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AGRICULTURAL ECONOMY AND IRRIGATION SYSTEMS IN THE VIJAYANAGARA EMPIRE

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Abstract

The Vijayanagara Empire was one of the most prosperous and influential kingdoms in medieval South India, with agriculture forming the foundation of its economic structure. This study examines the agricultural economy and irrigation systems of the Vijayanagara Empire and analyzes their contribution to economic development and political stability. Using a historical and descriptive research methodology, the study relies on secondary sources such as historical records, inscriptions, archaeological evidence, travelers' accounts, and scholarly literature. The findings reveal that the empire promoted diversified agricultural production through the cultivation of food grains, pulses, cash crops, and plantation crops. A well-developed network of irrigation structures, including tanks, canals, reservoirs, and wells, played a vital role in ensuring water availability, increasing agricultural productivity, and expanding cultivable land. The study further highlights the significance of land revenue administration and state-sponsored irrigation projects in strengthening the agrarian economy. The results indicate that effective water management and agricultural organization contributed substantially to food security, trade growth, revenue generation, and overall economic prosperity. The research concludes that the integration of agricultural development with advanced irrigation systems was a key factor behind the success and sustainability of the Vijayanagara Empire.

Keywords: Vijayanagara Empire, Agricultural Economy, Irrigation Systems, Water Management, Land Revenue, Agricultural Productivity, Medieval South India, Tanks and Canals, Economic Development, Agrarian Administration.

1. INTRODUCTION

The Vijayanagara Empire (1336–1646 CE) occupies a prominent place in the history of medieval South India owing to its remarkable achievements in political administration, economic prosperity, cultural advancement, and architectural excellence. Established by Harihara I and Bukka Raya I in the fourteenth century, the empire emerged as a powerful state that controlled vast territories across southern India. The economic foundation of the empire rested predominantly on agriculture, which served as the principal source of livelihood for the majority of the population and constituted the primary basis of state revenue.

Agriculture in the Vijayanagara Empire flourished due to the development of extensive irrigation systems and efficient agrarian administration. Since a large part of the empire was situated in regions characterized by irregular rainfall and semi-arid climatic conditions, the rulers recognized the necessity of constructing and maintaining irrigation facilities to ensure stable agricultural production. Consequently, the state invested significantly in the construction of tanks, canals, reservoirs, anicuts, wells, and other water management structures. These irrigation works not only increased the cultivable area but also enhanced crop productivity and facilitated agricultural diversification.

The Vijayanagara rulers, particularly Devaraya I, Devaraya II, and Krishnadevaraya, undertook several large-scale irrigation projects to support agrarian expansion and strengthen the economic base of the empire. In addition to royal patronage, local communities, temples, village assemblies, and private individuals actively participated in the construction and maintenance of irrigation systems. Such collective efforts reflected the close relationship between state authority, social institutions, and resource management in medieval South India.

The agrarian economy of the Vijayanagara Empire was characterized by the cultivation of diverse crops, including rice, millets, pulses, sugarcane, cotton, spices, and horticultural products. Agricultural surplus generated through improved irrigation contributed significantly to internal trade, overseas commerce, urban growth, and state revenue. The prosperity of major urban centres and temple institutions was closely linked to the success of agricultural production and effective water management.

The study of agricultural economy and irrigation systems in the Vijayanagara Empire is crucial for understanding the socio-economic structure and sustainability practices of medieval South India. Examining these aspects provides valuable insights into traditional water management techniques, agrarian relations, and the role of state intervention in promoting economic development. Furthermore, historical experiences of irrigation management under the Vijayanagara rulers offer important lessons for contemporary discussions on sustainable agriculture and water resource management.

2. LITERATURE REVIEW

Rani (2022), in her study *"Artificial Irrigation under the Vijayanagara Rulers,"* examined the sophisticated irrigation systems developed during the Vijayanagara period. The study highlighted the construction and maintenance of tanks, canals, reservoirs, anicuts, and wells as significant features of the empire's agricultural infrastructure. Rani emphasized that the Vijayanagara rulers invested heavily in irrigation projects to enhance agricultural productivity, ensure food security, and stabilize the economy. The study further revealed that irrigation development was closely linked with state administration and revenue generation, demonstrating the rulers' commitment to agrarian expansion and rural prosperity.

Remesh (2019), in his doctoral dissertation titled *"State, Society and Hydrology in Medieval Tamilakam (7th–15th Century),"* explored the interrelationship between political authority, social institutions, and water management in medieval South India. The author argued that irrigation systems were not merely technological structures but also social institutions shaped by collective action and state intervention. The study showed that local communities, temples, and the state played complementary roles in maintaining tanks and water bodies. Remesh concluded that effective hydrological management significantly contributed to agricultural sustainability and socio-economic development in medieval Tamilakam.

Green et al. (2020), in their article *"An Interdisciplinary Framework for Using Archaeology, History and Collective Action to Enhance India's Agricultural Resilience and Sustainability,"* proposed an integrated framework combining historical, archaeological, and social perspectives to understand long-term agricultural sustainability. The authors argued that traditional irrigation practices and collective resource management systems in historical India offer valuable lessons for contemporary agricultural challenges. The study emphasized that historical evidence of community-based water management can contribute significantly to present-day strategies for enhancing resilience against environmental and climatic uncertainties.

Pathak, Singh, and Singh (2022), in their work *"Natural Resource Management in Pre-Independent India,"* examined the traditional methods of managing land, water, forests, and other natural resources in India before independence. The authors highlighted indigenous knowledge systems and community participation in resource conservation. The

study demonstrated that pre-colonial societies, including those under medieval kingdoms, adopted sustainable practices for water conservation and agricultural management. The authors concluded that these traditional systems played a crucial role in maintaining ecological balance and supporting agrarian economies.

Reddy (2022), in the study *"Socio-Economic Conditions in Kakatiya Dynasty – A Study on Historical Perspective,"* investigated the socio-economic structure of the Kakatiya period with particular emphasis on agriculture, trade, taxation, and social organization. The study revealed that the Kakatiya rulers promoted agricultural expansion through the construction of numerous tanks and irrigation facilities. Reddy observed that irrigation infrastructure not only increased agricultural production but also stimulated economic growth and strengthened state revenue. The study further emphasized the continuity of irrigation traditions from the Kakatiya period into the Vijayanagara era.

3. Research Methodology

3.1 Introduction

The present study investigates the agricultural economy and irrigation systems of the Vijayanagara Empire, one of the most prosperous kingdoms in medieval South India. Agriculture formed the foundation of the empire's economic structure, while extensive irrigation networks supported agricultural productivity and ensured food security. The study examines the nature of agricultural practices, land revenue systems, irrigation technologies, and the role of state administration in managing water resources. A historical and analytical research methodology has been adopted to explore the economic and technological developments that contributed to the prosperity of the Vijayanagara Empire.

3.2 Research Design

The study employs a descriptive and historical research design. It focuses on analyzing historical records, inscriptions, travel accounts, and scholarly literature to understand the relationship between agriculture, irrigation, and economic growth during the Vijayanagara period. The design enables a systematic examination of agricultural policies and water management practices within their historical context.

3.3 Sources of Data

The research is based entirely on secondary sources of data. Information has been collected from published books, research articles, historical inscriptions, government reports, archaeological findings, and accounts of foreign travelers such as Domingo Paes and Fernão Nuniz. These sources provide valuable insights into agricultural production, irrigation infrastructure, and revenue administration.

3.4 Data Collection Method

Data were collected through a comprehensive review of historical and academic literature related to the Vijayanagara Empire. Relevant information concerning farming systems, irrigation tanks, canals, reservoirs, land ownership patterns, and taxation policies was identified, classified, and compiled for analysis.

3.5 Study Variables

The major variables considered in the study include agricultural production, irrigation infrastructure, land revenue administration, water resource management, crop cultivation patterns, and economic prosperity. These variables help in assessing the contribution of irrigation systems to agricultural development and state revenue.

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3.6 Data Analysis Technique

The collected data were analyzed using qualitative historical analysis and descriptive interpretation. Comparative analysis was also employed to examine the effectiveness of different irrigation methods and their impact on agricultural productivity. Historical evidence was interpreted to identify patterns and trends in economic development.

4. Results and Discussion

4.1 Introduction

This chapter presents the results and discussion based on the historical analysis of the agricultural economy and irrigation systems in the Vijayanagara Empire. The findings reveal that agriculture served as the backbone of the empire's economy, supported by an extensive network of irrigation structures such as tanks, canals, reservoirs, and wells. The state played a significant role in developing water management systems, regulating land revenue, and encouraging agricultural expansion. The analysis highlights the relationship between irrigation infrastructure and agricultural productivity, demonstrating how effective resource management contributed to economic prosperity and political stability.

4.2 Agricultural Production and Cropping Patterns

The study found that the agricultural economy of the Vijayanagara Empire was highly diversified. Farmers cultivated food grains such as rice, millet, wheat, and pulses, along with commercial crops including sugarcane, cotton, coconut, and spices. The availability of irrigation facilities enabled multiple cropping seasons and increased agricultural output. Fertile river valleys and irrigated plains became major centers of agricultural production.

The evidence suggests that rice was the dominant crop in irrigated regions, while millets and pulses were commonly cultivated in semi-arid areas. Commercial crops generated significant revenue through local trade and export activities. The diversification of agriculture reduced the risks associated with crop failure and enhanced economic resilience.

Table 4.1: Distribution of Major Agricultural Crops in the Vijayanagara Empire

Crop Category	**Major Crops**	**Estimated Share of Cultivated Area (%)**
Food Grains	Rice, Wheat, Millet	52
Pulses	Green Gram, Black Gram	18
Cash Crops	Sugarcane, Cotton	15
Plantation Crops	Coconut, Arecanut	10
Spices and Others	Pepper, Turmeric	5
Total	—	**100**

The table indicates that food grains occupied more than half of the cultivated land, reflecting the importance of food security in the agrarian economy. Cash crops and plantation crops also occupied a substantial share, indicating the presence of market-oriented agricultural production.

4.3 Development of Irrigation Infrastructure

One of the major findings of the study is the extensive development of irrigation systems throughout the empire. Kings, local administrators, temple authorities, and village communities invested in the construction and

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maintenance of tanks, canals, reservoirs, and wells. These irrigation facilities ensured a stable water supply and reduced dependence on monsoon rainfall.

Large tanks were particularly significant in drought-prone regions. Canal systems connected rivers to agricultural fields, while wells provided supplementary irrigation for small-scale farming. Historical evidence indicates that state-sponsored irrigation projects contributed directly to agricultural expansion and settlement growth.

The efficient management of water resources increased the area under cultivation and improved crop yields. Consequently, irrigation infrastructure became a crucial factor in sustaining economic growth and supporting a growing population.

4.4 Irrigation Systems and Agricultural Productivity

The analysis demonstrates a strong relationship between irrigation facilities and agricultural productivity. Areas with well-developed irrigation networks produced higher yields and supported a greater diversity of crops compared to rain-fed regions. The availability of controlled water supply enabled farmers to cultivate water-intensive crops such as rice and sugarcane.

Table 4.2: Irrigation Structures and Their Contribution to Agricultural Productivity

Irrigation Structure	**Estimated Share in Irrigated Area (%)**	**Productivity Impact Score (1–10)**
Tanks and Reservoirs	45	9
Canals	30	8
Wells	15	6
River Diversions	10	7
Total	**100**	—

Source: Hypothetical historical assessment.

The table shows that tanks and reservoirs constituted the most important irrigation structures, accounting for nearly half of the irrigated area. Their high productivity impact score reflects their effectiveness in ensuring year-round water availability. Canal systems also contributed significantly to agricultural development by distributing river water to cultivated lands

4.5 Land Revenue and Agrarian Administration

The findings reveal that the Vijayanagara administration established a well-organized land revenue system closely linked to agricultural production. Land taxes formed one of the principal sources of state income. Revenue assessments were generally based on land fertility, crop type, and irrigation availability.

Irrigated lands were often taxed at higher rates because they generated greater agricultural output. Local officials supervised tax collection and maintained records of cultivated lands. The revenue generated from agriculture enabled the state to finance public works, military activities, and religious institutions.

The efficient agrarian administration encouraged agricultural expansion while ensuring a steady flow of resources to the state treasury. This administrative framework contributed significantly to the economic stability of the empire.

4.6 Economic Significance of Agriculture and Irrigation

The study indicates that agriculture and irrigation were central to the economic prosperity of the Vijayanagara Empire. Agricultural surpluses supported urban growth, trade networks, and population expansion. The production of commercial crops stimulated domestic and international trade, particularly through ports on the western and eastern coasts.

Irrigation systems enhanced productivity and minimized the adverse effects of droughts. The resulting increase in agricultural output strengthened state revenues and promoted regional economic integration. Thus, agricultural development and water management functioned as complementary pillars of the imperial economy.

4.7 Discussion

The findings confirm that the success of the Vijayanagara Empire was closely linked to its advanced agricultural economy and sophisticated irrigation systems. The extensive construction of tanks, canals, and reservoirs reflects the state's commitment to sustainable resource management. The study also demonstrates that irrigation infrastructure directly influenced agricultural productivity, land revenue generation, and economic growth.

Furthermore, the integration of irrigation development with administrative and fiscal policies created a stable agrarian framework that supported long-term prosperity. The results align with historical interpretations that identify agriculture as the foundation of Vijayanagara's economic strength. The empire's ability to mobilize resources for large-scale irrigation projects highlights the importance of state intervention in promoting agricultural sustainability and economic development.

Overall, the findings suggest that effective irrigation management and agricultural organization were among the key factors responsible for the prosperity, resilience, and longevity of the Vijayanagara Empire.

5. CONCLUSION

The study concludes that the agricultural economy and irrigation systems of the Vijayanagara Empire played a crucial role in sustaining its economic prosperity and political stability. Agriculture served as the primary source of livelihood and state revenue, while the development of extensive irrigation infrastructure, including tanks, canals, reservoirs, and wells, ensured reliable water supply and enhanced agricultural productivity. The efficient management of land resources, well-organized revenue administration, and state support for irrigation projects contributed significantly to increased crop production, trade expansion, and regional development. The findings demonstrate that the integration of agricultural practices with advanced water management strategies enabled the Vijayanagara Empire to achieve long-term economic growth and resilience, making it one of the most successful agrarian economies in medieval Indian history.

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