iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** V **Month of publication:** May 2026

DOI: https://doi.org/10.22214/ijraset.2026.83045

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue V May 2026- Available at www.ijraset.com

Strategic Planning for Agro-Industrial Growth: An Integrated Regional Framework for Bargarh District

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Abstract: ***The Bargarh district, located in the western part of Odisha, occupies a unique position in terms of irrigated agriculture within the Indian territory. Being supplied with irrigation via canals from the Hirakud Dam and having an economy based mainly on rice cultivation, Bargarh offers promising prospects in terms of agro-industry development. Nevertheless, the presence of good agricultural productivity alone is not enough to ensure regional prosperity. According to this study, what the region requires now is an integrated regional planning process that will connect agriculture production with processing capacity, effective water management and transportation systems, environmental sustainability, and others. On the basis of empirical evidence derived from scholarly sources and regional statistics, this paper will develop a model of agro-industrial development for the region. In particular, it will be argued that rice value chain should act as the focal point in such a strategy, supplemented by a careful diversification of crop variety (such as pulses and oilseeds).***

Keywords: Agro-industrial growth, regional planning, Bargarh district, Irrigation-led development, Rice value chain, Rural industrialization, Sustainable agriculture, Odisha.

I. INTRODUCTION

Agro-industrial development has been a consistent theme in regional planning discourses as a means to enhance rural incomes and economic diversification in the form of value chain upgrading. The rationale is well-understood that when there is an agricultural production base, the setting up of nearby industries will help capture value from commodities that are being sold as raw materials, suffer from seasonality issues, and leakages along the chain. Such an approach toward a value-chain centric strategy as opposed to production-centred one becomes even more significant for irrigated agrarian regions in India due to the presence of agricultural stability but lack of industrial depth.

Bargarh district provides an interesting case for such a study. The construction of the Hirakud Dam – one of the first multipurpose projects of independent India – has led to favourable water availability in the region and ensured continuous irrigation facilities across a vast swath of the district. Agricultural intensification in the region, characterized by paddy growing on a huge scale in the Bargarh Canal Command Area, has provided enough and reliable raw material resources for agro-industries. However, despite the resource endowment, the agro-industries in the region have not yet become deep-rooted.

A. Background of Planning Problem

In the case of Bargarh district, there is no problem regarding the insufficient production of agricultural outputs. On the other hand, the issue is lack of integrated approach that links production, processing, infrastructure, environment sustainability, and institution management in order to ensure the development of a functional agro-industrial complex. Independent initiatives of constructing mills, storing goods, and improving irrigation are disconnected, resulting in failure of creating an agro-industrial cluster. Thus, there is a need for the formulation of strategic planning that would consider these factors as interconnected elements of regional economy.

B. Research Objectives and Scope

The present research seeks to formulate a strategic planning framework for promoting agro-industrial development in Bargarh district through analysis of secondary sources and regional studies. There are no results from primary research, agricultural studies, and macroeconomic forecast included in this paper. Geographical scope of the research is restricted to Bargarh district, while the rest of evidence related to Eastern India could be used occasionally only for purposes of sustainability assessment.

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II. STUDY AREA AND REGIONAL CONTEXT

A. Agro-hydrological Base

Bargarh district is located in the Mahanadi basin of western Orissa. It has been characterized as the Hirakud irrigation command and the Bargarh Canal command is the primary source of irrigation within the district. A recent review of peer-reviewed articles has confirmed the primacy of Bargarh Canal command area in irrigation and subsequent land use planning in the district. Water quality assessment of groundwater within Bargarh Canal command area reveals that despite the high irrigation potential, varying water quality in space necessitates consideration in land use planning for agricultural intensification and agro-industrial processing.

The irrigation facility in the region due to the Hirakud Dam is more than hydrological in nature. A study analysing the agricultural conditions in Bargarh district has revealed that with the commissioning of the dam, regular irrigation has altered the crop schedule and led to adoption of double cropping system in many blocks of Bargarh Canal command area resulting in increased paddy production. The uninterrupted irrigation facility is the comparative advantage that sets apart the district from other rain fed agriculture-based agrarian regions.

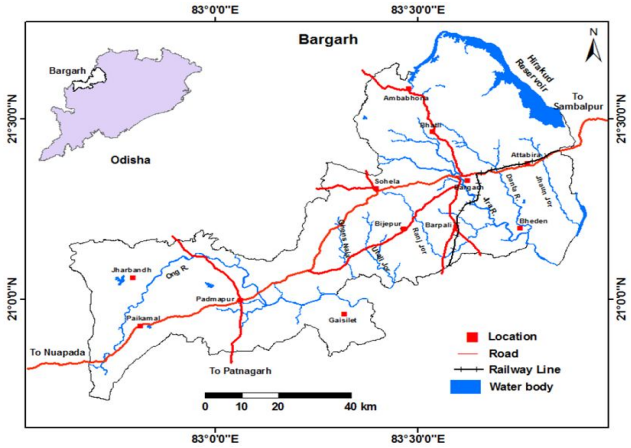


Fig. 1 A geographical reference map of the Bargarh district

B. Agricultural and Value Chain Profile

1) Paddy forms the dominant crop grown in Bargarh District, both in the kharif and rabi seasons through canal irrigation. The identity of Bargarh as a paddy-growing district is further enhanced by the existence of a network of rice mills and agricultural processing plants in the district, especially those in Attabira, one of the key nodes in the rice-milling profile of the district. Other minor crops such as pulses and oilseeds, grown in upland areas without irrigation, present under-utilised options for diversification.

2) With the population of 1.48 million in 2011 Census and a literacy rate of 71%, there exist some basic data for agro-industrial labour planning in the district. In terms of connectivity, road connectivity through NH-53, together with rail connectivity, makes outward movement easier. However, the strength of internal connectivity for transport needs to be a consideration in planning for agro-industries.

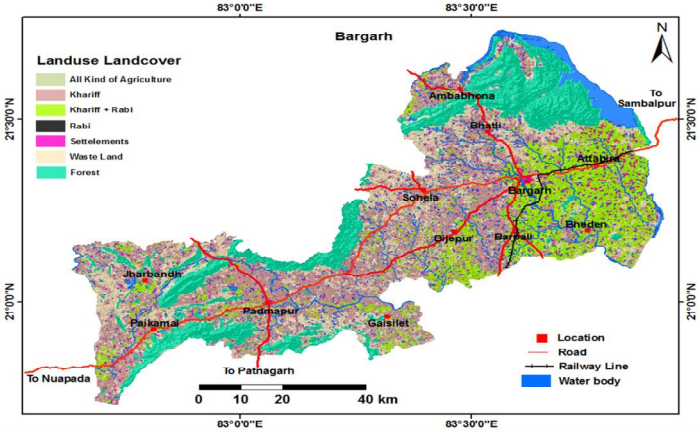


Fig. 2 A thematic land use and land cover map of the Bargarh district

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III. ANALYSIS AND PLANNING FRAMEWORK

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A. Advantages of Agro-Industrial Expansion

There are three important aspects that are the basic building blocks for growth in agro-industries in Bargarh. The first one is the guaranteed supply of water, which comes from the irrigation systems set up by the Hirakud reservoir project, to meet the needs of reliable supply of materials essential for any investment in the Agro-processing industry. Secondly, there is the present capacity in the milling of rice, especially the milling centres in Attabira, which signifies that the necessary nucleus of Agro-business is already in place in the area. Thirdly, there are various levels at which processing of paddy-rice can be undertaken.

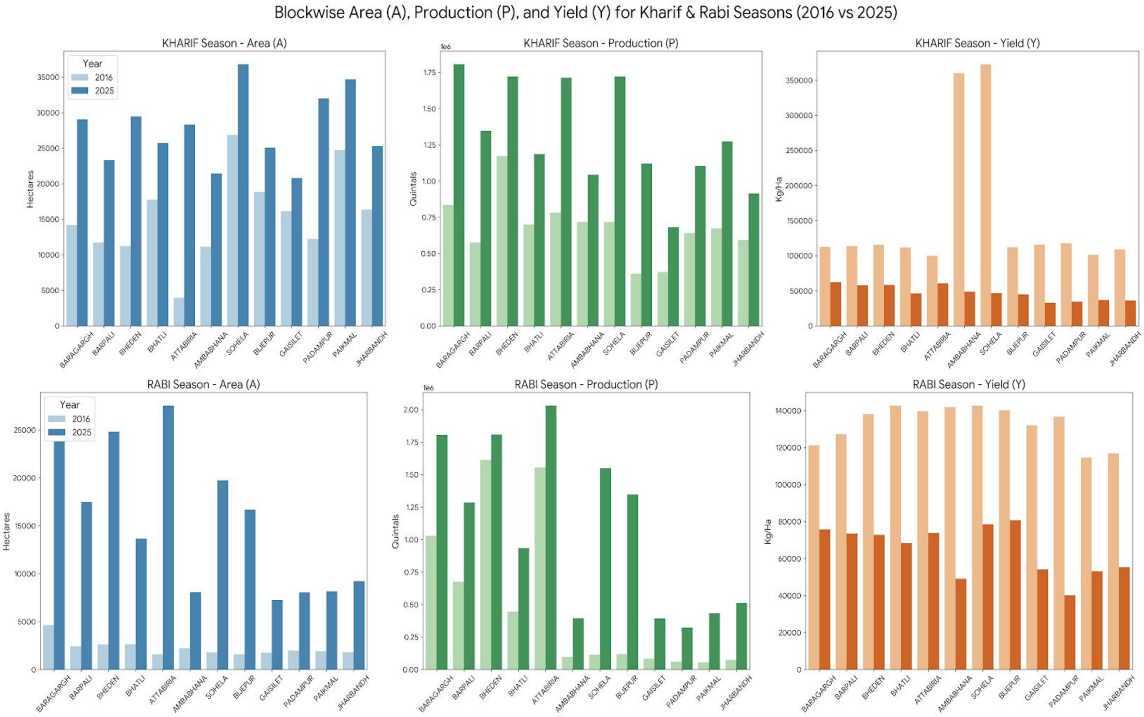


Fig.3 A comparative bar charts analysing the block-wise agricultural area, production, and yield for the Kharif and Rabi seasons across the Bargarh district for the years 2016 and 2025.

B. Constraints and Risks

The potential of the agro-industry in Bargarh is limited by a number of constraints that need to be considered in any sound planning process. The fluctuations in groundwater quality in the canal command area may influence the potential for sustainable intensification as well as the use of water in processing activities. Risks to the quality of the food chain arising from the presence of heavy metals in irrigated rice systems in eastern India pose a risk for achieving certification in food safety standards. It is important to note, however, that while there is evidence of heavy metal contamination in the broader region of eastern India, it cannot be used as evidence of the existence of such a problem in Bargarh specifically.

Structural risks also need to be considered. Dependence on one particular value chain increases vulnerability to changes in prices, weather patterns, and procurement policies. The logistics and post-harvest infrastructure of the district are yet to be analysed thoroughly.

C. Integrated Planning Framework

In terms of an integrated planning approach, the paper puts forward a planning framework that is based on five complementary elements:

Strengthening the Production Base. There is an urgent need for irrigation efficiencies and upgrading of input services; extension work and climatically adaptive crop management practices also need to be emphasised in command-area blocks. Diversification of crops, specifically towards pulses and oil seeds in the uplands, needs to be encouraged.

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Value Addition and Processing. An important element in the medium term is the modernization of rice mills to meet food safety and energy efficiency standards, establishing common facilities centres for byproduct processing, and enabling FPOs to have access to processing chains. This can be linked with the Attabira cluster.

Warehousing and Logistics. Storage capacities and last mile linkages with district produce through formal market yards need to be improved, along with aggregation capacities at the block level and mandals.

Environmental Management. An environmental monitoring program in relation to the quality of groundwater and surface canal water sources has to be put in place. Effluent management has to be followed by Agro-processing industries, while the husk and bran streams have to be diverted into energy and feed processing chains.

Institutional Coordination. There must be coordination among district administration, departments dealing with agriculture and irrigation, micro-small medium enterprises (MSME) promotion agencies, FPOs, and private processors. Fragmentation of activities among various departments remains a constant challenge; thus, there is a need for an agro-industrial planning cell in the districts.

Phased Implementation. Short-term measures include conducting baselines, infrastructure assessment, value-chain assessment, and putting environmental monitoring programs in place. Cluster modernization, common facilities creation, and expansion of warehousing capacities are some medium-term activities. Long-term measures involve developing a diversified and certified agro-industry ecosystem that could be marketed through brand development.

IV. STRATEGIC RECOMMENDATIONS

Agro-industrial policies need to move past output-based goals to incorporate considerations about value realisation, employment, environment and sustainability and institutional resilience in Bargarh. Some key recommendations based on the results of framework analysis are:

The rice-led approach to agro-industrial development needs to continue, but efforts to diversify towards pulses and oilseeds cannot be neglected to minimize dependency. Organized procurement and processing infrastructure needs to be made accessible to farmers through investment in infrastructure as well as carefully negotiated PPPs.

It is imperative that the district have a quality assurance system in place to ensure market credibility, which must include measures concerning grain safety, water quality, and processing. Efforts need to be made in promoting energy efficiency in agro-processing units and making good use of waste products. Producer organizations should be encouraged as intermediary institutions between small farmers and value chains.

Evaluation of the framework's efficacy needs to focus on some concrete indicators, including agricultural productivity and irrigation efficiency, processing capabilities and their utilization, jobs created in peri-urban processing facilities, percentage of output processed, water quality index and environment compliance levels, and logistics and market access performance measures.

V. CONCLUSIONS

The future agricultural industrialization of Bargarh depends on the strength of its irrigated agrarian base, which few similar districts in western Odisha could rival. The combination of the Hirakud command area, the predominance of paddy agriculture, and the presence of rice processing infrastructure makes for a genuine foundation of development. But turning this foundation into an agro-industrial success calls for holistic planning.

This framework outlined in this paper considers all five aspects -production, processing, infrastructure, environment, and institutional arrangements-as integral parts of a coordinated strategy at the district level. With an emphasis on rice production and processing, along with diversification, quality, and sustainability concerns, this framework serves as a useful model of district-level planning based on regional realities.

Future studies must use this model based on empirical data and statistical sources from Bargarh itself, including district-level primary data and geospatial mapping of existing infrastructure networks Causal Productions permits the distribution and revision of these templates on the condition that Causal Productions is credited in the revised template as follows: “original version of this template was provided by courtesy of Causal Productions (www.causalproductions.com)”.

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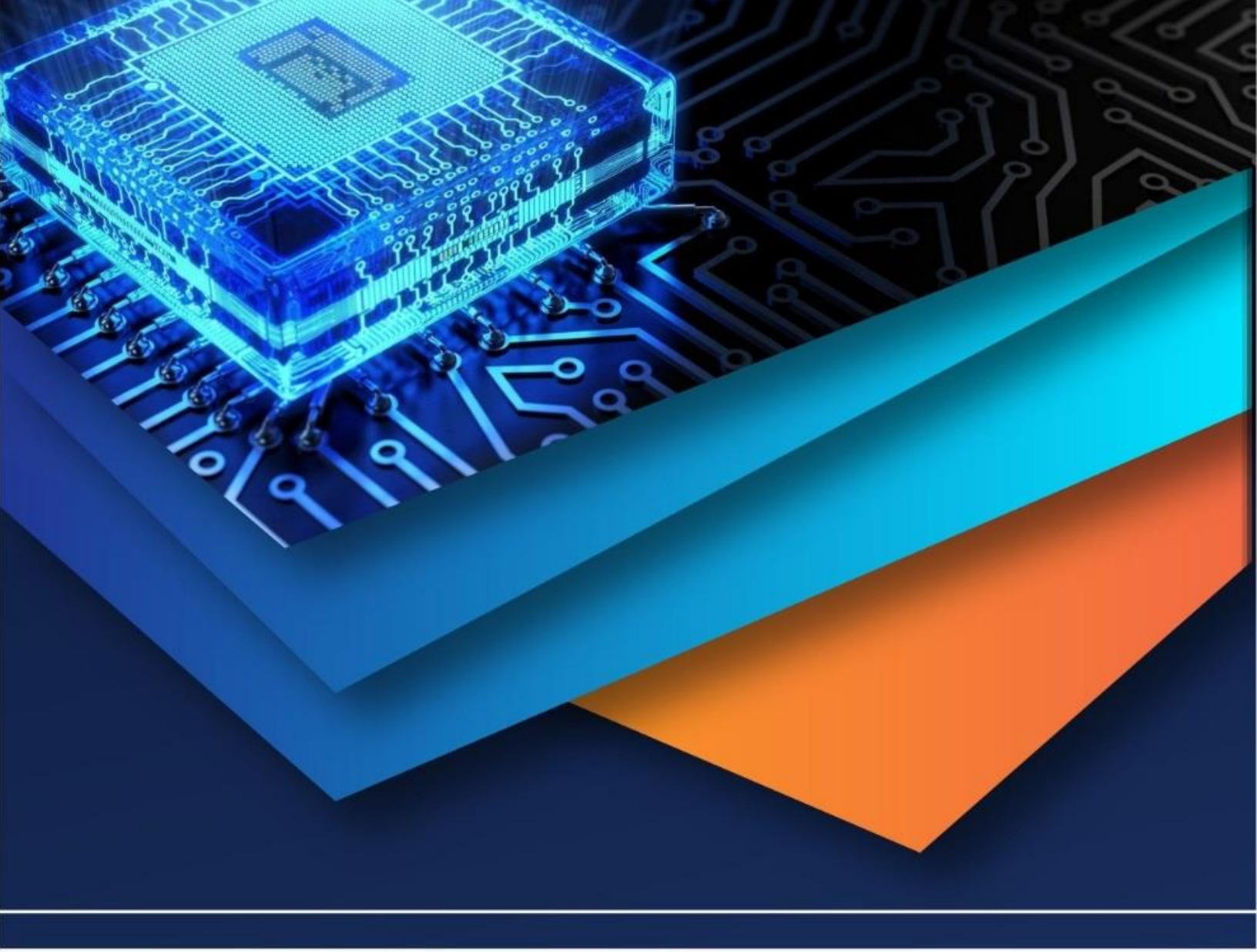
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