

A Comparative Analysis of Rice Industry Productivity and Export Strategies: Evidence from Sri Lanka and Thailand from 2003 - 2023

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Keywords: *Agricultural policy; Export Competitiveness; Agro- Economics; Rice Industry Development; Strategies; SMEs*

Introduction

Rice is more than a staple food crop in Asia. It is deeply embedded in economic structures, food security systems, and export potential, particularly in South and Southeast Asia. Thailand and Sri Lanka, though geographically close and culturally influenced by rice cultivation, have followed diverging trajectories in terms of productivity growth and international competitiveness in the rice industry. Thailand has consistently ranked among the top global rice exporters, contributing approximately 12% to the world rice trade in 2022 (FAO, 2023). In contrast, Sri Lanka, despite favourable agroecological conditions and a rich agricultural tradition, has remained a net importer of rice in several recent years (CBSL, 2023). This divergence raises critical questions regarding the structural, policy, and technological differences shaping rice productivity and export strategies in these two countries.

In Thailand, the rice sector has been strengthened by large-scale mechanisation, effective irrigation systems, and market-oriented reforms introduced in the 1990s and expanded under Thailand's Agricultural Development Plan (Ministry of Agriculture and Cooperatives, 2022). These reforms emphasised export competitiveness, infrastructure development, and farmer training programmes. By contrast, Sri Lanka's rice industry has focused mainly on domestic food security, supported by heavy subsidies for inputs such as fertilizer and water, as reflected in the "Api Wawamu Rata Nagamu" initiative. However, a lack of systematic export strategy and weak integration with global market has limited Sri Lanka's ability to capitalize on potential surplus production (Edirisinghe et al., 2020).

Moreover, comparative productivity between the two countries reflects a significant disparity. In 2022, Thailand recorded an average rice yield of 3.0 metric tons per hectare, while Sri Lanka achieved 4.3 metric tons per hectare (FAOSTAT, 2023). Despite Sri Lanka's higher yields, Thailand has outperformed in total factor productivity due to technological efficiency, superior logistics, and post-harvest management systems (World Bank, 2022). This paradox of higher yields, lower export performance in Sri Lanka indicates that productivity alone does not ensure trade competitiveness, highlighting the need for a multi-dimensional analysis of industry performance.

The importance of this study is underscored by the economic crises faced by Sri Lanka in recent years, where agriculture and export diversification have emerged as key pillars in the recovery discourse (IMF, 2023). Understanding the successful elements of Thailand's rice export strategies could offer critical insights for Sri Lanka to realign its agricultural policy toward both food security and global trade integration. Further, this research filled the gap in comparative literature that systematically evaluates production and trade metrics, institutional frameworks, and technological adoption in rice sectors across these two countries. Further, this study conducted a comparative analysis based on quantitative methods, investigated not only the level of productivity and export performance but also the institutional and technological foundations of sectoral outcomes, and found evidence-based policymaking contributes to the broader discourse on sustainable agricultural development and trade resilience in developing country contexts.

Objectives

This study evaluates and compares the productivity and export strategies of the rice industries in Sri Lanka and Thailand over the period 2003-2023 using quantitative methods, and derives policy-oriented lessons to enhance Sri Lanka's export competitiveness.

Methodology

This study employs a quantitative, comparative research design to analyse rice sector productivity and export strategies in Sri Lanka and Thailand across the period 2003-2023. The research relies exclusively on secondary

data sourced from internationally and nationally credible databases. Key sources include the Food and Agriculture Organization (FAO), the World Bank, the International Rice Research Institute (IRRI), the Department of Census and Statistics of Sri Lanka, and Thailand's National Statistical Office. Additionally, export-related data were verified using UN COMTRADE and WTO trade profiles to ensure reliability.

Productivity was measured using three key indicators: (i) paddy yield per hectare, (ii) total annual rice production in metric tons, and (iii) labour productivity measured as tons of rice produced per agricultural worker. Export performance was assessed using four core metrics: (i) total export volume in metric tons, (ii) total export value in US dollars, (iii) unit export price in US dollars per ton, and (iv) number of export destination markets. To evaluate international competitiveness, the Revealed Comparative Advantage (RCA) index was calculated using the "Balassa– formula", which measures a country's share of global exports of a specific commodity relative to its overall share in world exports.

To capture both short-term dynamics and long-term structural shifts, the twenty-year period was segmented into four- five year intervals: 2003-2007, 2008-2012, 2013-2017, and 2018-2023. All monetary values were adjusted for inflation using GDP deflators sourced from the World Bank to ensure comparability over time. Exchange rate fluctuations were controlled by using annual average exchange rates published by the Central Bank of Sri Lanka and the Bank of Thailand. Data analysis was conducted using STATA and SPSS statistical software. Descriptive statistics were employed to identify overall trends. The Compound Annual Growth Rate (CAGR) was calculated for each productivity and export indicator to assess long-term growth. In addition, correlation analysis was performed to examine the relationship between productivity indicators and export performance.

Although qualitative variables, such as farmer perceptions and policy discourse, were intentionally excluded in order to focus exclusively on quantifiable metrics. This narrow scope enhances the objectivity of the findings and enables robust cross-country comparison over time. However, insights from government policy documents and academic studies were incorporated to contextualize the quantitative results. By integrating multiple

statistical methods with reliable datasets, the methodology provides a solid empirical foundation for comparing rice industry performance between Sri Lanka and Thailand. It facilitates the identification of key drivers behind export success and productivity improvements, thus generating actionable insights that can guide future agricultural and trade policies, particularly for Sri Lanka.

Results and Discussions

The comparative analysis of rice industries of Sri Lanka and Thailand between 2003 and 2023 reveals substantial disparities in productivity and export performance. Despite recording higher yields per hectare, Sri Lanka lags significantly behind Thailand in terms of total production, labour productivity, and export competitiveness.

Sri Lanka's average paddy yield improved modestly from 3.9 metric tons per hectare in 2003 to 4.5 metric tons per hectare in 2023, reflecting a growth rate of around 1.5% annually. Thailand's yield remained stable at approximately 3.1 metric tons per hectare, with only minor yearly fluctuations. However, Thailand's total rice production rose from 25.4 million tons in 2003 to 30.8 million tons in 2023. In contrast, Sri Lanka's production plateaued around 4.9 million tons during the same period. Thailand's success in maintaining a higher production level despite lower yields per hectare can be attributed to its larger cultivated area, mechanization, and efficient water management systems. Labour productivity increased by 41% in Thailand, driven by mechanization and training, compared to a modest 23% rise in Sri Lanka. This difference highlights how technological adoption and workforce optimization significantly influence overall sector efficiency beyond per hectare yields.

Export performance metrics paint an even starker contrast. Thailand's rice export volume grew from 7.8 million tons in 2003 to 10.9 million tons in 2023, generating approximately US dollars 5.4 billion in export revenue. In contrast, Sri Lanka's rice exports remained negligible, averaging less than 0.05 million tons per year, with foreign exchange earnings rarely exceeding US dollars 40 million even in peak years. This disparity persists despite Sri Lanka's favourable Agro-ecological conditions and higher average yields.

The RCA index reinforces these trends. Thailand maintained a strong RCA above 2.5 throughout the period, indicating a sustained comparative advantage in the global rice trade. Sri Lanka's RCA ranged between 0.25 and 0.40, underscoring its weak competitiveness in the international market.

Correlation analysis provides further evidence of these dynamics. In Thailand, productivity indicators exhibited a strong positive correlation with export outcomes ($r = 0.89$), suggesting a direct link between strategic productivity enhancements and trade performance. In Sri Lanka, however, the correlation was weak ($r = 0.34$) reflecting a disconnection between domestic production and international market integration. Thailand's export-oriented policies, investment in branding of premium varieties such as jasmine rice, and market intelligence systems have enabled it to capture premium markets. Meanwhile, Sri Lanka's policy framework has remained domestically focused, with limited support for export diversification or value addition. The absence of certified quality control mechanisms, inadequate post-harvest infrastructure, and poor trade facilitation leads to lack of competitiveness.

Overall, the results suggest that productivity gains are insufficient. Thailand's experience demonstrates the necessity of aligning productivity with market-driven strategies, institutional reforms, and global value chain integration. Due to the stagnation of export performance, Sri Lanka needs favourable conditions focusing on policy coherence.

Conclusion and Policy Recommendations

This comparative analysis of the rice industry in Sri Lanka and Thailand over the period 2003-2023 provides critical insights into how agricultural productivity and export strategies shape national economic outcomes. Although Sri Lanka consistently demonstrates higher yields per hectare, Thailand has significantly outperformed it in aggregate production, labour productivity, and export competitiveness. These findings confirm that productivity improvements, while necessary, are insufficient to secure competitiveness. Instead, institutional quality, policy coherence, and integration into global markets emerge as decisive drivers of sustained comparative advantage. This study also contributes to the broader literature

by demonstrating that export competitiveness in staple crops is determined less by yield metrics and more by the institutional, social, and technological foundations of agricultural systems. It provides an evidence-based framework for Sri Lanka to realign its rice sector with the principles of comparative advantage, thereby achieving both domestic food security and enhanced resilience in international trade.

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