



Quick Response Code:



Website: <https://wgges.us>



Creative Commons (CC BY-NC-SA 4.0):

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Public License, which allows others to remix, tweak, and build upon the work noncommercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Manuscript ID:
IJWGAFES-2026-030303

DOI: 10.5281/zenodo.21822298

DOI Link:
<https://doi.org/10.5281/zenodo.21822298>

Volume: 3

Issue: 3

March

Year: 2026

E-ISSN: 3066-1552

Submitted: 05 Feb. 2026

Revised: 15 Feb. 2026

Accepted: 06 Mar. 2026

Published: 31 Mar. 2026

Associate Professor in Geography, s.
Zulal Bhilajirao Patil College, Deopur,
Dhule (M.S., India), Affiliated to North
Maharashtra University, Jalgaon
Email: pdnikumbh@gmail.com

Address for correspondence:

Dr. Priyanka D. Nikumbh
Associate Professor in Geography, s.
Zulal Bhilajirao Patil College, Deopur,
Dhule (M.S., India), Affiliated to North
Maharashtra University, Jalgaon
Email: pdnikumbh@gmail.com

How to cite this article:

Nikumbh, P. D. (2026). Infrastructure and Industrial Development as Drivers of Agricultural Growth in Dhule District, Maharashtra. In *International Journal of world Geology, Geography, Agriculture, forestry and Environment Sciences* (Vol. 3, Issue 3, pp. 22–26).
<https://doi.org/10.5281/zenodo.21822298>

Infrastructure and Industrial Development as Drivers of Agricultural Growth in Dhule District, Maharashtra

Dr. Priyanka D. Nikumbh

Abstract

Agriculture continues to be one of the most significant sectors of the Indian economy despite its declining share in the national Gross Domestic Product (GDP). Infrastructure development and industrial expansion play a crucial role in shaping agricultural productivity and rural economic transformation. This study examines the influence of transportation networks, the Delhi–Mumbai Industrial Corridor (DMIC), and energy infrastructure on agricultural development in Dhule district of Maharashtra. The research is based on secondary data obtained from government reports, district irrigation plans, agricultural statistics, and relevant academic literature. The findings reveal that improved connectivity through highways and railway networks facilitates agricultural marketing, reduces transportation costs, and improves access to markets. The DMIC project has the potential to stimulate agro-processing industries, enhance storage infrastructure, and encourage agricultural diversification. In addition, energy projects such as thermal, solar, and wind power plants improve electricity availability for irrigation and agricultural operations. The study concludes that infrastructure and industrial development can act as significant catalysts for agricultural growth in semi-arid regions like Dhule district, provided that these initiatives are supported by effective policy implementation and farmer participation.

Keywords: Agricultural development, Infrastructure development, Industrial corridor, Renewable energy, Dhule district, Rural economy

Introduction

Agriculture has historically played a fundamental role in the economic development of India. It has not only served as the primary source of food production but has also provided employment and livelihoods for a large proportion of the population. Although the share of agriculture in India's Gross Domestic Product (GDP) has declined from nearly 50 percent in the early 1950s to approximately 14 percent in recent years, the sector continues to employ more than half of the country's workforce (Arora, 2013). This structural transformation reflects the growth of industrial and service sectors; however, agriculture remains critical for ensuring food security, poverty reduction, and rural development.

India is endowed with significant agricultural resources, including approximately 140 million hectares of net cropped area and one of the largest irrigated areas in the world. The Green Revolution significantly enhanced agricultural productivity by introducing high-yielding varieties, improved irrigation systems, and chemical fertilizers. As a result, India achieved self-sufficiency in food production and emerged as a major producer of several agricultural commodities such as rice, wheat, pulses, fruits, vegetables, and milk.

Despite these achievements, agricultural development in many regions of India remains constrained by several challenges including climatic variability, inadequate irrigation facilities, fragmented landholdings, and insufficient infrastructure. Infrastructure development plays a vital role in overcoming these challenges by facilitating efficient transportation, enhancing market accessibility, and improving the availability of essential services such as electricity and water supply.

In recent decades, the Government of India has initiated several large-scale infrastructure projects aimed at promoting regional development and improving economic connectivity. One such initiative is the Delhi–Mumbai Industrial Corridor (DMIC), which is considered one of the most ambitious infrastructure development projects in the country. The DMIC aims to create high-technology industrial zones, improve transportation networks, and promote industrialization across several states including Maharashtra.

Dhule district, located in the northern part of Maharashtra, has emerged as an important region within the influence zone of the DMIC. The district is strategically located at the intersection of major national highways and railway routes, making it a potential hub for industrial and agricultural development.

The establishment of industrial zones, textile parks, and agro-processing units in this region is expected to create new economic opportunities for farmers and rural communities.

In addition to transportation and industrial infrastructure, energy infrastructure also plays a critical role in agricultural development. Reliable electricity supply is essential for irrigation systems, especially in semi-arid regions where rainfall is irregular and insufficient for crop production. Renewable energy projects such as solar and wind power plants have gained importance in recent years as sustainable alternatives for rural electrification.

Dhule district has witnessed the development of several energy projects, including thermal power plants, solar power plants, and wind energy installations. These projects are expected to enhance electricity availability and support irrigation infrastructure, thereby improving agricultural productivity.

Given these developments, it is important to examine how infrastructure and industrial expansion influence agricultural growth in the region. This study aims to analyze the role of transportation networks, industrial corridors, and energy projects in promoting agricultural development in Dhule district.

The specific objectives of the study are:

- To examine the existing transportation and infrastructure facilities in Dhule district.
- To analyze the potential impact of the Delhi–Mumbai Industrial Corridor on agricultural development.
- To evaluate the role of energy infrastructure in improving irrigation and agricultural productivity.
- To assess the overall prospects for agricultural development in the region.

Literature Review

Infrastructure development has long been recognized as a key driver of agricultural growth and rural transformation. Several studies have highlighted the importance of transportation networks, irrigation systems, and energy infrastructure in enhancing agricultural productivity and improving farmers' livelihoods.

According to Arora (2013), agricultural growth in India has been significantly influenced by public investments in rural infrastructure, particularly irrigation and transportation. Improved connectivity between rural areas and urban markets enables farmers to access larger markets, reduce transportation costs, and obtain better prices for their agricultural products.

Similarly, Singh and Dhillon (2005) emphasize that transportation infrastructure plays a crucial role in agricultural geography by facilitating the movement of agricultural inputs and outputs. Efficient transportation systems help reduce post-harvest losses and encourage farmers to diversify into high-value crops.

Industrial development also has important implications for agricultural growth. Industrial corridors such as the Delhi–Mumbai Industrial Corridor are designed to stimulate economic development by promoting manufacturing, logistics, and service industries. These corridors often lead to the development of supporting infrastructure such as roads, railways, warehouses, and cold storage facilities, which benefit the agricultural sector as well.

Research on agro-processing industries suggests that industrial development can create new markets for agricultural produce and encourage value addition. Agro-processing industries transform raw agricultural products into processed goods, thereby increasing their market value and generating employment opportunities in rural areas.

Energy infrastructure is another critical factor influencing agricultural development. Reliable electricity supply enables farmers to operate irrigation pumps, use modern agricultural machinery, and adopt advanced farming technologies. Renewable energy sources such as solar and wind power have gained importance in recent years due to their environmental benefits and potential for decentralized energy production.

Several studies have highlighted the role of solar energy in supporting agricultural irrigation in rural areas. Solar-powered irrigation systems reduce dependence on conventional electricity sources and provide a sustainable solution for water management in drought-prone regions.

Despite these advancements, many rural regions still face significant challenges related to infrastructure and energy availability. In semi-arid districts such as Dhule, agricultural productivity is often constrained by irregular rainfall, limited irrigation facilities, and inadequate rural infrastructure.

Therefore, understanding the relationship between infrastructure development and agricultural growth is essential for designing effective policies and development strategies.

Study Area

Dhule district is located in the northern part of Maharashtra and forms part of the Khandesh region. The district lies within the Tapi river basin and is characterized by diverse geographical features including plains, river valleys, and hilly terrains.

The district experiences a semi-arid climate with hot summers and moderate winters. The average annual rainfall is relatively low and is mainly concentrated during the southwest monsoon season. Rainfall variability and frequent droughts pose significant challenges for agricultural production in the region.

Agriculture is the primary occupation of the majority of the population in Dhule district. The major crops grown in the district include cotton, jowar, bajra, wheat, pulses, and oilseeds. In addition, horticultural crops such as onions, chilies, and papaya are also cultivated in certain areas.

The district consists of several tehsils including Dhule, Shirpur, Sakri, and Shindkheda. Each of these regions has distinct agricultural characteristics based on soil type, rainfall patterns, and irrigation facilities.

In recent years, Dhule district has gained strategic importance due to its location at the intersection of major transportation routes. Several national highways pass through the district, connecting it to major cities such as Mumbai, Surat, Indore, and Nagpur.

The district is also included in the influence zone of the Delhi–Mumbai Industrial Corridor, which is expected to bring significant industrial and infrastructural development to the region. These developments are likely to influence agricultural practices, market access, and rural livelihoods in the district

Data and Methodology

The present study is primarily based on secondary data sources supplemented by field observations. Secondary data were collected from various official reports, government publications, and academic literature relevant to agricultural development and infrastructure planning.

The major sources of data include:

District Irrigation Plan (2016–2021), Government of Maharashtra

Agricultural Statistics at a Glance (Government of India)

Maharashtra Energy Development Agency reports

Research publications related to agricultural geography and rural development

Published reports on the Delhi–Mumbai Industrial Corridor (DMIC)

Field observations conducted in selected villages of Dhule district were also considered in order to understand the practical implications of infrastructure development on agricultural activities. The analysis in this study is qualitative and descriptive in nature, focusing on examining the relationship between infrastructure development and agricultural growth. The major variables considered include:

Transportation infrastructure, Industrial corridor development, Energy infrastructure projects

Market accessibility, Irrigation potential

These factors were analyzed in relation to their impact on agricultural productivity and rural economic development.

Infrastructure Development in Dhule District

1. Transportation Infrastructure

Transportation infrastructure plays a crucial role in agricultural development by enabling efficient movement of agricultural inputs and outputs. Farmers depend heavily on transportation facilities for accessing markets, transporting fertilizers and seeds, and delivering agricultural produce to urban centers.

Dhule district enjoys a strategic geographical position due to the presence of several major national highways. The Bombay–Agra Highway (NH-3) is one of the most important transportation routes passing through the district. This highway connects the district with major cities such as Mumbai, Nashik, and Indore, thereby facilitating trade and transportation.

Another significant transportation route is the Surat–Nagpur–Kolkata Highway (NH-6), which connects the western and eastern parts of India. This highway enables the transportation of agricultural commodities to major markets and industrial centers.

The Dhule–Solapur Highway (NH-211) further enhances regional connectivity and improves access to markets in southern Maharashtra.

In addition to road transport, railway connectivity also contributes significantly to regional economic development. The Dhule–Chalisgaon railway line and the Bhusawal–Surat railway line provide important transportation links for goods and passengers.

A major future infrastructure development is the proposed Indore–Dhule–Malegaon–Manmad railway line, which is expected to reduce the distance between Mumbai and central India by approximately 171 kilometers. This railway corridor will facilitate faster transportation of agricultural commodities and reduce logistical costs for farmers.

Improved transportation infrastructure not only enhances agricultural marketing but also promotes the development of agro-processing industries and cold storage facilities.

2. Industrial Development and the Delhi–Mumbai Industrial Corridor

The Delhi–Mumbai Industrial Corridor (DMIC) is one of the largest infrastructure projects in India. It is a joint initiative between the governments of India and Japan under the Comprehensive Economic Partnership Agreement (CEPA). The primary objective of the project is to develop high-technology industrial zones and promote manufacturing and logistics industries along the corridor.

The DMIC covers six states, including Uttar Pradesh, Haryana, Rajasthan, Madhya Pradesh, Gujarat, and Maharashtra. Approximately 18 percent of the area of Maharashtra lies within the influence zone of the corridor.

In Maharashtra, four development nodes have been identified within the influence zone of the corridor. One of these is the Dhule–Nardana Investment Region, which is located near the intersection of three major national highways.

The strategic location of the Dhule–Nardana region makes it highly suitable for industrial development. The Government of Maharashtra has proposed the establishment of a textile park at Nardana covering approximately 600 hectares of land. The region has abundant availability of raw materials and labor, making it an ideal location for textile and agro-processing industries.

The development of industrial zones and manufacturing units in the region is expected to have several positive effects on agriculture, including:

Creation of new markets for agricultural products

Promotion of agro-processing industries

Improved storage and transportation facilities

Increased employment opportunities for rural populations

Agro-processing industries, in particular, can play a crucial role in enhancing agricultural value addition by converting raw agricultural commodities into processed products.

3. Energy Infrastructure and Agricultural Development

Energy availability is a critical factor for agricultural development, particularly in regions where irrigation depends on electrically operated pumps.

Dhule district has experienced rapid development in energy infrastructure through thermal, solar, and wind energy projects.

Dondaicha Thermal Power Project

The Dondaicha Thermal Power Project is a major proposed power generation facility with a capacity of 3300 MW. The project is located in villages such as Vikharan, Methi, and Vazhadi in Shindkheda tehsil.

The development of this power plant is expected to significantly improve electricity supply in the region. Increased electricity availability will enable farmers to operate irrigation pumps more efficiently, thereby improving crop production.

Sakri Solar Power Plant

The Sakri Solar Power Plant, located at Shivajinagar in Sakri tehsil, is one of the largest solar power projects in the region. The plant has a capacity of approximately 125 MW and was established under the National Solar Mission of the Government of India.

Solar energy provides a sustainable and environmentally friendly source of electricity for rural areas. Solar-powered irrigation systems can reduce dependence on conventional electricity sources and help farmers manage water resources more effectively.

Wind Energy Projects

Wind energy projects developed by Suzlon Energy Limited have also been established in Sakri tehsil. Wind turbines have been installed in villages such as Brahmanwel and Khori, generating substantial amounts of renewable electricity.

These renewable energy initiatives contribute to the diversification of energy sources and support sustainable rural development.

Impact of Infrastructure Development on Agriculture

Infrastructure and industrial development can significantly influence agricultural productivity and rural economic development.

One of the most important impacts is improved market accessibility. Farmers in Dhule district can now transport their agricultural produce to larger markets more efficiently. This reduces post-harvest losses and increases the profitability of agricultural activities.

Another important impact is the promotion of agro-processing industries. The development of industrial zones encourages investment in food processing units, textile mills, and storage facilities. These industries create demand for agricultural raw materials and provide additional income opportunities for farmers.

Infrastructure development also contributes to improved irrigation facilities. Reliable electricity supply enables farmers to operate irrigation pumps more effectively. This is particularly important in semi-arid regions where rainfall is insufficient for crop cultivation.

Furthermore, the development of transportation and industrial infrastructure attracts investment and creates employment opportunities for rural populations. This contributes to overall rural development and improves the standard of living of farmers.

Discussion

The findings of this study highlight the significant role of infrastructure and industrial development in promoting agricultural growth in Dhule district.

Transportation networks such as highways and railways play a vital role in connecting rural areas with urban markets. Efficient transportation systems reduce the cost of agricultural marketing and encourage farmers to cultivate high-value crops. Industrial development initiatives such as the DMIC can stimulate economic growth by promoting agro-processing industries and improving logistics infrastructure. These developments can transform rural economies by creating new employment opportunities and increasing farmers' income.

Energy infrastructure is equally important for agricultural development. Reliable electricity supply enables farmers to adopt modern irrigation technologies and increase crop productivity.

However, infrastructure development alone cannot guarantee agricultural growth. Effective policy implementation, institutional support, and farmer participation are essential for ensuring that the benefits of these projects reach rural communities.

Policy Implications

Based on the findings of the study, several policy recommendations can be proposed:

Strengthening rural transportation networks to improve agricultural marketing.

Promoting agro-processing industries in industrial corridor regions.

Expanding renewable energy projects for sustainable irrigation.

Encouraging farmer participation in industrial development initiatives.

Improving agricultural extension services to support technological adoption.

Conclusion

Infrastructure and industrial development play a crucial role in shaping agricultural growth in semi-arid regions. Dhule district possesses significant potential for agricultural transformation due to its strategic location, transportation networks, and industrial development initiatives.

The Delhi–Mumbai Industrial Corridor, renewable energy projects, and improved transportation infrastructure can significantly enhance agricultural productivity and rural livelihoods. However, achieving sustainable agricultural development requires integrated planning, effective policy implementation, and active participation of farmers.

Acknowledgment

The author expresses sincere gratitude to Kavayitri Bahinabai Chaudhari North Maharashtra University for providing academic support and encouragement for the completion of this research work. Special thanks are extended to the management and colleagues of S. Zulal Bhilajirao Patil College for their valuable cooperation and institutional support during the study.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References

1. Arora, V. P. S. (2013). Agricultural growth and productivity in India. *Agricultural Economics Research Review*, 26(2), 135–157.
2. District Irrigation Plan. (2016–2021). Government of Maharashtra.
3. Singh, J., & Dhillon, S. S. (2005). *Agricultural Geography*. New Delhi: Tata McGraw-Hill.
4. Government of India. (2012). *Agricultural Statistics at a Glance*.
5. Ezedimma.F.O.C.1986,” Crop Science” in A. Youdeowei, Ezedinma, F.O.C. and Onazi. A. (eds). *Introduction to Tropical Agriculture*, Longman Essex.
6. Hodder. 1980. *Economic Development in the tropics*,Methuen London. www.hpccc.gov.in
7. Singh. Yadavindar(1997): “Eco-Degradation of Productive Life Support Environment As Correlated to Agricultural Development In Paudh Region, Panjab”, *Transactions, Institute of Indian geographers*, Pune.Vol.19,No.1 pp.57-69