023). 2023 World Population Data Sheet.

| Table 1: Population Characteristics, World, Global Regions, Asian Regions, and Top 10 Populous Countries, 2023-Contd. | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Family Planning among Married Women | | Life Expectancy at Birth (Years) | | | | |
| | Using All Methods (%) | Using Modern Methods (%) | Total | Male | Female | GNI per Capita, PPP | Population per $km^2$ of Arable Land |
| **WORLD** | 63 | 55 | 72 | 70 | 75 | 20,510 | 2,203 |
| **World Regions** | | | | | | | |
| I. More Developed | 67 | 59 | 78 | 75 | 81 | 56,361 | 690 |
| II. Less Developed | 62 | 55 | 71 | 69 | 73 | 13,570 | 2,489 |
| III. Least Developed | 39 | 34 | 65 | 63 | 67 | 3,658 | 984 |
| 1. High Income | - | - | 80 | 77 | 83 | 60,988 | 8,452 |
| 2. Middle Income | - | - | 72 | 70 | 74 | 14,261 | 1,073 |
| 3. Low Income | - | - | 63 | 61 | 66 | 2,202 | 774 |
| | | | | | | | |
| **World Regions** | | | | | | | |
| 1. Africa | 36 | 32 | 63 | 61 | 65 | 5,654 | 879 |
| 2. Americas | 75 | 69 | 75 | 72 | 78 | 40,105 | 621 |
| 3. Europe | 68 | - | 78 | 75 | 81 | 47,960 | 560 |
| 4. Oceania | 59 | 55 | 79 | 76 | 81 | 43,904 | 1,181 |
| 5. Asia | 68 | 59 | 74 | 72 | 76 | 16,349 | 3,214 |
| | | | | | | | |
| **Asian Regions** | | | | | | | |
| 1. Western Asia | 52 | 37 | 74 | 72 | 77 | 35,707 | 3,468 |
| 2. Central Asia | 51 | 49 | 73 | 70 | 76 | 13,641 | 658 |
| 3. South Asia | 62 | 52 | 70 | 68 | 71 | 7,818 | 1,009 |
| 4. South East Asia | 63 | 54 | 72 | 72 | 75 | 14,622 | 10,118 |
| 5. East Asia | 82 | 78 | 79 | 76 | 82 | 24,561 | 3,152 |
| | | | | | | | |
| **Top-10 Countries** | | | | | | | |
| **WORLD** | 63 | 55 | 72 | 70 | 75 | 20,510 | 2,203 |
| India | 67 | 56 | 70 | 69 | 71 | 8,210 | 925 |
| China | 85 | 81 | 79 | 76 | 81 | 21,250 | 1,296 |
| United States | 74 | 66 | 76 | 73 | 79 | 77,530 | 212 |
| Indonesia | 64 | 57 | 71 | 76 | 74 | 14,250 | 1,060 |
| Pakistan | 34 | 23 | 65 | 65 | 66 | 6,350 | 788 |
| Nigeria | 22 | 18 | 54 | 53 | 54 | 5,650 | 607 |
| Brazil | 81 | 80 | 73 | 70 | 77 | 17,260 | 350 |
| Bangladesh | 64 | 55 | 74 | 72 | 76 | 7,690 | 2,139 |
| Russia | 68 | 55 | 70 | 66 | 75 | 35,770 | 121 |
| Mexico | 73 | 70 | 75 | 72 | 78 | 21,060 | 652 |

Source: Population Reference Bureau (2023). 2023 World Population Data Sheet.

| Table 2: Indicators of Climate Vulnerability and Resilience, World, Global Regions, Asian Regions, and Top 10 Populous Countries, 2023 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Projected deaths per 100,000 Due to temperature change, 2040-2050 Annual Avg. | Internally Displaced Persons Due to Disasters | Urban Population (%) | Urban Population Living in Slum Households (%) | Moderate/ Severe Food Insecurity (%) | Percent of Population | | Infant Mortality Rate | Demand for FP satisfied by modern methods | Ratio of Female to Male Unemployment Rates |
| | | | | | | Ages <15 | Ages 65+ | | | |
| **WORLD** | -2 | 8,660,000 | 57 | . | . | 25 | 10 | 29 | . | . |
| **World Regions** | | | | | | | | | | |
| I. More Developed | -25 | 599,000 | 50 | - | 8 | 16 | 20 | 4 | - | 1.0 |
| II. Less Developed | 2 | 8,061,000 | 53 | - | - | 27 | 8 | 31 | - | - |
| III. Least Developed | 5 | 4,536,000 | 36 | 57 | 59 | 39 | 4 | 42 | 61 | - |
| 1. High Income | -17 | - | 82 | - | 7 | 16 | 19 | 4 | - | 1.2 |
| 2. Middle Income | 1 | 3,643,000 | 55 | - | - | 25 | 9 | 27 | - | - |
| 3. Low Income | 3 | - | 35 | 62 | 69 | 42 | 3 | 45 | - | - |
| | | | | | | | | | | |
| **World Regions** | | | | | | | | | | |
| 1. Africa | 3 | - | 45 | 46 | 59 | 40 | 3 | 44 | 53 | 1.6 |
| 2. Americas | -7 | 720,000 | 82 | - | 23 | 21 | 12 | 11 | - | 1.2 |
| 3. Europe | -37 | - | 75 | - | 8 | 16 | 19 | 4 | - | 1.0 |
| 4. Oceania | 11 | 11,000 | 68 | - | 13 | 23 | 13 | 15 | - | - |
| 4. Asia | 3 | 4,196,000 | 53 | - | - | 23 | 10 | 24 | - | - |
| | | | | | | | | | | |
| **Asian Regions** | | | | | | | | | | |
| 1. Western Asia | 8 | - | 70 | - | - | 28 | 6 | 18 | - | 2.4 |
| 2. Central Asia | -9 | - | 50 | - | 18 | 31 | 6 | 13 | 74 | 1.6 |
| 3. South Asia | 9 | 3,288,000 | 38 | 51 | - | 27 | 7 | 32 | 71 | 1.0 |
| 4. South East Asia | 1 | 612,000 | 52 | 23 | 17 | 24 | 8 | 18 | 73 | 1.1 |
| 5. East Asia | 5 | 196,000 | 68 | - | - | 16 | 16 | 6 | - | - |
| | | | | | | | | | | |
| **Top-10 Countries** | | | | | | | | | | |
| **WORLD** | -2 | 8,660,000 | 57 | . | . | 25 | 10 | 29 | . | . |
| 1. India | 4 | 32,000 | 36 | 49 | - | 25 | 7 | 28 | 74 | 0.8 |
| 2. China | -5 | 146,000 | 65 | - | - | 17 | 15 | 6 | - | - |
| 3. United States | -6 | 543,000 | 83 | - | 8 | 18 | 17 | 5.6 | 82 | 1.0 |
| 4. Indonesia | -1 | 68,000 | 59 | 19 | 5 | 24 | 7 | 15 | 77 | 0.9 |
| 5. Pakistan | 42 | 1,025,000 | 38 | 56 | 42 | 38 | 4 | 56 | 49 | 1.7 |
| 6. Nigeria | 6 | 854,000 | 54 | 49 | 70 | 43 | 3 | 63 | 40 | 2.2 |
| 7. Brazil | -3 | 44,000 | 88 | - | 33 | 20 | 10 | 11 | - | 1.5 |
| 8. Bangladesh | 14 | 8,600 | 40 | 52 | 31 | 26 | 6 | 25 | 74 | - |
| 9. Russia | -56 | 28 | 75 | - | 5 | 18 | 16 | 4.6 | 72 | 1.1 |
| 10. Mexico | 2 | 3,600 | 82 | 18 | 28 | 25 | 8 | 10 | 83 | 1.0 |

Source: Population Reference Bureau (2023). 2023 World Population Data Sheet. Note: - Not available.

| Table 3: Population of top 10 countries, 1950-2050 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rank | Country | 1950 | Country | 1960 | Country | 1970 | | 1980 |
| 1 | CN | 543,979,233 | CH | 654,170,692 | CN | 822,534,450 | CN | 982,372,466 |
| 2 | IN | 357,021,100 | IN | 445,954,579 | IN | 557,501,302 | IN | 696,828,385 |
| 3 | US | 148,281,550 | US | 176,188,578 | US | 200,328,340 | US | 223,140,018 |
| 4 | RU | 102,580,107 | RU | 119,735,095 | RU | 130,093,010 | ID | 148,177,096 |
| 5 | JP | 84,353,049 | JP | 94,464,839 | ID | 115,228,394 | RU | 138,257,420 |
| 6 | DE | 70,964,095 | ID | 88,382,881 | JP | 105,416,839 | BR | 122,288,383 |
| 7 | ID | 69,567,619 | BR | 73,092,515 | BR | 96,369,875 | JP | 117,624,196 |
| 8 | BR | 53,955,360 | DE | 73,063,695 | DE | 78,294,583 | BD | 83,929,765 |
| 9 | GB | 50,055,065 | GB | 52,543,017 | BD | 67,541,861 | PK | 80,624,057 |
| 10 | IT | 46,391,938 | BD | 50,396,429 | PK | 59,290,872 | DE | 77,786,703 |
| | | 1990 | | 2000 | | 2010 | | 2020 |
| 1 | CN | 1,153,704,253 | CN | 1,264,099,069 | CN | 1,348,191,368 | CN | 1,424,929,781 |
| 2 | IN | 870,452,165 | IN | 1,059,633,676 | IN | 1,240,613,620 | IN | 1,396,387,127 |
| 3 | US | 248,083,732 | US | 282,398,554 | US | 311,182,845 | US | 335,942,004 |
| 4 | ID | 182,159,874 | ID | 214,072,422 | ID | 244,016,173 | ID | 271,857,971 |
| 5 | BR | 150,706,446 | BR | 175,873,720 | BR | 196,353,492 | PK | 227,196,741 |
| 6 | RU | 148,005,704 | PK | 154,369,924 | PK | 194,454,498 | BR | 213,196,304 |
| 7 | JP | 123,686,321 | RU | 146,844,839 | NG | 160,952,854 | NG | 208,327,405 |
| 8 | PK | 115,414,070 | BD | 129,193,327 | BD | 148,391,140 | BD | 167,420,951 |
| 9 | BD | 107,147,651 | JP | 126,803,861 | RU | 143,242,599 | RU | 145,617,329 |
| 10 | NG | 95,214,257 | NG | 122,851,984 | JP | 128,105,431 | MX | 125,998,302 |
| | | 2022 | | 2023 | | 2025 | | 2050 |
| 1 | CN | 1,425,887,337 | IN | 1,428,627,663 | IN | 1,454,606,724 | IN | 1,670,490,596 |
| 2 | IN | 1,417,173,173 | CN | 1,425,671,352 | CN | 1,424,381,924 | CN | 1,312,636,325 |
| 3 | US | 338,289,857 | US | 339,996,564 | US | 343,603,404 | NG | 377,459,883 |
| 4 | ID | 275,501,339 | ID | 277,534,123 | ID | 282,004,306 | US | 375,391,963 |
| 5 | PK | 235,824,863 | PK | 240,485,658 | PK | 249,948,885 | PK | 367,808,468 |
| 6 | NG | 218,541,212 | NG | 223,804,632 | NG | 234,573,603 | ID | 317,225,213 |
| 7 | BR | 215,313,498 | BR | 216,422,446 | BR | 218,803,058 | BR | 230,885,725 |
| 8 | BD | 171,186,373 | BD | 172,954,319 | BD | 176,421,510 | CD | 217,494,004 |
| 9 | RU | 144,713,314 | RU | 144,444,359 | RU | 143,494,210 | ET | 214,812,309 |
| 10 | MX | 127,504,126 | MX | 128,455,567 | ET | 132,938,555 | BD | 203,904,900 |

Note: BD=Bangladesh, BR=Brazil, CN=China, CD=D.R. Congo, ET=Ethiopia, DE=Germany, IN=India, ID=Indonesia, IT=Italy, JP=Japan, MX=Mexico, NG=Nigeria, PK=Pakistan. RU=Russian Federation, GB=United Kingdom, US=United States of America

Source: United Nations (2022)/ UNECE

# The Impact of Bandits and Kidnappers Activities on 5 Local Government Areas in Edo State of Nigeria: a Threat to Food Security

**Moses Osamudiamen Izevbizua**

**Abstract**

The attacks on farmers and farmlands on 5 local government areas in Edo State, Nigeria have undermined food cultivation and harvest, leading to acute food shortages. Following the scarcity emanating from the decline in food production, basic food prices have skyrocketed. The crisis has displaced millions of people who could not produce or afford the price of basic food. Relying on exigencies of relevant secondary sources, the paper posits that rural banditry disrupts agricultural activities, creates food crisis and distorts economic activities of the rural dwellers in the study areas. Therefore the paper recommends that government at all levels should declare war against banditry. The security forces together with the collaboration of vigilantes must confront the bandits continuously and crush them with their sponsors. Moreover, death penalty should be meted out on any perpetrators and accomplices of banditry found guilty regardless of their economic and socio-political status while payment of kidnap ransom should be discouraged and probably criminalized, so as to discourage quest kidnapping. Above all, government should pursue national food policy that is reasonably priced which seeks to assure all citizens access to food supply. It is hoped that when this is done, scourge of rural banditry and food crisis shall be brought to the barest minimum.

**Keywords:** Bandit, Kidnapper, and Food Security.

## 1.0 Introduction

Recently banditry and kidnapping have been on the rise in Edo state, with high profile personalities and the low in some selected local government areas abducted and made to cough out millions of naira through their families or have their lives brutally cut short. Kidnappers have been terrorizing residents and others unchallenged. Beside local miscreants who have

turned themselves to kidnappers in their respective communities, armed bandits, including herdsmen have also taken the business of kidnapping into a higher level (Ibileke, 2020). The heavy presence of security agencies like the Army, Police, Airforce and the DSS, in Benin, the state capital, has not prevented these hoodlums from perpetrating their nefarious activities. Apart from the rural dwellers who are mostly farmers, commuting on most major highways across the state has become a nightmare for travelers, as notable men and political figures have become victims of kidnapping. The five affected areas are: Ovia north-east local government area; Orhionmwon local government area; Uhumwode local government area; Igueben local government area; and Akoko-Edo local government area.

Agriculture constitutes a viable economic stability and employment in Edo state. But despite the sector's significant contributions to the economic stability and employment in the state, the insurgence of armed banditry and kidnapping, have led to hikes in food prices and an increased reliance on importation of food from other states within and outside Nigeria. The unprecedented rise in insecurity has displaced farming communities and hindered cultivation, leading to scarcity of food crops and subsequent galloping rise in prices. As a result, many farmers have abandoned their farmlands, fled their communities, and relocated to urban areas, or taken shelter in Internally Displaced Persons (IDP) camps. Many have become unemployed and can no longer care for their families, and in some cases they have resorted to criminality, leading to a vicious cycle of poverty and insecurity (Ewing-Chow, 2022). Increased attacks against farmers in the five local government areas of Edo State and across parts of Nigeria are leading to displacement, market disruptions and loss of livelihoods. Armed groups killed more than 128 farmers and kidnapped 37 others across Nigeria between January and June 2023. According to the Nigerian Security Trackers, in June, 19 farmers were killed by non-state armed groups in Nigeria's Northern Borno State alone (Save the Children international, 2023).

In January, 2023 the United Nations Organization (UNO) estimated that more than 25 million people in Nigeria could face food insecurity and declared 47% increase from the 17 million people who were already at risk of going hungry mainly due to the ongoing insecurity, protracted conflicts, and the projected rise in food prices. In addition, an estimated two million children under five across the northeastern Nigerian states of Borno, Adamawa, and Yobe are likely to be pushed into acute malnutrition in 2023, with about

700,000 children on the brink of death (Save the Children International, 2023).

Just recently, no fewer than 15 communities in Edo State in collaboration with civil society organizations (CSOs), barricaded the Lagos-Benin express road in protest against the nefarious activities of alleged herdsmen which they said had resulted in killings, destruction of farm produce and forceful evictions from their ancestral homes. The communities, namely, Odiguetue, Ofintebe, Igolo, Okokuo, Abumwenre 1 and 11, could no longer suffer in silence. Speaking for the communities and for the civil rights groups, a legal practitioner and former Edo State attorney general and commissioner for justice, said they were worried about the looming crisis brewing in the various communities in the state, allegedly orchestrated by armed herdsmen. Zeroing in on Ovia North-East communities, he stated that some farmers have been under siege for some years, as they have been prevented from going to their farms and sentenced to hunger, which has implication for the larger society. He emphasized that the suffering of the farmers in Edo State is similar to other parts of Southern and Northern Nigeria where farmers cannot access their ancestral lands for farming and solicited for action to stop the menace (Morphy, 2022). The title of the paper is "The impact of bandits and kidnappers activities on 5 local government areas in Edo state of Nigeria: a threat to food security". The paper posits that rural banditry disrupts agricultural activities, creates food crisis and distorts economic activities of the rural dwellers in the study areas. The security of lives and property is the reason for the existence of government. Government must provide security for farmers that feed the nation as well as for all Nigerians. If serious effort is not made to keep the farms safe, the consequences will be food importation, starvation and more insecurity.

## 2.0 Conceptual Clarifications

### 2.1 Bandit

Bandit is a thief with a weapon, belonging to a group that attacks people traveling through the countryside. It is a term used to refer to acts of robbery and violence in areas where the rule of law has broken down. The word bandit came from the Italian bandito, "outlaw," "to proclaim or proscribe". A bandit essentially belongs to a gang of bandits who commit crimes in remote, lawless, or out - of - the way places. For example, a vehicle traveling through an isolated location that is not policed might be at risk of being attacked by bandits (Collins, 2024). Current incident is British Broadcasting Corporation

(BBC) report on Northwestern Nigeria, where ultra-violent bandit gangs raided villages, kidnapped civilians, abducted school children, and killed those who resisted (BBC, 2022). Banditry has affected all facets of human life among which is food security in many states in Nigeria including Edo State, hence government at all levels need to take appropriate steps to forestall its activities and avoid socio-economic and political disorder in the country.

**2.2 Kidnapper**

Kidnapper is a person who takes somebody away illegally and holds them captive, in order to get money or something else for returning them. In criminal law, kidnapping is the unlawful abduction and confinement of persons against their will. Kidnapping also involves menace, assault or battery. However, it also amounts to kidnapping without those extraneous elements, especially if a person is enticed to enter a vehicle or a dwelling place willingly. Kidnapping may be accompanied by bodily injury, which elevates the crime to aggravated kidnapping (Gilbert, 2022). The phenomena of kidnapping and its attendant consequences have badly affected and slowed down socio-economic development and political stability in some countries of West Africa. Nigeria is one of the notable countries that have been grappling with kidnapping and banditry activities (Science & Education Development Institute, 2021). Furthermore, kidnapping has been identified as one source by which terrorists organizations have been known to obtain funding. For example, it was reported that armed groups in Colombia engaged in ransom kidnappings as a way to maintain the armed groups' local systems of taxation (Gilbert, 2022). Kidnapping is a serious crime and has the potential for transforming into other felonious offenses, such as physical violence, financial victimization, and murder. For kidnapping to be eradicated, terrorism and insurgency should be fought as they involved abductions of innocent people, women and children in particular. For any nation to address kidnapping phenomenon, strategic security action should be onslaught against terrorism and insurgency (Abodurin, 2011). This will help to ameliorate multiple consequences of kidnapping such as financial victimization, rape, and even death of the victims.

**2.3 Food Security**

Food security is a state of having sufficient and reliable access to affordable quantity of nutritious food. According to the United Nation's Committee on World Food Security, food security means that all people, at all times, have physical, social, and

economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life (World Food Summit, 1996). Household food security is considered to exist when all the members of a family have access to enough food for an active healthy life at all times. Similarly, the availability of food for people of any class, gender or religion is another element of food security.

Food insecurity is the opposite of food security. It is a state where there is only limited or uncertainty in the availability of suitable and nutritious food for the people. There are many possible causes of food insecurity. The most important ones are climate change, land degradation, agricultural diseases and disruption in global food supplies due to war, as well as bandits and kidnapper's activities. All these subsequently lead to high food prices, which results in hunger and even famine (Ayalew, 2013). The current plan to boost food production and stabilize prices in Nigeria is being threatened as the rising spate of banditry and kidnapping across the country has worsened farmer's plights. Hence, the need for government at all levels to address the issues of insecurity while promoting mechanized farming, technology, and innovation to safeguard food security in the country (Okojie, 2024). Food security is the only assurance for the continued existence, growth and stability of any nation in the world. As the slogan reads, "No farmers, no nation". Any nation with the intention of nursing its citizenry to take over the mantle of good leadership, cannot afford to undermine food security.

## 3.0 Current Anti-social Activities of Bandits and Kidnappers in the 5 Affected Local Government Areas in Edo State and its Implications for Food Security in the Communities and Nigeria in General

Sadly as it may, kidnapping has been on the rise in Edo State, with both low and high profile personalities in the communities abducted and made to cough out millions of naira through their families or have their fragile lives brutally cut short. Living up to its slogan as 'The Heartbeat of the Nation' many hearts are presently beating whenever they step their feet on the soil of the state. While many food stuff traders are refusing to travel home, many farmers have abandoned their farms for fear of ending up in the hands of bandits and kidnappers, who are on the prowl in several vicinities, lurking around to pounce on their vulnerable preys (Ashiru, 2020). Commuting on most major highways across Edo State has become a nightmare for travelers, as many notable men and political figures have become victims of kidnapping. On many occasions, the

entire passengers of commercial buses have been diverted into the forests and abducted for ransom. Many victims, including security operatives, have also suffered death at the hands of their abductors. Reported cases indicate that certain spots have become flash points for kidnapping in Edo State. Among which are:

### 3.1 Ovia North-East Local Government Area

Ovia North-East is a local Government Area in Edo State, Nigeria. Its headquarter is located in Okada town. It has an area of 2,301sq km and a population of 153,849 as at 2006 census. The major communities in the local government area are Okada, Uhen, Utese, Okokhuo, Uhiere, Isiuwa, Ekiadolor, Oluku, Iguoshodin, Utoka, Oghede, Egbeta, Ora, and Ogbese (Iyangbe, 2014). Okada village, located along Benin/Lagos highway in Ovia north-east local government area of Edo State is a hotbed for kidnapping local residents and others. People living or traveling through this agrarian community no longer feel safe as many of the villagers who are mostly farmers have relocated to the city centre for other ventures. Another spot for kidnapping in the area is John Holt (formerly called Ogbemudia farm). The oil palm plantation in the farm gives cover to the bandits to pounce on motorists who ply the road unnoticed, and an easy escape with their victims. On several occasions, many buses have had their passengers forcefully abducted and taken all long and arduous journey walk into the forest that span several kilometres. Securities operatives have had herculean task combing the forest in search of kidnappers and their victims.

In a study carried out by Ahmadu and Okoror in 2020, the food security status of farmers in Ovia North-East Local Government Area of Edo State was assessed. A simple random sampling technique was employed to sample a total of 120 farmers from the study area. Using food security status analysis and logit regression model, the results showed that farmers in the study area generated income from both farming of #1,780,592.00 and other non-farm sources of #107,874.00, representing 94.28% and 5.72% of total income respectively. Their average per capita income and per capita food expenditure were #739.13 and #246.48 respectively. The farmers' average per capita calorie food intake was 1923.55kcal which is lower than the Food and Agricultural Organization (FAO) recommended per capita food consumption of 2700kcal. Consequently, majority of them (86%) were food insecure. The logit regression result showed that age, sex, and household size had negative and significant influence on

the food security status of the farmers while income from farming had positive and significant effect. It was therefore recommended that farmers should increase the proportion of their income allocated for food expenditure since it had significant and positive effect on food security (Ahmadu & Okoror, 2020). Sadly as it is, this recommendation has been hampered by the invasion of bandits and kidnappers into the local government area, which has distorted farming activities in the area and increased food insecurity in Ovia North-East Local Government Area, Edo State and indeed the entire country.

### 3.2 Orhionmwon Local Government Area

Orhionmwon is a local government area in Edo State, Nigeria. The headquarter is in Abudu town. It has an area of 2,382 sq km and a population of 206,717 based on 2006 census figures. It is considered as one of the biggest local government areas in Edo State. It comprises towns and communities such as Idumodin, Ottah, Okuor, Edummungba, Egbhuru, Egbokor, Ute-Oheze, Ugo, Urhonigbe, Igbanke, Iru egbede, Evbobanosa, Oza, Ogan, Uson, Oloten, Obagie N'Oheze, Ugokoniro, Iguehanza, Obi, among others. The local government has rubber plantations, agricultural produces, crude oil as well as mineral resources. It is dominated by Benin speaking communities such as Ugo and Okogbo and surrounded by Agbor and Eku from neighbouring Delta State (Nation Newspaper, 2013). The Iyekeorhionmwon axis of Benin / Abraka road, in Orhionmwon local government area is presently serving as a fertile region for kidnapping. The river in the area gives the kidnappers unhindered movement as they ferry their captives through the river, either to Delta state or to interior villages in the difficult terrain.

Over the last 10 years, agriculture has remained the highest growth driver of the Nigeria economy, growing by 10% on the average and contributing about 73.1% of output expansion annually throughout the period. Crop production, which was driven largely by favourable weather condition, was the dominant agricultural sub-sector growth with an annual growth rate of 11.5% (National Population Commission, 2011). A research was conducted by Igbinidu and Emokaro on food insecurity levels among yam-based rural farming households in Orhionmwon Local Government Area of Edo State. The result shows that the mean household size was estimated as seven people with a mean farm size of 1.35 hectares. The mean annual household income in the study area was estimated as #496,850.00 out of which farm income contributed 62.43% and off-farm income contributed 37%. The mean monthly

household expenditure was #40,934.31 out of which food expenditures accounted for 40.22%. The degree of food insecurity levels among households shows incidence, depth and severity, increasing with age while along the line of marital status, the incidence of food insecurity was worse-off with the married than the unmarried. It was also worse with males than females. Hence, it was recommended that government should empower farmers with inputs that will enable them expand their farm sizes to enhance a positive effect on food security (Igbinidu & Emokaro, 2014).

Unfortunately, the above named recommendation is presently being thwarted by the evil activities of kidnappers, as majority of the farmers have abandoned farming and their traditional farmland for other ventures. This has further posed a threat to food security in the local government and by extension, to Nigeria in general.

### 3.3 Uhumwonde Local Government Area

Uhunmwonde is one of the local government areas in Edo State, with its headquarters in Ehor town. It has an area of 2,033sq km and a population of 120,813, based on 2006 census figures. The villages in the local government includes: Obadan, Igueuwangue, Igieduma, Ugiamwen, Iguevbiahiamwen, and Ogheghe (Nigeria Media, 2018). Ogbemudia farm, now owned by late Chief Tony Anenih, along the ever busy Benin/Abuja highway, is another place many commuters and local dwellers have had bitter experience with rampaging kidnappers. Many important personalities and the very common alike have been abducted on this highway. The thick evergreen forest in the area makes it easy for the kidnappers to operate without much hindrance. The riverine Obadan village makes it easy for the miscreants to escape with their victims to Agbor, in Delta State. Recently, these hoodlums struck and abducted one Waziri Edokpa, a Professor in the Department of Mathematics at Ambrose Alli University, Ekpoma, and Chairman of Esan Central Local Government Area of Edo State. While the agony raised by the abduction of the local government Chairman was yet to settle down, it was also reported that all passengers of a popular Benin based transport company were hijacked and kidnapped by kidnappers in the area. It was so sad that family members of the bus driver were not given the privilege of negotiating ransom for his life, as he was allegedly killed by the miscreants, before taking his passengers into captivity. In another recent development, a 400 level medical student of an undisclosed University, Oghogho Christiana, was abducted in the same area (Ibileke, 2020).

Food crop agriculture in Uhunmwonde Local Government Area does not only provide food for the inhabitants of the area, but also for nearby local government areas and cities. However, the recent invasion of bandits and kidnappers into the area has created a huge challenge to food crop production in the area, as many farmers have abandoned farming and their traditional farmland for fear of being kidnapped or killed by the hoodlums. In a recent study carried out in the local government by Nwagbara, Ozabor and Obisesan, the research examined the perceived effects of climate variability on food crop agriculture. The simple percentage analysis was adopted for the data analysis and the results showed that very few young people are engaged in agriculture. The respondents in the age group of 25 – 30 were only 6.7% of the total respondents, while the largest proportion of the respondents (64.4%) belongs to above 40 years (Nwagbara, Ozabor & Obisesan, 2017). The able body youths that are strong and energetic enough to work in farms, have abandoned farming and their traditional farmland for fear of being kidnapped or killed by the kidnappers. This is presently having a challenging effect on food security in the local government in particular and Nigeria in general.

The tabular display, which is the result of the above mentioned research, calls for an urgent action from government and other stakeholders to fight against kidnappers and keep the local government safe for energetic people to cultivate crops and ensure food security for the region and the entire country.

**Age distribution of respondents**

| Age group | Frequency | % |
|---|---|---|
| 25 - 30 | 12 | 6.7 |
| 31 - 35 | 17 | 9.4 |
| 36 - 40 | 35 | 19.4 |
| Above 40 | 116 | 64.4 |
| Total | 180 | 100 |

*Source: 2017 Research Data.*

### 3.4 Igueben Local Government Area

Igueben is one of the 18 local government areas in Edo State. Its headquarter is located in Igueben town, which has an area of 380 sq. km and a population of 69,639 based on 2006 census figures. Some of the towns and villages in the local government are Eguare, Oyomo, Afuda, Idumeka, Idumonka, Uhe, Egbiki, Ekekhen, Idigun, Idumogbo, among others. In January 2023, a Nigerian passenger train was kidnapped, during which 32 passengers and staff of the Nigerian Railway Corporation (NRC) were abducted at Igueben local government area of Edo State. The passengers were said to be waiting to board a train from the Tom Ikimi train station to Warri,

Delta State, when the armed men struck. Following the incidence, fear gripped the quiet agrarian communities. As if the abduction of the 32 passengers were not enough, the President of Igueben Area Customary Court was also kidnapped around Ugoneki axis, on her way to Court in Igueben. Before the news of her kidnap, a former lawmaker of the Edo State House of Assembly, was kidnapped in Ubiaja on his way to Benin to board a plane to Abuja (Ochoga, 2023).

In a statement by the director of a Charity Organization in Nigeria, the armed groups have killed more than 128 farmers and kidnapped 37 between January and June in 2023. The increased attacks have led to displacements, market disruptions and loss of livelihoods, adding that there is an urgent need to stop the trend (Bodunde, 2023). Attacks on farmers are affecting food supplies and pushing Nigeria deeper into food crisis. A farmer in the community was quoted as saying, "Armed groups have attacked and kidnapped farmers who are our friends and brothers, requesting ransom, which most times amounts to what no villagers can afford". He went further by saying "They have killed our farmers and stolen our farm produce, leaving us helpless and with nothing to take home. The hunger and starvation most of us suffer in this community are because insurgents deprive us of accessing the farmlands, and even when we risk our lives in our fields, they steal everything and allow us to starve" (Bodunde, 2023). This is an eloquent testimony that the activities of kidnappers in the area constitute an astute threat to food security in the area in particular and Nigeria in general.

### 3.5 Akoko-Edo Local Government Area

Akoko- Edo is a local government area in Edo State, Nigeria. Its headquarters is in Igara town. It has an area of 1,371 sq km and a population of 262,110 based on the 2006 census figure. Some of the major towns and villages in Akoko Edo are Bekuma, Ikiran-Ile, Sasaro, Billo, Okpeshi, Somorica, Dagbala, Ileteju, Ugboshi-Afe, and others (Edoworld, 2020). Kidnappers have operated with ease many times on the Auchi/Igarra road. These cruel bandits have operated in the most barbaric manner, and road users and the people in the locality are always at the mercy of the hoodlums.

Recently, a socio-cultural group in Akoko-Edo Local Government Area of Edo State, the Okpameri Descendants Union (ODU), has condemned in strong terms, the renewed spate of kidnapping and banditry on the Igara-Ibillo road, especially around the Uneme-Nekhua-Ayetoro/Ogbe-Okpameri junction axis of the road. In a press statement endorsed by the spokesperson of the group, ODU

called on the government and security agencies to beam their searchlights on the Fulani Camp around Uneme-Ayetoro area, where the criminal activities take place almost on a daily basis. According to the group, just recently, the blood-sucking kidnappers and bandits reigned supreme around Ayetoro flank of Igarra/Ibillo road that led to the killing of a young promising man from Ayegunle while his sibling and others were forcefully taken away into the bush (Ayodele, 2023).

In a related development, the Otaru of Igarra, has appealed to the federal and state governments to rescue the community from incessant attacks by kidnappers, calling for the deployment of soldiers into the area. He lamented that their women are being raped everyday in their farms, noting that farming, which is their major occupation, is dying because people no longer go to farms due to fear of being killed. He added that many labourers and miners from the neighbouring Atte village no longer report to work because they are scared as a result of incessant attacks, which has crippled the economy of the community (Alemma-Ozioruwa, 2018). Sequel to the activities of the miscreants in the community, there is no gain saying the fact that food security in the community and indeed the entire country is under a serious threat if adequate steps are not taking to salvage the situation.

**4.0 Conclusion**

The relentless wave of attacks against farmers by bandits and kidnappers in the 5 focused local government areas in Edo State and indeed, across the 774 local government areas in Nigeria is hindering critical food supplies and threatening to push the country deeper into a devastating hunger crisis . The increased attacks are leading to displacement, market disruptions and loss of livelihoods. Crisis in any part of the country tends to affect food security by creating shortage, which disrupt both gross domestic product (GDP) and net domestic product (NDP) of the country.

Before the increase in the ugly incidence of banditry and kidnapping, the main national priority in Nigeria was to make food secure to cater for the majority of its population, hence the government strides to revive the agricultural sector and diversify its economy in order to match up with other developed countries in the world. With the invasion of bandits and kidnappers, despite the favourable agro-ecological endowments, Nigeria currently has low productivity in food production. Only about 32 million hectares or 34.63 percent are used for cultivation out of the total landmass of 92.4 million hectares. Therefore, Nigeria lacks both the capacity and

capability to cater for the food and nutrition requirements of its teeming population. As such, food loss and prevalence of under-nutrition in Nigeria are among the worst globally (Fadare, Akerele, Mavrotas & Ogunniyi, 2019). Consequent upon the above, one can rightly conclude that the activities of bandits and kidnappers in the 5 concerned local government areas in Edo State constitutes a threat to the state in particular and Nigeria in general.

**5.0 Recommendations**

To forestall the activities of bandits and kidnapers in the 5 concerned local government areas in Edo State, and bring sanity to the localities , with a view to ensuring food security in the local government areas, Edo State and indeed the entire country, the following steps are hereby recommended:

1. That government at all levels should declare war against banditry. The security forces together with the collaboration of vigilantes must confront the bandits continuously and crush them with their sponsors.

2. That death penalty should be meted out on any perpetrators and accomplices of banditry found guilty regardless of their economic and socio-political status.

3. That payment of kidnap ransom should be discouraged and probably criminalized, so as to discourage quest kidnapping.

4. That government at all levels should strive to reduce poverty and high unemployment rate. With such a teeming youthful population that is unemployed or underemployed, there is no way abduction will not become rampant.

5. That government should invest in modern technology and equipment which can significantly enhance surveillance and response capacity in combating banditry and kidnapping. The use of drones and CCTV cameras.

6. That considering the effectiveness of private military companies (mercenaries) in other parts of the world, the Nigerian government should look into enlisting their services in putting a stop to the incessant cases of banditry and kidnapping.

7. Above all, government should pursue national food policy that is reasonably priced which seeks to assure all citizens access to food supply. It is hoped that when this is done, scourge of rural banditry and food crisis shall be brought to the barest minimum.

**References**


1. Abodurin, .A. (2011), Disunity between or among Security Agencies: A threat classified as confidential to National Security, Abodurin, A (ed) Nigeria's National Security: Issues and Challenges. P. 317 – 339.

2. Ahmadu, J. & Okoror, O.J. (2020), Analysis of food security status of farmers in Ovia North-East Local Government Area, Edo State, Nigeria.

3. Alemma-Ozioruva, A. (2018), Tension, anxiety as herdsmen cause mayhem in Akoko-Edo. The Guardian. Guardian.ng

4. Ashiru, T. (2020), Kidnappers on the prowl in Edo: Five hotspots to avoid. Bulwarkintelligence.com

5. Ayalew, M. (2013), "Food Security and Famine and Hunger" Archived from the original on 21, October, 2013. Retrieved on 21, October, 2013.

6. Ayodele, S. (2023), Edo: Group reacts over spate of kidnapping, banditry in Akoko-Edo Local Government Area of Edo State. Tribuneonlineng.com

7. BBC News Africa, (2022), The Bandit Warlords of Zamfara – BBC Africa Eye documentary. Facebook. BBC News Africa.

8. Bodunde, D. (2023), Save the Children: Abduction, Killing of Farmers Worsening Food Crisis in Nigeria. The Nation, the cable news and views unlimited.

9. Collins, C. (2024), Definition of bandit. Advance learner Dictionary. Harper Collins Publishers. Collinsdictionary.com

10. Edoworld, (2020), Major Towns and Villages in Akoko Edo Local Government Area of Edo State. Power by edoworld.net.

11. Ewing-Chow, D. (2022), In Nigeria, Terrorism has become a Major Threat to Food Security. Forbes.com

12. Fadare, O. Akerele, D. Mavrotas, G. Ogunniyi, A. (2019), Effect of conflict and food price shocks on calorie intake and acute malnutrition in Nigeria: A micro-panel data analysis.

13. Gilbert, D. (2022), "The Logic of Kidnapping in Civil War: Evidence from Colombia" American Political Science Review.

14. Ibileke, J. (2020), Kidnappers on the prowl in Edo: Five hotspots to avoid. Nigerian News. Pmnewsnigeris.com

15. Igbinidu, O. and Emokaro, C.O. (2014), Food Insecurity Levels Among Yam-Based Rural Farming Households in Orhionmwon Local Government Area of Edo State, Nigeria. International Journal of Agriculture Innovations and Research. Volume 3, Issue 2, ISSN (Online).

16. Iyangbe, O. (2014), "List of Towns and Villages in Ovia North-East Local Government area". Nigeria Zip Codes. Retrieved in 2023.

17. Morphy, R. (2022), Food Scarcity Looms as Bandits Terrorise Farmers. Leadership.ng.

18. Nation Newspaper, (2013), Concern over Orhionmwon Local Government Area of Edo State, Nigeria. 2013. Retrieved in 2023.

19. National Population Commission, ( 2011), Federal Republic of Nigeria official gazette 4(94), Pp. 1-8 http://www.population.gov.ng/pop .figure.po

20. Nigeria Media, (2018), "List of Towns and Villages in Uhunmwonde local Government Area of Edo State". Retrieved in 2023.

21. Nwagbara, M.O, Ozabor, .F, & Obisesan, A. (2017), Perceived Effects of Climate Variability on Food Crop Agriculture in Uhunmwonde Local Government Area of Edo State, Nigeria. Journal of Scientific Research & Reports 16(3): 1-8.

22. Ochoga, P. (2023), Igueben, Edo Community Where Rampaging Kidnappers Lay Siege. Leadership News. https://leadership.ng.

23. Save the Children International, (2023), Worsening Food Crisis in Nigeria as farmers Face Wave of Attacks and Kidnapping by Armed Groups. savethechildren.net.

24. Science & Education Development Institute, (2021), The effect of herdsmen, banditry and kidnapping activities on Food Security in Nigeria. Academia.edu

25. World Food Summit, (1996), United Nation's Committee on World Food Security. Okojie, J. (2024), Kidnap plague threatens Tinubu's food security plan. From businessday.ng

❐ ❐ ❐

# Implementation of Jal Jeevan Mission (JJM) Scheme in Karnataka: Issues of Management and Sustainability

**Narayana Bilava, Vasantkumar S Katakati, Neelamma R Kolageri, Priya Hegde**

**Abstract**

The Jal Jeevan Mission (JJM) in India aims to provide clean drinking water to rural households and public institutions. A study conducted in Karnataka's Gadag and Uttara Kannada districts assessed the program's effectiveness. Randomly sampling 200 individuals from each area, the study found that most respondents held a positive view of JJM, citing increased community involvement through water tap connections. Challenges were identified in Uttara Kannada District, including poor awareness and difficulties reaching remote areas. The study recommended improved awareness campaigns, effective implementation strategies, and extending JJM connections to schools and health centers. Overall, the study emphasized the program's significance while urging increased efforts for successful implementation in rural Karnataka

**Keywords:** Jal Jeevan Mission, Rural Drinking Water Supply, Grama Panchayat, Water Management, Sustainability.

## 1. Introduction

Water is a vital resource necessary for sustaining life, but its management poses challenges due to population growth and shifting demands. Karnataka, like many regions, experiences uneven rainfall patterns, impacting surface and groundwater management. While two-thirds of the Earth's surface is covered in water, only a small fraction is accessible freshwater. Merely 3% of freshwater resources are safe for drinking, with the majority inaccessible in glaciers and deep aquifers. This scarcity of safe drinking water contributes to over a billion people lacking access to clean water globally.

The United Nations recognizes the importance of safe drinking water as a global priority, as highlighted in the

MDGs and SDGs. Despite efforts, many still lack access to clean water, resulting in significant health risks. India, including Karnataka, has made commitments to water supply and sanitation, striving for safe drinking water for all. Groundwater is the primary source in Karnataka, but depletion poses challenges. The state has already depleted 64% of its groundwater, leaving limited reserves for future use. The government has initiated projects like Jaladhare, Multi Village programs, and Water Purification Plants to address drinking water needs in rural areas.

The Rural Drinking Water and Sanitation Department (RDWSD) in Karnataka plays a crucial role in implementing water and sanitation programs. It oversees initiatives like the Swachh Bharat Mission Gramin (SBMG) Karnataka and Jal Jeevan Mission (JJM) Karnataka, focusing on providing clean drinking water and sanitation facilities to rural areas. However, ongoing efforts are necessary to address water scarcity and ensure sustainable access to clean drinking water for all communities.

## 2. Achievement of Jal Jeevan Mission in India and Karnataka

The government of India has restructured and included the ongoing National Rural Drinking Water Programme (NRDWP) into Jal Jeevan Mission (JJM) to provide Functional Household Tap Connection (FHTC) to every rural household which was launched on the 15th of August 2019. The goal of the Jal Jeevan Mission is to provide every household in rural India with access to safe and sufficient drinking water by 2024. The programme will also implement source sustainability measures as mandatory elements, such as recharge and reuse through greywater management, water conservation, rainwater harvesting. One of the goals of the NRDWP was to "allow all households, to the extent practicable, to have access to and use safe and adequate drinking water inside premises." The target was set to be met by 2030, which coincided with the United Nations' SDGs. However, with the Jal Jeevan Mission, it is now projected to achieve the target by 2024. According to DDWS data, just 18.33 percent of rural homes, or 3.27 crore out of the total 17.87 crore rural households in the country, have access to piped water as of 31.3.2019.

The Jal Jeevan Mission aims at supplying clean and sufficient drinking water to all rural Indian homes through individual household tap connections by 2024. It sources the sustainability measures, such as recharge and reuses through grey water management, water conservation, and rainwater collecting, will be obligatory aspects of the programme. The JJM is centered on a community-based approach to water,

with substantial information, education, and communication as vital component. JJM hopes to establish a Janandolan for water, making it as a top priority. The Jal Jeevan Mission is mobilizing a national campaign for water, in Karnataka, it is known as the "Mane ManegeGange" Scheme. This scheme aims to offer every family a working household tap connection and a service level of 55 liters water per capita per day (lpcd).

According to the 2022 household report, in India Punjab, Gujarat, Bihar, Himachal Pradesh and Sikkim has the highest percent of water connection under JJM scheme and considerably, Goa, Haryana and Telangana have covered 100 per cent tap water connection. In Karnataka successful water connection is achieved in Gadag and Dharwad districts, whereas in Uttar Kannada district mission is yet to achieve complete success. The table 1 shows the data on the category of states according to performance level by no. of households with tap connection. Goa, Gujarat, Haryana, Telangana and Punjab are the top five states;

**Table 1: Top and bottom five states' performance level by number of households with tap connection**

| Sl. No. | Top five states | Percentage | Bottom five states | Percentage |
|---|---|---|---|---|
| 1 | Goa | 100.00 | Chhattisgarh | 41.85 |
| 2 | Gujarat | 100.00 | West Bengal | 38.82 |
| 3 | Haryana | 100.00 | Rajasthan | 37.59 |
| 4 | Telangana | 100.00 | Uttar Pradesh | 35.44 |
| 5 | Punjab | 99.93 | Jharkhand | 34.32 |

***Source:****JJM Website, Ministry of Jalashakti*

**Table 2: Performance level of districts of Karnataka having the highest rural water supply connection under JJM**

| Sl. No. | Top five | Percentage | Bottom | Percentage |
|---|---|---|---|---|
| 1 | Gadag | 98.30 | Vijayanagara | 36.29 |
| 2 | Dharwad | 97.34 | Chikkaballapur | 24.82 |
| 3 | Koppal | 84.70 | Kolar | 22.34 |
| 4 | Dakshina Kannada | 81.78 | Bengaluru Urban | 17.16 |
| 5 | Mandya | 80.17 | Bengaluru Rural | 16.20 |

***Source:****JJM Website, Ministry of Jalashakti*

Chhattisgarh, West Bengal, Rajasthan, Uttar Pradesh and Jharkhand are the bottom five states in terms of a number of households with tap connection.

Table 2 presents the categorization of districts based on their performance levels in terms of the number of households with tap connections. The top five districts in this regard are Gadag, Dharwad, Koppal, Dakshina Kannada, and Mandya. These districts have shown significant progress in providing tap connections to households. On the other hand, the bottom five districts, namely Vijayanagara, Chikkaballapura, Kolar, Bengaluru Urban, and Bengaluru Rural, have a lower number of households with tap connections, indicating a need for further improvement in these areas.

Table 3 provides an overview of the tap connection coverage in different districts of Karnataka as of November 1, 2022. The districts are categorized based on the percentage of households with tap connections in each district. The aspirant districts, with tap connection coverage ranging from 0-25 percent, include Bengaluru Rural, Bengaluru Urban, Chikkaballapur, and Kolar. These districts have a relatively lower level of tap connection coverage and require more efforts to improve access to clean drinking water. Districts like Bidar, Hassan, Kalaburgi, Tumakuru, Uttara Kannada and Vijayanagara are the performing districts having a coverage of 25-50 per cent. The achiever districts, with tap connection coverage ranging from 50-75 percent, consist of Bagalkote, Ballari, Belagavi, Chikkamagaluru,

**Table 3: Category of districts in Karnataka according to performance of JJM (as on 01 Nov 2022)**

| |
|---|
| **Aspirant [Tap connection coverage (0-25%)** |
| Bengaluru rural, Bengaluru urban, Chikkaballapur, Kolar |
| **Performers [Tap connection coverage (25-50%)** |
| Bidar, Hassan, Kalaburgi, Tumakur, Uttara Kannada Vijayanagara |
| **Achievers [Tap connection coverage (50-75%)** |
| Bagalakote, Ballari, Belagavi, Chikkamagaluru, Chitradurga, Davangere, Mysuru, Raichur, RamanagaraShivamogga, Udupi, Vijayapura, Yadgir |
| **High Achievers [Tap connection coverage (75-100%)** |
| Chamarajanagara, Dakshina Kannada, Dharwad, Gadag Haveri, Kodagu, Koppal, Mandya |

***Source:****JJM Website, Ministry of Jalashakti*

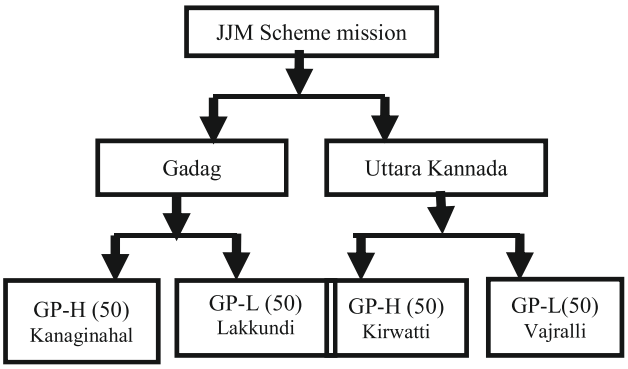
Chitradurga, Davangere, Mysuru, Raichur, Ramadurga, Shivamogga, Udupi, Vijaypura, and Yadgir. These districts have achieved a significant level of tap connection coverage and have made substantial strides in providing access to clean drinking water. The high achiever districts, with tap connection coverage between 75-100 percent, include Chamarajanagara, Dakshina Kannada, Dharwad, Gadag, Haveri, Kodagu, Koppal, and Mandya. These districts have attained a commendable level of tap connection coverage and have successfully provided access to clean drinking water to a majority of households.

In light of this context, the research paper aims to assess the current status of the Jal Jeevan Mission at both Karnataka and national levels. Additionally, the paper aims to document field experiences and evaluate the sustainability of the Jal Jeevan Project, which focuses on providing clean drinking water access.

## 3. Methodology

In order to assess the current status of the Jal Jeevan Mission (JJM) scheme in rural Karnataka, as well as the level of community participation and awareness regarding the scheme, a study was conducted in Gadag and Uttar Kannada districts. These districts were chosen based on their classification within the tap connection coverage categories. Gadag district falls under the category of high achievers (75-100% tap connection coverage), while Uttara Kannada district falls under the performer's category (25-50% tap connection coverage). The objective of the study was to gain insights into the implementation of the JJM scheme in

**Chat 1: Flow Chart of Sampling**




***Note:*** *GP-H means Highest coverage households tap connection by GP*
*GP-L Lowest coverage households tap connection by GP*

these districts and understand the level of community involvement and awareness. Two Gram Panchayats (GPs) each were selected from both Gadag and Uttara Kannada districts for the study. A total of 200 households were surveyed, with 50 households sampled from each of the four GPs. The study aimed to gather information on various aspects, including the financial provisions available for water supply management in these GPs and the sustainability issues related to the implementation of the JJM scheme.

The selected villages in Gadag district had more than 90 % of the JJM implementation and Uttara Kannada district has a lesser percent of JJM implementation of 48 per cent only. Both primary and secondary data were collected. The secondary information was obtained from the RDPR department of GoK, GPs, JJM reports from Ministry of Department of Drinking Water & Sanitation, Ministry of Jalshakti. The Primary data was collected through the structured schedule. The data was analyzed through descriptive statistics.

## 4. Results and Interpretation

The drinking water tap connection was highest in both the villages of Gadag district but in Uttara Kannada only Kirwatti village had 100 per cent of tap connection (group house). Only 8 per cent of the respondents had JJM drinking water tap connection in Vajralli because of the household locations (scattered houses). In Vajralli the houses are located at distance of 1 to 2 km apart due to the forest coverage. The water tap connection under JJM is highest in Gadag district and in Kirwatti village of Uttara Kannada also. But in Vajralli water tap connection under JJM was almost nil.

**Table 4: Opinion of respondents regarding Drinking water tap connection under JJM scheme and awareness about JJM (in %)**

| Sl. No. | Opinion of Respondents | Gadag District | | Uttara Kannada District | | Total |
|---|---|---|---|---|---|---|
| | | Kanaginahal | Lakkundi | Kirwatti | Vajralli | |
| **I** | **Drinking water tap connection** | | | | | |
| 1 | **Yes** | 100.00 | 88.00 | 100.00 | 8.00 | 74.00 |
| 2 | **No** | 0.00 | 12.00 | 0.00 | 92.00 | 26.00 |
| **II** | **Water Connection under JJM Scheme** | | | | | |
| 1 | **Yes** | 100.00 | 96.00 | 100.00 | 0.00 | 74.00 |
| 2 | **No** | 0.00 | 4.00 | 0.00 | 100.00 | 26.00 |
| **III** | **Awareness about JJM Scheme** | | | | | |
| 1 | **Yes** | 70.0 | 25.0 | 60.0 | 20.0 | 43.8 |
| 2 | **No** | 30.0 | 75.0 | 40.0 | 80.0 | 56.3 |

***Source:*** *Field data-2022*

Table 4 shows that the major source of awareness about JJM Scheme among respondents is from gram panchayat and its associated programmes and the awareness percentage is very less among the respondents.

**Table 5: Conduct of Special Gram Sabha meetings on JJM and household members' participation**

| Sl. No. | Opinion | Gadag District | | Uttara Kannada District | | Total |
|---|---|---|---|---|---|---|
| | | Kanaginahal | Lakkundi | Kirwatti | Vajralli | |
| | Conduct of Special Grama Sabha meetings on JJM | | | | | |
| 1 | Yes | 74.00 | 68.00 | 14.00 | 0.00 | 36.00 |
| 2 | No | 26.00 | 32.00 | 86.00 | 100.00 | 61.00 |
| | HH members attended JJM Grama Sabha | | | | | |
| 1 | Yes | 24.00 | 4.00 | 4.00 | 0.00 | 8.00 |
| 2 | No | 76.00 | 96.00 | 96.00 | 100.00 | 92.00 |

***Source:*** *Field data-2022*

Table 5 illustrates the organization of Special Gram Sabha meetings on the Jal Jeevan Mission (JJM) and the participation of household members. It was observed that Gadag district had better participation compared to Uttara Kannada district. However, the overall participation of respondents in both districts was found to be very poor.

**Fig 1: Conduct of Special Grama Sabha meetings on JJM**

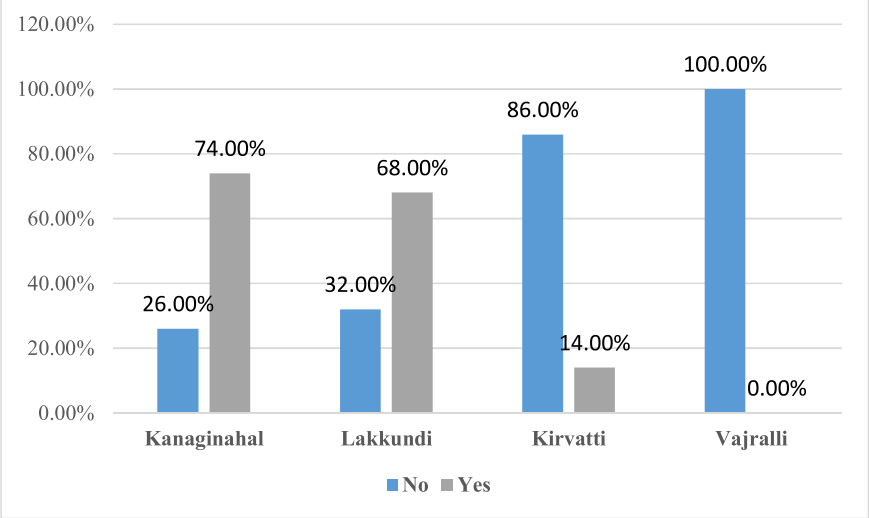


**Fig 2: Participation of Household members in JJM Grama Sabha**

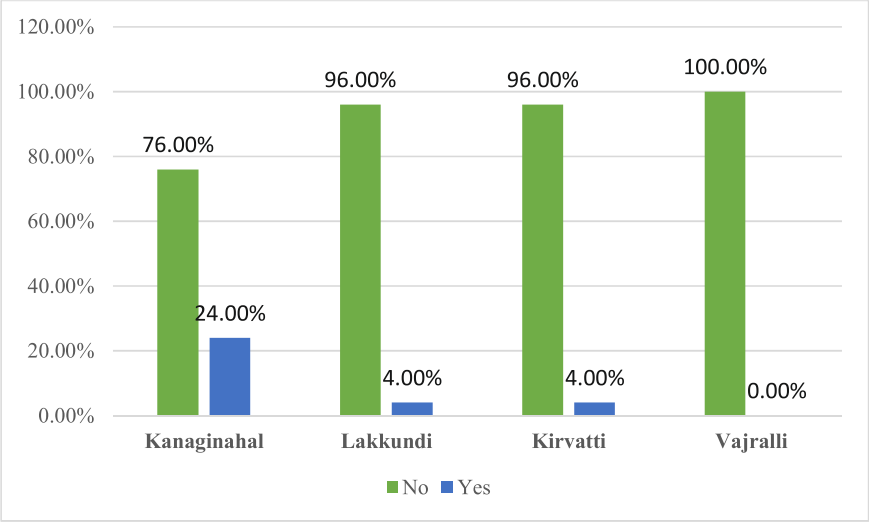



**Table 6: Status of JJM facilities provision among respondents (in %)**

| Sl. No. | Status of Facilities | Gadag District | | Uttara Kannada District | | Total |
|---|---|---|---|---|---|---|
| | | Kanaginahal | Lakkundi | Kirwatti | Vajralli | |
| 1. | Received benefit (provided the tap connection) | 100.00 | 0.00 | 100.00 | 0.00 | 50.00 |
| 2. | Benefit received but no water supply | 0.00 | 100.00 | 0.00 | 0.00 | 25.00 |
| 3. | I don't know | 0.00 | 0.00 | 0.00 | 100.00 | 25.00 |
| | Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

***Source:*** *Field data-2022*

Table 6 presents the provision of Jal Jeevan Mission (JJM) facilities among the beneficiaries. In the majority of villages in Gadag district, the benefits of the JJM facilities were received. However, in the village of Lakkundi, the water supply connection was pending and not yet completed. In the village of Vajralli, the respondents appeared to be unaware of this facility, likely due to a low level of awareness and knowledge about the JJM.

**Table 7: Source of water supply (Before and after implementation of JJM)**

| Sl. No. | Source of water supply | Gadag District | | Uttara Kannada District | | Total |
|---|---|---|---|---|---|---|
| | | Kanaginahal | Lakkundi | Kirwatti | Vajralli | |
| | **Source of water supply (Before implementation of JJM)** | | | | | |
| 1 | Unaware | 20.0 | 4.0 | 0.0 | 76.0 | 25.0 |
| 2 | Bore well | 0.00 | 2.00 | 20.00 | 14.00 | 4.50 |
| 3 | Public water system | 80.0 | 62.0 | 20.0 | 10.0 | 61.0 |
| 4 | Reverse osmosis water | 0 | 0 | 60 | 0 | 1.5 |
| 5 | Other | 0 | 32 | 0 | 0 | 8.0 |
| | Total | 100 | 100 | 100 | 100 | 100 |
| | **Source of water supply (After implementation of JJM)** | | | | | |
| 1 | Jal Jeevan Mission | 80.0 | 0.0 | 90.0 | 0.0 | 42.5 |
| 2 | Unaware | 20.00 | 2.00 | 0.00 | 76.00 | 24.50 |
| 3 | Bore well | 0.00 | 2.00 | 2.00 | 14.00 | 4.50 |
| 4 | Public water system | 0.00 | 64.00 | 2.00 | 10.00 | 19.00 |
| 5 | Reverse osmosis water | 0.00 | 0.00 | 6.00 | 0.00 | 1.50 |
| 6 | Other | 0.00 | 32.00 | 0.00 | 0.00 | 8.00 |
| | Total | 100 | 100 | 100 | 100 | 100 |

***Source:*** *Field data-2022*

According to table 7 majority (61.0 per cent) of the respondents said that public water system (PWS) was the major source of water supply before the implementation of JJM followed by other sources. However after the implementation of JJM connection, the dependency of villagers on the other water sources was less observed. It is found that the newly implemented water source has provided a huge advantage for the villagers by making it easy to avail water. The duration of the water supply under JJM scheme was less than 2 hours in Gadag districts and little bit higher was in Kirwatti village of Uttara Kannada district. The study findings of Purandara et al 2012 are in consistence with the above findings.

**Table 8: Co-ordination among the GP and NGO in creating awareness about JJM**

| Sl. No. | Co-ordination between GP and NGO | Gadag District | | Uttara Kannada District | | Total |
|---|---|---|---|---|---|---|
| | | Kanaginahal | Lakkundi | Kirwatti | Vajralli | |
| **1** | Don't know | 0.0 | 0.0 | 0.0 | 100.0 | 25.0 |
| **2** | No | 28.0 | 58.0 | 70.0 | 0.0 | 39.0 |
| **3** | Yes | 72.0 | 42.0 | 30.0 | 0.0 | 36.0 |
| | Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

***Source:*** *Field data-2022*

Based on the information provided in Table 8 the status of coordination among the Gram Panchayat and NGOs in creating awareness of JJM scheme is illustrated. It is found that 36.0% of the respondents expressed that there is good coordination between the Gram Panchayat and NGOs in creating awareness of the JJM scheme. 39.0% of the respondents stated that there is no coordination between the Gram Panchayat and NGOs in creating awareness of the JJM scheme.25.0% of the respondents mentioned that they don't have any idea about the coordination between the Gram Panchayat and NGOs in creating awareness of the JJM scheme. These percentages reflect the opinions of the respondents regarding the level of coordination between the Gram Panchayat and NGOs in promoting awareness of the JJM scheme.

**Table 9: Level of satisfaction towards the supply of water quantity, water quality and water force**

| Sl. No. | Respondent's Opinion | Gadag | | Uttara Kannada | | Total |
|---|---|---|---|---|---|---|
| | | Kanaginahal | Lakkundi, | Kirwatti | Vajralli | |
| | **Water Quantity** | | | | | |
| 1 | Not satisfied | 24.00 | 32.00 | 12.00 | 0.00 | 17.00 |
| 2 | Satisfied | 76.00 | 68.00 | 88.00 | 100.00 | 83.00 |
| | Total | 100 | 100 | 100 | 100 | 100 |
| | **Water Quality** | | | | | |
| 1 | Not satisfied | 24.00 | 28.00 | 10.00 | 0.00 | 15.50 |
| 2 | Satisfied | 76.00 | 72.00 | 90.00 | 100.00 | 84.50 |
| | Total | 100 | 100 | 100 | 100 | 100 |
| | **Water force** | | | | | |
| 1 | Not satisfied | 34.00 | 38.00 | 32.00 | 0.00 | 26.00 |
| 2 | Satisfied | 66.00 | 62.00 | 68.00 | 100.00 | 74.00 |
| | Total | 100 | 100 | 100 | 100 | 100 |

***Source:*** *Field data-2022*

The data from Table 9 shows the level of satisfaction regarding water quantity, water quality, and water force in Gadag and Uttara Kannada. Overall, the satisfaction levels in Uttara Kannada appear to be higher compared to Gadag. Therefore, it can be concluded that effective management of available water quantity is crucial for improving the level of satisfaction with service delivery.

**Table 10: Overall satisfaction towards water supply under JJM**

| Sl. No. | Respondent's Opinion | Gadag District | | Uttara Kannada District | | |
|---|---|---|---|---|---|---|
| | | Kanaginahal | Lakkundi | Kirwatti | Vajralli | |
| 1 | Not satisfied | 20.0 | 22.0 | 16.0 | 70.0 | 32.0 |
| 2 | Satisfied | 80.0 | 78.0 | 84.0 | 30.0 | 68.0 |
| | Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

***Source:*** *Field data-2022*

Based on the data provided in Table 10, the overall satisfaction towards water supply under the Jal Jeevan Mission (JJM) has been analyzed for Gadag and Uttara Kannada districts. Overall, it appears that the satisfaction levels are higher in Gadag district compared to Uttara Kannada district. It is evident that in both GPs of Gadag District, nearly 80% of the respondents are satisfied with the water supply under the Jal Jeevan Mission (JJM). However, in the Vajralli GP of Uttara Kannada District, 70% of the respondents are not satisfied with the water supply under JJM. This dissatisfaction in Vajralli GP can be attributed to the fact that very few households have received water supply under JJM.

Based on the study's results, several suggestions were made to improve the management of the JJM scheme. Firstly, since the level of awareness among beneficiaries was found to be low, it is recommended to schedule awareness programs or meetings specifically focused on the Jal Jeevan Mission Scheme. These initiatives can help enhance awareness and knowledge among villagers in the selected districts. Secondly, active participation and coordination among the Gram Panchayat, NGOs, and local communities are crucial for the effective implementation of the JJM scheme. Collaboration among these stakeholders can contribute to better outcomes. Thirdly, the Gram Panchayat could consider collecting water charges or implementing a minimal fee for water usage. This approach can create awareness among rural households about the efficient utilization of water resources. Fourthly, issuing water meters to users can serve as an effective means of monitoring water consumption and promoting efficient water management. Lastly, the suggestion from villagers to prioritize providing water facilities in public places like temples, schools, and Anganwadi centers instead of solely focusing on household connections should be taken into consideration.

## 5. Conclusion

To supply functional household tap connections (FHTCs) in rural Karnataka, the Karnataka State

Government has implemented the Jal Jeevan Mission (JJM) under the "Mane Manege Gange" Scheme. As of May 2022, there were 53.06 lakh houses with tap connections compared to 24.51 lakh in 2019. However, JJM has not been implemented in some districts, such as Kolar, Bangalore Rural, and Chikkaballapur. Additionally, JJM tenders have not been called so far in a few Gram Panchayats (GPs). A study observed that proper implementation and management of JJM are the main challenges in the selected villages. The study examined the perception of household members regarding the implementation and management of the JJM scheme. Most respondents had a positive and satisfactory opinion about the JJM scheme. It has provided water tap connections in villages while maintaining drinking water quality, significantly reducing the problem of fetching water from kilometers away.

The major drawback identified was the poor awareness of the JJM scheme among the villagers. The study suggested creating awareness and spreading information about the scheme's benefits among rural people. Awareness programs and meetings can be arranged by respective authorities like Gram Panchayats, Gram Sabhas, NGOs, and community organizations in association with the government. The study found that the implementation of JJM has been successful in Gadag District but faced challenges in Uttara Kannada District. Poor awareness among villagers and the difficulty in drawing water lines to remote, forested rural areas with scattered houses have hindered effective implementation in Uttara Kannada. These challenges have led to cost escalations and hindered water supply provision.

To address these issues, it is crucial to create more awareness about the JJM scheme among villagers in both Gadag and Uttara Kannada districts. This can be achieved through community engagement, awareness campaigns, and information dissemination programs. Additionally, providing JJM connections to public places like temples, schools, anganwadi centers, and health centers can improve overall accessibility and the mission's impact. By extending the reach of JJM and ensuring its benefits are felt by the entire community, the implementation can be enhanced and residents' satisfaction levels can be improved. In summary, the study emphasizes the need for improved awareness and effective implementation of the JJM scheme in rural Karnataka. It calls for collaborative efforts from various stakeholders to create awareness, provide connections to public places, and ensure the successful management of the scheme.

**References**


1. Amha, A., and Debebe, A., 2016.Estimating Access to Drinking Water Supply, Sanitation, and Hygiene Facilities in WolaitaSodo Town, Southern Ethiopia, in Reference to National Coverage. Journal of Environmental Public Health.doi: 10.1155/2016/8141658 volume 2016:1-9.

2. Benson J.L., and Geofrey G., 2022. Water supply and sanitation services towards customer satisfaction. Olva Academy – School of Researchers, 4(1): 96-106.

3. Dharmapuri R., Tirumala and Tiwari P., 2022. Household expenditure and accessibility of water in urban India. Urban Analytics and City Science, 49(8):2072–2090.

4. Ellawala K C., Wasala Y., Wijesiri T K, Silva A S., Zoysa L and Wijesiri I D, 2019. Interrelations among self-reported water use behavior, awareness, and metered water consumption in domestic use in Southern Sri Lanka, Journal of the University of Ruhuna, 7(2):51-62.

5. Government of India (1999): Guidelines for the implementation of Rural Water Supply Programme, New Delhi.

6. Government of India (2002), The National Water Policy, Ministry of Water Resources, New Delhi.

7. Government of India (2013) National Rural Drinking Water Programme, Rajiv Gandhi Drinking Water Mission, Movement towards Ensuring People's Drinking Water Security in Rural India, Framework for Implementation (updated 2013), New Delhi: Ministry of Drinking Water and Sanitation.

8. Government of Karnataka (2002-03), Annual Report, Rural Development and Panchayat Raj Department, Bangalore.

9. Lakshmi K S., Hemavathi S., Padma N and Sumitha P., 2013. Rural water supply and sanitation. National Seminar on Rural Infrastructure in India: Issues and Prospects, 2013.

10. Lalita SI., Icheal V and Iromony, Drinking water issues in Rural India: Need for stakeholders' participation in Water resources management.Future of Food: Journal on Food, Agriculture, and Society,2(1): 67-79

11. Mehta M., Mehta D and Vavaliya J., Urban drinking water security in Gujarat. Journal of Social and Economic Development, 2021, 23(1): S166–S180.

12. Ministry of Jal Shakti. (2021). Jal Jeevan Mission. New Delhi: Department of Drinking Water and Sanitation.

13. OkohE.O.,MinerC.A.,Ode G. N., and Zoakah A. I., 2021. Assessment of Household Management Practices of Drinking Water in Two Selected Rural Communities of Plateau State. Journal of community medicine and primary health care, 33(2): 35-51.

14. Prabhu N., 24x7 drinking water project launched in twin cities of Gadag-Betageri. The Hindu Newspaper, 2017.

15. Purandara B K., Varadarajan N, Venkatesh B and Choubey V K, Surface water quality evaluation and modeling of Ghataprabha River, Karnataka, India. Environmental monitoring and assessment,184(3):1371-8.

16. World Bank Group Water Global Practice, 2018, worldbankwater @worldbank.orgGOI (2002): "National Water Policy-2002", Ministry of Water Resource, New Delhi, April 2002, http://www.wrmin.nic.in/writereaddata/linkimages/nwp20025617515534.pdf

❐ ❐ ❐

## *An Invitation*

The Local Government Quarterly invites contributions in the form of articles and research papers from its readers and well-wishers.

Contributions may be e-mailed to us in digital form as a Word file.

Articles could normally be between 3000 and 4000 words, though we do not wish to limit the size. As we print in black and white, tables, charts, graphs, images, etc. need to be compatible. We reserve the right to edit for sense, style, space, etc.

Contributors may e-mail their articles to:
aiilsgquarterlyjournal@aiilsg.org or info.algq@aiilsg.org

The Chief Editor
**Local Government Quarterly**
**All India Institute of Local Self-Government,**
M.N.Roy Human Development Campus, Plot No. 6, 'F' Block,
TPS Road No 12, Bandra (East), Mumbai – 400051, India.
Tel: +91 86576 22550 / 51 / 52 / 54

# Impact of watershed development program on agriculture and livelihood resources in Latur district of Marathwada region

**Jignyasa Kurlapkar, V.V. Kulkarni**

## Introduction

Watershed development refers to a comprehensive approach to managing and conserving water resources within a defined area. A watershed is also known as a catchment area which is a geographic region where natural water drains to a common point, such as a river, lake, or stream. Watershed development involves the sustainable management of land, water, and other natural resources within this area to improve the environmental and economic conditions for the people. The key component of watershed development programme is water conservation which includes rainwater harvesting and ground water recharging, soil conservation to control erosion and managed soil fertility, improvement in the vegetative measures which includes afforestation, improvement in agricultural practices that is sustainable farming techniques and irrigation management, community involvement and capacity building for natural resource management that includes participation training and education and development of infrastructure needed for agriculture. The main objectives of watershed development are to make water available for agriculture, to conserve natural resources - soil and water, to enhance biodiversity, to improve livelihoods resources and to improve the local environment conducive to develop livelihoods.

Unprecedented population pressure has forced degradation of natural resources. The demand of society from land, water and biological resources needs that utmost attention be given for its restoration. Hence this problem has come to the forefront in prevalent condition which is grossly affecting the ecosystem and environment. Optimum and scientific use of these natural resources have acquired the pivotal position in planned development. The

management of these natural resources is complex and multi-dimensional and a chronic problem. It requires a scientific, holistic and innovative approach by involving the people from grass root level (Badal, P.S., Kumar Pramod and Geeta Bisaria. 2006).

Hence to harness the full potential of available resources (especially land and water) and to prevent its further degradation, Wasteland Development Program is being implemented by Government of India since last 30 years. Among them, Area Development Program is a comprehensive program, which covers three schemes namely – Integrated Watershed Development Program, Drought Prone Area Development Program, and Desert Development Program. However, these programs have inbuilt limitations. Several reports prepared by the government and various agencies appointed by the government have shown that these programs are not effective in all situations. However, it is suggested by most of the scholars and scientists working in this field that natural stream watershed development program would be one of the most important alternatives for these schemes. Naturally along with the government, various CSR projects have joined hands with the local government for making the attempt to overcome the problem of water scarcity for drinking and for agriculture.

**Water scarcity a common problem**

India today is desperately in need of answers to resolve its water crisis. The country is facing a critical challenge to improve the availability of drinking water. Socio-economic development is not possible without ensuring uninterrupted supply of water for agriculture and domestic purposes. It is therefore clear that a watershed development program is needed across the country. In other words, we have to capture rainwater where it falls, over vast parts of the country so that we can overcome water shortage (Shekhar and Prasad 2009, Das 2014).

**International organizations and Issue of water scarcity**

The growing awareness among the international organizations has already given the indications to take corrective measures for appropriate and effective use of natural resources. The literature from the Earth Summit in 1992, the World Summit on Sustainable Development in 2002, and the 3rd World Water Forum in 2003 have focused on the need to examine the concept and practice of watershed in sustainable manner. Several thinkers such as Kerr (1992 and 2002), Hanumantha Rao (2000) and Reddy (2004 and 2002), Pandey (2007), Krchnak (2007), Ghare (2000, 2001), Shanker (2003), Kaushik (2001) and Baumann (1998) have evaluated the

impact of Watershed Development Program (WDP) and have arrived at the conclusion that watershed management can be used as an ecological tool to achieve sustainable development as it involves both environmental and social issues. They have emphasized that there can be no sustainable natural resources management unless it involves the participation of all the inhabitants of the concerned environment in an active manner.

**Regional Profile of water scarcity:** Monsoon of 2021 and 2022 were in deficit in the Central India, especially Marathwada. The Marathwada region has seen two consecutive years of drought. This has impacted agricultural, industrial and domestic sectors. This has also created conflicts including city vs region, taluka vs taluka and district vs district. The Marathwada region is located in the south-eastern part of Maharashtra consisting of 8 districts namely Aurangabad, Jalna, Beed, Dharashiv, Nanded, Latur, Parbhani, Hingoli. It gets an average annual rainfall of about 600mm - 800mm. This region is known as a drought prone area with high vulnerability in annual rainfall and many villages come under Red Zone area.

Hence a need was felt to study watershed development programs in view of its impact, effectiveness and utility as perceived by the people in draught prone area as this program has a special significance in development process. Based on the above discussion following hypothesis was proposed:

**Statement of Problem**

The Latur district is facing a severe water crisis, characterized by prolonged periods of no rainfall resulting in deep water table. This has led to widespread water scarcity, adversely affecting agricultural production, the primary source of livelihood for most of the population. Consequently, this situation has caused socio-economic issues, including poor health, economic stagnation, and increased migration. The interconnected issues are declining agricultural production and economic development. These conditions are forcing people to migrate for their livelihood. Addressing this multi-faceted problem requires a comprehensive study of the situation including sustainable water management, to mitigate the immediate and long-term impacts on the affected population.

**Hypothesis**

1. Watershed development program helps to solve the problem of drinking water in drought prone areas of Marathwada region

2. Watershed development program helps improve agriculture production in drought prone area

3. Watershed development program had positive impact on employment generation, which leads to sustainable development of the villages

**Objectives**

The above-mentioned hypothesis will be tested by studying the following objectives:

1. To study the perception of villagers about the impact of Watershed development program on the agricultural production

2. To study the impact of watershed development program on water scarcity in villages

3. To study the impact of watershed development program on the patterns of land use.

4. To study the impact of watershed development program on improvement in water availability, increased cropping intensity, productivity of crop, and horticulture development.

**Methodology of study and tools of data collection**

A structured interview method was used to collect the information from stakeholders and participant observation to assess their attitude and understanding about the project and its implications. All watershed development projects implemented by the government in Latur district are the universe of study. In order to fulfill the objectives, the purposive sampling method was used to select the farmers who are the beneficiaries' of the watershed development program. Following sampling frame for collection of data/information is used.

**Table No. 1 Sampling frame for collection of data/information**

| Stakeholders | No. of direct beneficiaries** | No. of respondents (33% ) selected |
|---|---|---|
| 1. Bhopla, | 235 | 71 |
| 2. Borgaon, | 215 | 65 |
| 3. Gategaon, | 220 | 64 |
| 4. Khandala, | 231 | 70 |
| 5. Mathephal | 257 | 78 |

*** Grampanchyat Record*

**Expected outcomes of study**

The study is helpful to fill the gap in existing implementation method of watershed development program and quantifying the qualitative information related to agriculture production and other aspects of rural development. This research is expected to provide some concrete suggestions and conditions for smooth implementation of watershed development.

**Limitations of the study**

1. Cooperation of the villagers and village authorities is a big question
2. The background data is not adequate and to recall historical events was very difficult.
3. Quantification of output of WDP is very vague and no standard parameter is available to measure in all respects.
4. Benchmark data for studying the impact of WDP on various aspects of agriculture production is difficult.

**The Data and analysis**

The information related to the age and education of the respondent is given in following Table No 2

It is seen from the table above that 50% of respondents are illiterate and 33% respondents are educated up to 7 grade; there are very few respondents who have completed 12 grade. This

**Table No. 2 Age (Years) of respondent V/s Education of respondent**

| Aspect | | Education of respondent | | | | Total |
|---|---|---|---|---|---|---|
| | | Illiterate | Up to 7 | Up to10 | Up to 12 th | |
| Age (Years)of respondent | 31-40 | 0 | 9 | 20 | 0 | 29 |
| | | 0.0% | 31.0% | 69.0% | 0.0% | 100.0% |
| | 40-50 | 27 | 68 | 24 | 3 | 122 |
| | | 22.1% | 55.7% | 19.7% | 2.5% | 100.0% |
| | 50 + Yrs | 146 | 36 | 8 | 7 | 197 |
| | | 74.1% | 18.3% | 4.1% | 3.6% | 100.0% |
| Total | | 173 | 113 | 52 | 10 | 348 |
| | | 49.7% | 32.5% | 14.9% | 2.9% | 100.0% |
| Pearson Chi-Square | | | 164.564 | 6 | | |

clearly indicates that even today illiteracy in society is very high. The cross table of age versus education indicates that highest illiteracy is in the respondents who are above 50 years of age, which is quite expected. Educational development has taken place during the last 20 years; before that it was very less. To find out the association between education and the age of the respondent Chi square taste was applied. It shows that Pearson $\chi 2$ value is 164.5 d.f 6 this is highly significant that there is a close association between age of the respondent and education of the respondents.

As regards to availability of water throughout year- before implementation and after implementation of the program the details are collected and given in Table No. 3.

**Table No. 3 Availability of water throughout year before implementation and after implementation of the program**

| Name of Villages | Availability of water before implementation | Availability of water After implementation | |
|---|---|---|---|
| | Yes | Yes | Total |
| Bhopla | 16 | 71 | 71 |
| | 22.5% | 100.0% | 100.0% |
| Borgaon | 7 | 64 | 65 |
| | 10.8% | 98.5% | 100.0% |
| Gategaon | 16 | 64 | 64 |
| | 25.0% | 100.0% | 100.0% |
| Khandala | 24 | 69 | 70 |
| | 34.3% | 98.6% | 100.0% |
| Methphal | 21 | 78 | 78 |
| | 26.9% | 100.0% | 100.0% |
| Total | 84 | 346 | 348 |
| | 24.1% | 99.4% | 100.0% |

*$\chi 2$ value = 83.64 ** d.f 3*

As the $\chi 2$ value is highly significant at 5% level this clearly shows that after implementation of the program there is a significant change in availability of water in all the villages. This is mainly due to an increase in recharging in the groundwater and level of well water has remained for longer time in a year. Most of the village's respondents have reported that there is hardly any water

scarcity for drinking and domestic use. This clearly indicates that watershed development program has made significant impact on community leading to improvement in their economic condition through agriculture development and improvement in health of a common man. The type of soil in agriculture and type of agricultural land is given in following Table No. 4.

**Table No. 4. Type of soil in agriculture V/s Type of agriculture land**

| Aspect | | Type of agriculture land (Acres) | | Total |
|---|---|---|---|---|
| | | Irrigated | Non-irrigated | |
| Type of soil in agriculture | Black | 215 | 28 | 243 |
| | | 88.5% | 11.5% | 100.0% |
| | Red | 49 | 35 | 84 |
| | | 58.3% | 41.7% | 100.0% |
| | Not fertile | 3 | 18 | 21 |
| | | 14.3% | 85.7% | 100.0% |
| Total | | 267 | 81 | 348 |
| | | 76.7% | 23.3% | 100.0% |
| Pearson Chi-Square | | | 80.5 ** | 2 |

The above table indicates type of agricultural land that is irrigated and non-irrigated and the type of soil in agricultural land. It was found that the highest proportion of black and red soil is in the irrigated land whereas in non-irrigated land there is a non-fertile soil. The cross tabulation indicates that $\chi 2$ value = 80.5 ** (Significant at 5%) d.f 2. Agricultural land which has black soil is mainly the irrigated area followed by red soil also. One of the points is to be mentioned here that black soil has the capacity to hold moisture in land for longer time. Naturally farmers will get crop in such type of agricultural land. About 86% of respondents have reported that their soil is not fertile in non-irrigated land. From the data tab one can conclude that impact of the watershed development in the black soil is more effective for crop production.

In continuation of the introduction of the paper there is acute scarcity of water in the study area. Government is trying to overcome this problem by implementing various schemes related to water conservation. However, there is a need of technology in saving the water. Details about use of technology to save the water in agriculture is collected and given in Tab No.5

**Table No.5 Use of Technology to save the water in agriculture V/s Education of respondent**

| Aspect | | Education of respondent | | | | Total |
|---|---|---|---|---|---|---|
| | | Up to 12 th | Up to10 | Up to 7 | Illiterate | |
| Use of Technology to save the water in agriculture | Sprinkler | 7 | 7 | 0 | 2 | 16 |
| | | 43.8% | 43.8% | 0.0% | 12.5% | 100.0% |
| | Drip | 100 | 67 | 20 | 8 | 195 |
| | | 51.3% | 34.4% | 10.3% | 4.1% | 100.0% |
| | Bore well | 66 | 39 | 32 | 0 | 137 |
| | | 48.2% | 28.5% | 23.4% | 0.0% | 100.0% |
| Total | | 173 | 113 | 52 | 10 | 348 |
| | | 49.7% | 32.5% | 14.9% | 2.9% | 100.0% |

*$\chi 2$ value = 23.6* (Significant at 10%) d.f 6.*

The table above indicates that there is a close association between education and the technology used to save water in agriculture. The $\chi 2$ value = 23.6* (Significant at 10%) d.f 6. The highest proportion of the respondents educated up to 12 grades are using sprinkler and drip irrigation followed by the respondents educated up to 10th grades and 7th grades. One of the significant observations is that the illiterate respondents are not aware about the technology available for saving water and using the water saving technology in their agriculture.

Apart from the above discussion crosstab relation was also computed on various aspects of agriculture and use of water in agriculture. The details about the chi-square values of the cross tables are given in following Table No. 6

**Table No. 6 The details about the chi-square values of the cross tables computed for finding the association between two variables**

| Aspects | $\chi^2$ value | d.f. |
|---|---|---|
| Elements concerned with choice of crop production depends V/s Use of Technology to save the water in agriculture | 15.1** | 6 |

| | | |
|---|---|---|
| Use of desilted soil in agriculture V/s Education of respondent | 12.5* | 3 |
| | | |
| Information related to Watershed development program V/s Type of agriculture land | 30.5** | 1 |
| Information related to Watershed development program V/s Active participation in Watershed Development Program | 23.2* | 1 |
| Information related to Watershed Development Program V/s Year of implementation of Watershed Development Program in Village | 8.5 N.S | 2 |
| \ | 11.6 N.S | 3 |
| Active participation in Watershed Development Program V/s Year of implementation of Watershed Development Program in Village | 22.1** | 2 |
| Active participation in Watershed Development Program V/s Source of fund made available for watershed development work | 8.0 N.S | 2 |
| Active participation in Watershed Development Program V/s Impact of watershed development work on economic development of family | 17.9** | 1 |

***Indicates Highly Significant at 5% level*
**Indicates Highly Significant at 10% level*
*No sign Indicates No significance*
*d.f. Degrees of Freedom*

The elements concerned with choice of crop production depend on market situation, rate of the various foodgrains and the climatic conditions. Farmers are using technology to save the water so that they can produce more crops. The association between various elements V/s Use of Technology to save the water in agriculture shows significant association as $\chi 2 = 15.1^{**}$ d.f 6 is highly significant at 5% level. Use of desilting soil generated through watershed development program is one of the natural asset most of the farmers especially the farmers located adjacent to the watershed development program. The educated farmer is using desilting soil in their agriculture to

improve soil fertility. This is the impact of watershed development program. The association between use of desilted soil in agriculture and education of respondent shows the association between two variables as $\chi 2$ value 12.5* d.f 3 is significant and 10% level.

At community level every farmer is aware about watershed development program implemented. The details about the association between Watershed development program and Type of agriculture land is observed to be highly significant ($\chi 2$ =30.5** d.f 1). This indicates that there is impact of watershed development program on agriculture. Community participation plays a very pivotal role in success of watershed development program. There is a very close association between successful implementation and participation of all the farmers in the implementation process. It was observed that there was very very active participation in the programs as chi-square test is found to be highly significant indicating that larger participation of the farmers leads success of the program ($\chi 2$ = 23.2* d.f 1).

However, the farmers are not able to tell about watershed development program and the year of implementation. The chi-square test value is observed to be non-significant. The educated farmer is expected to take the active part hence the active participation makes the significant difference in implementation process; it was found to be highly significant as $\chi 2$ = 22.1** d.f 2. Active participation in Watershed development Program V/s Source of funds made available for watershed development work $\chi 2$ = 8.0 N.S d.f 2 has not shown association. One of the significant associations is observed in economic development of the family due to watershed development program. The chi-square value is observed to be highly significant $\chi 2$ =17.9** d.f 1. As regard to the watershed development program and education of respondent, very weak association is observed. This is followed by very close and highly significant association between benefit of watershed development and the type of agriculture as the chi-square test is observed to be highly significant $\chi 2$ = 20.1** d.f 2. at 5% level.

There are several aspects which are impacted by the development work conducted at community level. Some of the most important aspects to note are the type of agricultural land, information about watershed development program, active participation in implementation and its impact on economic condition of the family. There is significant impact on these aspects leading to economic development of the farmers and the community as a whole. The chi-square value is observed to be highly significant either at 5% or 10% level.

Impact of watershed development on villagers and availability of water throughout year made a significant contribution in agriculture development. There is a strong association of watershed development work and availability of water for agriculture as $\chi 2 = 24.8$ d.f. 2

**Summary and conclusion**

To summarize the results of the research one can conclude that watershed development work helped substantially in availability of water for drinking and agriculture purposes; now the farmers are cultivating various crops particularly short-term cash crops, livestock development process is initiated, secondary occupations are also initiated. Most of the farmers are interested in cash crops rather than traditional crops. Demand for agricultural laborers is increased hence the migration is considerably reduced.

There is no specific long-term data on which basis one can conclude that the overall ecological conditions have improved in these villages but it was observed that water table is increased, moisture content in the soil is increased, water is available in the well for longer duration in a year, farmers are cultivating summer crops and the crops related to green and leafy vegetables. In brief it is to state that there are several dimensions of impact of the watershed development program at community level.

**Discussion**

To implement any developmental activity at community level is a difficult task because every individual has one's own mindset. Thus, bringing together the diverse mindset population under one umbrella of development is a very difficult task. Large variations can be observed in the participation at community level. One the one hand, the farmers who were going to get the direct benefit were actively involved in implementation of the program whereas some farmers who were likely to lose their assets were trying to create hurdles in implementation process. However, there is a particular section in society or the community that is neutral in its approach. While implementing such types of activities the organizer must consider community dynamics and community bonding processes. While planning the program one must consider this situation on priority basis. Watershed development program is one program that can be beneficial to all individuals of the community, but the response for this work is not uniform.

**References**

1. Angurana, A.K. Gender orientation to watershed development. Jharkhand Journal of Development and Management Studies. XISS, Ranchi, Vol. 1, No.3. June 2003. pp 393-395.

2. Baumann, P. Panchayati Raj and Watershed Management in India: Constraints and Oppourtunities. Overseas Development Institute, Portland House, Stag Place, London. 1998. http://www.odi.org.uk/publications/ working_ papers/wp114.pdf3. (Accessed on 28/01/2006).

3. Bhatnagar, A. Revised Guidelines for Watershed Development. Department of Land Resources, Ministry of Rural Development, Government of India. 2001.

4. Das, P. Cropping Pattern (Agricultural and Horticultural) in Different Zones, their Average Yields in Comparison to National Average/ Critical Gaps/Reasons Identified and Yield Potential. Indian Council of Agricultural Research, New Delhi. 2002. pp 33-47.

5. Ghare, M. Handbook of Participatory Watershed Development. AFARM, Raisoni Park, Market Yard, Pune. 2000.

6. Kaushik P.K., Pandey B.K. and Y.C. Thripathi. Participatory Approach to Watershed Management in India. Indian Forester. Dec 2007. pp 1659-1668. Kerr (1992 and 2002),

7. Kerr, J. Watershed development, environmental services, and poverty alleviation in India, World Development, Vol.30, No.8. 2002. pp1387-1400.

8. Kerr, John. Watershed Management: Lessons from Common Property Theory. International Journal of the Commons, Vol. 1, no 1 October 2007, Oct 2007. pp. 89-109.

9. Krchnak M.Karin..Watershed Valuation as a Tool for Biodiversity Conservation: Lessons Learned from Conservancy Projects. The Nature Conservancy, USAID. Jan 2007.

10. Pandey, Sanjay. Reducing the gender bias through Water Shed Management. 2007. http://www.mynews.in/fullstory.aspx?storyid=1069.

11. Rao, C. H. Hanumantha, "Watershed Development in India: Recent Experiences and Emerging Issues," Economic and Political Weekly, 25. 2000.

12. Reddy Ratna, V., Gopinath Reddy, M., Malla Reddy, Y.V., Sousson, J., Sustaining Rural Livelihood in Fragile Environments: Resource Endowments or Policy Interventions? Working paper No.58, CESS, Begumpet, Hyderabad – 500016, AP, India. 2004. pp 33.

13. Shanker, M. Hariyali Guidelines on Watershed Development. Government of Maharashtra, India. 2003.

**Guidelines for Authors**

- This is a Peer-Reviewed journal.
- Contributions need to be in English.

  The journal is dedicated to governance and developmental issues. Therefore, submissions could be related to governance and development related subjects – urban, rural or tribal, i.e., issues confronting cities, villages, peri-urban areas, issues related to urban and rural local bodies, issues related to education, public health, livelihood, urban and/or rural poverty, gender equality, etc. We however do not wish to limit the scope of authors' contributions to these areas. These are only indicative.
- Normally length could be 3000 to 4000 words though we do not wish to limit the size.
- Authors are requested to ensure that they follow all guidelines and practices applicable for this kind of work, in particular to ensure the following:
  - That the work is original, not previously published, does not infringe on others' rights and that reproductions from other sources are appropriately credited to the source and permissions taken where required. In other words, the authors shall remain solely responsible for the content provided by them
  - All persons who have contributed to the work are credited as authors or co-authors or otherwise appropriately. Further that persons credited as above have actually contributed to the work
- As we print in black & white, tables, charts, graphs, images, etc. if included, need to be compatible and easy to understand in printed form.
- We reserve the right to edit for sense, style, space, etc.
- Contributions may be sent as a Word file by email to aiilsgquarterlyjournal@aiilsg.org or info.algq@aiilsg.org
- In case of submissions selected for publication, the author would be sent a copy of the printed journal by post. However, it may not be possible for us to respond to individual queries from contributors enquiring about the status of their submissions.
- The Publisher reserves the right of publication.
- We publish quarterly, usually for the quarters January - March, April - June, July - September and October - December. The publication is usually at the end of each of these quarters.
- We do not levy any submission/processing/publication charges.

**Ethics Policy**

The Local Government Quarterly has been instituted and is being published with a view to promote the knowledge and sharing of ideas on subjects related to local governance - urban and rural, in India and overseas. It seeks to address related subjects including, but not limited to, education, public health, livelihoods, urban and rural poverty, gender equality.

The publication aims to contribute to the development effort in these and related areas by taking a positive approach so that achievement of favourable outcomes is made possible. The aim is to enable positive impacts in all sections of society including the poor, vulnerable and disadvantaged. The publication aims to add value to the efforts of all stakeholders particularly those working in these and related fields from all sectors - government, non-government organisations, academia, research and industry.

The publication is committed to a fair and equitable approach in all its pursuits and is bound to act without any ideological bias, in a non-adversarial, non-discriminatory and positive manner. The publication is committed to respect diverse views of stakeholders, especially of the contributing authors provided these are not against or unfair to any section/s of society or could create disharmony among or hurt the sentiments of any section/s of society – actually or potentially.

Readers and all concerned may note that the views expressed in the published contributions would represent the personal opinions of the authors and would not necessarily reflect the opinion of the publisher.

The publication will act in full compliance with all laws and regulations that are applicable to it and will act in a purposeful manner to rectify any inadvertent non-compliance that may be brought to its notice.

`On the part of authors, the publication expects similar fair, equitable and inclusive approach to be reflected in the contents of the contributions. In particular, authors are required to ensure the following:

- That the work is original, not previously published, does not infringe on others' rights and that reproductions from other sources are appropriately credited to the source and permissions taken where required. In other words, the authors shall remain solely responsible for the content provided by them
- All persons who have contributed to the work are credited as authors or co-authors or otherwise appropriately. Further that persons credited as above have actually contributed to the work
- All other ethical guidelines that are applicable for such work

We commit ourselves to the standard ethical norms.

**Publication and Peer-review Policy**

Local Government Quarterly is being published by All India Institute of Local Self-Government by incorporating research papers and articles contributed by diverse stakeholders including academicians, urban planners, practitioners and others with, among others, the following objectives:

- To bring to the fore and highlight issues regarding governance and development especially in India. The issues could include urban, rural or tribal ones covering an array of topics including education, public health, poverty, livelihood and gender.
- The aim is to generate debate and deliberation with the objective of seeking solutions to challenges in the above areas.
- To contribute to capacity building of institutions and personnel working in the related fields thereby improving their response to the issues being confronted in these sectors.
- Contributions are invited from authors in accordance with the 'Guidelines for Authors' published separately.
- Those contributions which are found to be as per the 'Guidelines for Authors' would be provided to some member/s on our panel for 'Peer-review'. In case found necessary, the feedback of the panel member/s could be provided to the concerned author for any modifications he/she may like to make based on the feedback and resubmit the work.
- The publisher reserves the right to publish.

For submission of papers/contributions, kindly note the changed e-mail IDs

aiilsgquarterlyjournal@aiilsg.org

or

info.algq@aiilsg.org

**Report Review**

# The Global Risks Report 2024

**By World Economic Forum**

***Read the report here: https://www.weforum.org/publications/global-risks-report-2024/***

The Global Risks Report 2024 was published by the World Economic Forum in January 2024. It was prepared in partnership with Marsh McLennan and Zurich Insurance Group. This edition is the Nineteenth one.

The Preface penned by Saadia Zahidi, Managing Director starts off on a somber note stating that 'the world is plagued by a duo of dangerous crises: climate and conflict'. While on the one hand the world is seeing geo-political tensions and hostilities, climate change is throwing up unprecedented challenges with record-breaking extreme weather and related events increasing in frequency and intensity. These are accompanied by economic uncertainties driven up by high interest rates and inflation. As per the preface, the report explores the global risks landscape in a phase of transition and where the governance systems are stretched beyond their limit. It points to the possible threats from criminality, corruption and an 'arms race' in experimental technologies. The report, as per the preface, highlights the findings from the Global Risks Perception Survey (GRPS) bringing together the views of nearly 1500 global leaders from academia, business, government, civil society and international community.

Following the Preface there is a brief section describing the methodology of the report. Thereafter are presented the Key Findings.

Here, it states a key finding - deteriorating global outlook. The report quotes the lethal conflicts affecting vulnerable populations like those in Sudan, Gaza, and Israel. Alongside there has been much stress on account of extreme temperatures, floods, droughts, etc. At the same time there was societal discontent including violent protests, and riots in the news. The survey, as per the report, paints a negative picture over the next two years and further deterioration over the next decade. It states that four structural forces will shape the materialization and management of global risks over the next decade. These are - Climate change, Demographic bifurcation, Technological acceleration, and Geostrategic shifts. Another section

states that Economic strains on low and middle-income people and countries are set to grow. That is because inflation and economic downturn have emerged as important risks. Geopolitical risks and technology will present significant new risks.

The Global Risks Report analyses risks over various time horizons – one year, two years, and ten years. Chapter 1 addresses risks over the first two time horizons, namely one and two years. Chapter 2 addresses the 10 year outlook. Chapter 3 looks at the concept of cooperation and analyses different approaches to address global risks.

Chapter 1 is titled **Global Risks 2024: At a turning point.**

While a subdued fallout of the geopolitical turmoil has not yet touched other regional locations and a world economic recession failed to materialize, the medium to longer term outlook remains negative and is expected to worsen over the longer term. This is the finding of the global survey. While 63% of respondents expect a stormy or turbulent outlook over the 10- year period, less than 10% expect a calm or stable situation. For the one-year time frame, respondents were asked to select up to five risks that they feel are most likely to present a material crisis on a global scale in 2024. Two-thirds of respondents selected Extreme weather (66%) as the top risk faced in 2024. AI-generated misinformation and disinformation (53%) and Societal and/or political polarization (46%) follow in second and third places. Cost-of-living crisis (42%) and Cyberattacks (39%) remain major concerns. In the second time frame covered by the survey, respondents were asked to rank the likely impact of risks in the next two years (upto 2026). Here the findings are depicted in colourful tables and charts. Analyses of responses by various stakeholder groups are provided. Graphic representation of various findings such as 'the Global risks landscape: an interconnections map' are indeed innovative and lead to easy assimilation by the reader.

Some of the key risks such as False information, Rise in conflict, and Economic uncertainly are dealt with in much detail in this chapter. Here the report says that while there is widespread expectation of interest rate cuts in major economies, stubborn inflation could stymie these expectations and rates could remain higher for longer amid concerns of stagnating economic growth. The report expresses concerns over supply side shocks leading to higher prices. The El Nino impact on food production is quoted as an example. There is a detailed look at the two largest economies of China and the USA. Chapter 1 ends on a grim note with the section Looking Ahead. It warns that

the impacts of climate change/extreme weather could lead to depleting resources to adapt to and mitigate climate change and increase vulnerabilities.

Chapter 2 is titled **Global Risks 2034: Over the limit.**

This chapter looks at the longer term of the next decade compared to Chapter 1 which looked at the nearer term - next two years. It notes that 63 percent of the survey respondents 'predict a turbulent or stormy outlook, with upheavals and elevated risk of global catastrophes at best'. Respondents have ranked the global risks by severity (top 5) in the following order: extreme weather events, critical change to earth systems, biodiversity loss and ecosystem collapse, natural resource shortage, and misinformation and disinformation. It also ranks and discusses the ranking of the risks by different stakeholder groups. These global risks are discussed in detail in this chapter. There are several box items each titled 'The next global shock?' These paint possible scenarios of likely outcomes of current trends, which are indeed thought-provoking and often worrying. In one such box item, it says, 'Although highly unlikely, the unilateral and ungoverned deployment of climate manipulation technology is possible within the next 10 years, including by a single country, non-state actors such as philanthropists, or by companies for commercial gain. While some technologies only have temporary effects, there is a great deal of uncertainty around impacts even over a short term time frame.'

There is a separate section on Artificial Intelligence and its various dimensions including risks. The survey respondents have highlighted cyber insecurity and technological power concentration as risks. It states 'The production of AI technologies is highly concentrated, in a singular, globally integrated supply chain that favors a few companies and countries... This creates significant supply-chain risks that may unfold over the coming decade.' Another 'the next global shock' box deals with the post SDG era. It notes that looking at domestic challenges and reducing international cooperation, there could be rise in deprivation, and distribution of aid could become uneven, 'driven by narrow security interests rather than broader, traditional development imperatives…'. This chapter also has a section on crime where it discusses various dimensions and threats.

Chapter 3 is titled **Responding to global risks.**

It starts off by saying that while some of the risks we face are familiar, like pandemics and geopolitical conflicts, others such as earth system

changes and effects of new technologies are newer and evolving. Collaboration and cooperation would be important approaches to addressing these challenges. Several risk management approaches were highlighted under the Survey falling under the categories – Public awareness and education, Financial instruments, and National and Local regulations. Other approaches such as Research and development, and Corporate strategies, and Cross-border coordination are also discussed.

After Chapter 3 are provided various appendices which are also well illustrated with colour graphs and charts. An interesting appendix is the one on country-wise responses to the Survey identifying the top risks.

The Global Risks Report 2024 is an engaging document and a seminal piece of work which highlights the dangers of the world in which we live and are likely to encounter in the coming 2 years as well as the decade ahead. It dissects the challenges before us based on a survey, ranks and analyses their severity and presents the findings in lucid, easy-to-understand manner supported by colour graphics – charts, graphs, etc. The Report would be found useful by policymakers, academicians, students, corporate leaders and researchers, among others. Policymakers and governments will find the inputs valuable in crafting policies and putting in place mechanisms for combating the challenges that face the world today, and those emerging challenges which could threaten peace and well-being on earth in the coming years.

**V. Vijaykumar**

## Our Contributors

- **Manjamuthu Viruthambal Vaithilingam**

  *Dr. Manjamuthu Viruthambal Vaithilingam is Research Officer / Visiting Faculty, Centre for Distance and Online Education, International Institute for Population Sciences, Mumbai*

- **Moses Osamudiamen Izevbizua**

  *Dr Moses Osamudiamen Izevbizua is with the Institute of Public Administration and Health Services Management, University of Benin, Benin City, Edo State, Nigeria*

- **Narayana Bilava**

  *Dr. Narayana Bilava is Assistant Professor, Centre for Multi-disciplinary Development Research (CMDR), Dharwad*

- **Vasantkumar S Katakati**

  *Vasantkumar S Katakati is Student MBA, Rural Management Department, Karnataka State Rural Development and Panchayat Raj University, Gadag*

- **Neelamma R Kolageri**

  *Neelamma R Kolageri is Assistant Professor, Karnataka State Rural Development and Panchayat Raj University, Gadag*

- **Priya Hegde**

  *Priya Hegde is Research Associate, Centre for Multi-Disciplinary Development Research (CMDR), Dharwad*

- **Jignyasa Kurlapkar**

  *Jignyasa Kurlapkar is Head CSR, Rallis India*

- **V V Kulkarni**

  *Dr. V V Kulkarni is Former Dean and Professor (Social Sciences), Bharati Vidyapeeth Deemed University, Pune and currently a Development Sector Professional*

- **V Vijaykumar**

  *V. Vijaykumar is Senior Advisor, All India Institute of Local Self-Government*

## OBJECTIVES

The main emphasis of the Institute's work is to see that the local bodies can contribute more effectively to the development process and provide the citizens with better living conditions by meeting their aspirations in terms of required amenities, infrastructure and better environmental conditions, thus contributing to social and economic development of the society as a whole by better management of the human settlements. While these are the long-term objectives, the immediate ones are:

- To advance knowledge of the principles and practices of Local Government by conducting research and by organising training courses and programmes at various centres in India for officials and elected representatives in the local bodies.
- To strengthen and improve Local Government Institutions by improving their performance through education, orientation and bringing them together for common endeavor by organising specialised conferences, conventions and seminars.
- To make available a platform for members of local bodies and officials for exchange of views and ideas related to urban development and administration.
- To represent the views of local authorities supported by research work to the concerned higher authorities from time to time.
- To publish bibliographies, articles, books and other literature on matters of interest to local bodies.
- To publish journals, bulletins and other literature on different aspects of Local Government and on the working of Local bodies in different states.
- To undertake research studies in public administration, problems of local bodies and also in related topics of urban and environmental factors and arrange for their publication etc.
- To establish and maintain an information-cum-documentation service for local bodies.
- To undertake consultancy assignments in various areas of urban development and problems of local bodies with a view to improve and develop organisational, managerial and operational efficiency.

In view of the above, the Institute has been collaborating with the relevant government departments, Central and State, Universities, Organisations and Research Institutions. The work of the Institute covers several aspects involving a multi-disciplinary teamwork.

**All India Institute of Local Self-Government**

M. N. Roy Human Development Campus, Plot No.6, 'F' Block,
TPS Road No.12, Bandra (E), Mumbai – 400051.
Tel : +91- 86576 22550 / 51 / 52 / 54
E-mail : aiilsgquarterlyjournal@aiilsg.org, info.algq@aiilsg.org
Website : www.aiilsg.org