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Impact of Agricultural Irrigated Land and Raw Material Import, Labor Force and Capital Formation on Rice Production: Evidence from the Malaysian Economy

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Abstract: Rice production has recently become a global requirement due to its high demand, necessitating the attention of contemporary studies and regulators. Thus, the current research examines the impact on rice production in Malaysia of agricultural irrigated land, agricultural raw material imports, labor force, and capital formation. The present paper collected data for analysis from 1981 to 2020 using secondary data collection methods and the World Bank Indicators (WDI) and Statista databases. Additionally, the Augmented Dickey-Fuller test was used to determine stationarity, and the Autoregressive Distributed Lag (ARDL) model was used to analyze the association between the constructs. The findings indicate that irrigated agricultural acreage, agricultural raw material imports, labor force, and capital formation positively and substantially affect rice output in Malaysia. This study assists policymakers in formulating policies that promote high rice production through irrigated agricultural land, raw material imports, labor, and capital.

1. Introduction

The agriculture sector plays a vital role in economic growth and sustainable development in agricultural countries. It contributes to different industries to promote the economy by providing raw materials. Agriculture is a significant sector in Malaysia. This industry has been the backbone of Malaysia's economy for many years, producing agricultural products for domestic consumption while earning foreign currency. Agriculture contributes to the country's Gross Domestic Product (GDP). The impact of irrigated land, raw material imports, labor force and capital formation on rice production was examined in this study. The study determined that if a country has a high proportion of agricultural land that is irrigated, it provides the expected results in rice production. The study established that improving the quality of imported raw materials such as seeds, crop medicines, and the quality of different seeds from other nations might increase Malaysia's production limitations. The trained and expert labor force can also play a tremendous role in rice production in the Malaysian agriculture sector. A considerable capital investment can get the required output of rice to boost the economy of Malaysia. Although Kuala Langat and Sabak Bernam are typically suited for a greater range of crops, the study predicted that agricultural expansion could lead to environmental degradation in these areas. This research could be valuable in determining possible agricultural yields and ecological deterioration in the study area and estimating the potential conversion of agricultural land to non-agricultural uses (Olaniyi, Ajiboye, Abdullah, Ramli, & AM, 2015).

Numerous factors affect the quality of rice noodles, including rice species and compositions, raw material pretreatment, processing methods, and ambient conditions. Additionally, anti-aging, water retention, and preservatives enhance rice noodles' quality. (L. He et al., 2020). Rice production in Malaysia is linked to technological adoption, labor force, human capital, and capital accumulation positively and significantly. (Abidin, Haseeb, Islam, & Chiat, 2022). Precipitation and production factors such as planted area, fertilizer use, and rural labor force played a significant part in improving rice output and guaranteeing food security in major Asian rice-producing countries (Li et al., 2022). At 28,000 MJ/ha, the lowest energy input for rice production was observed in groups of medium-aged farmers with moderate farming experience. Farmers having a higher net income, larger fields, and involvement in extension classes are more likely to reduce rice farming's total energy usage. (Ehsan Houshyar, B Chen, & GQ Chen, 2019). Age, rice revenue, loans from cooperatives and other sources, and agricultural holdings are the most important elements determining capital accumulation. Increasing farmers' average education considerably boosts agricultural capital. Farmers' and rural dwellers' education should be at the forefront of any rural reform program (Olowa & Olowa, 2017).

The notion of irrigated agricultural land and raw material imports, labor force, and capital formation in rice production is an enthralling subject for research among famous academics. Rice yields are projected to be more susceptible to weed infestation and water stress due to climate change, which will aid in the development of appropriate management strategies for future rice output. (Kontgis et al., 2019). Rice production impacted the environment in three ways: potential global warming, potential water use, and potential fossil fuel depletion. The cultivation phase of rice production was the major contribution to environmental repercussions due to the manufacturing and application of fertilizer and pesticides (Zheng et al., 2020). Due to their close relationship, climate change poses a significant threat to paddy production, hence affecting food security. As a result, Malaysia's paddy and rice intervention techniques must be rethought, with an emphasis

on increasing paddy farmers' adaptive capacity in the face of climate change. (Firdaus, Leong Tan, Rahmat, & Senevi Gunaratne, 2020).

This study aimed to analyze the agricultural irrigated land and raw material import, labor force, and capital formation on rice production with evidence from the Malaysian economy. Malaysia is an agrarian country and produces a large part of the economy through agriculture. Thus, manufacturing and service sectors exhibit a strong correlation with real GDP per capita, whereas agriculture exhibits no such correlation. (Firdaus et al., 2020). The Malaysian economy and GDP were forecasted for 2020 to 2050 for the required sectors. Some sectors, such as agriculture and services, have forward linkages. Others, such as manufacturing and mining, are unaffected by construction sector causality, which refers to contributing sectors' conduct during a recession that results in significant income. Malaysia's economy is evolving toward more environmentally friendly output, focusing on the construction sector. Other countries can utilize the findings as a blueprint for achieving long-term development. The significance of this study is that it will be helpful to experts worldwide in allocating resources to make the construction industry a more sustainable sector following a shock. A sustainable conceptual framework has been presented for a global application that underlines the components involved in the construction industry's expansion to ensure its long-term viability (Alaloul et al., 2021).

Malaysia is a country in Southeast Asia. Malaysia's official religion is Islam, and Muslims account for over 60% of the population, while Buddhists make up the remaining 20%. The diverse cultures of its people influence Malaysian culture. The Malays were the first to settle in the area, arriving from mainland Asia in ancient times, followed by indigenous tribes. When economic relations with those countries began, cultural influences from China and India became more apparent, and immigration to Malaysia increased significantly. Malaysian culture has been impacted by Persian, Arabic, and British cultures. Malaysia's various ethnic groups each have distinct cultural identities; however, there is significant overlap.

Thus, there is a need to show the impact of agricultural irrigated land and raw material import, labor force, and capital formation on rice production with evidence from the Malaysian economy. This research is being presented to address this pressing need. Our study elucidates the impact of agricultural irrigated land and raw material import, labor force, and capital formation on rice production with evidence from the Malaysian economy. The study also aimed to analyze agricultural irrigated land and raw material import, labor force, and capital formation on rice production. Many experts and academics have undoubtedly looked into agricultural irrigated land and raw material import, labor force, and capital formation on rice production. However, just a few research have looked into agricultural irrigated land and raw material import, labor force, and capital formation on rice production. Our research bridged this gap in the literature by examining the contribution of agricultural irrigated land and raw material import, labor force, and capital formation to rice production with evidence from the Malaysian economy. Most of the extant material focuses on the direct influence of agricultural irrigated land and raw material import, labor force, and capital formation on rice production.

Nonetheless, few studies have examined the impact of agricultural irrigated land and raw material imports, labor force, and capital formation on rice output using Malaysian data. Thus, our analysis bridges this gap by examining the impact on rice production of agricultural irrigated land and raw material imports, labor force, and capital formation. The Malaysian economy and manufacturing sector were chosen for the understudy construct analysis because no one had

previously examined agricultural irrigated land and raw material imports, labor force, and capital formation in rice production using information from the Malaysian economy. This work is organized into five sections. Following an introduction to the subject, the paper establishes a framework for the interplay of agricultural irrigated land, raw material imports, labor force development, and capital development on rice production, utilizing data from the Malaysian economy and earlier literary arguments. The third section explains how the data to back up the study concepts has been gathered. Additionally, this section explains how the validity of data was determined and the conclusions drawn as a result of this examination. Following that, the study's findings are confirmed by previous research. The study's implications, conclusion, and limitations are then presented in the last section. Analyses were carried out to assess the situation.

2. Literature Review

The sustainable development of the agriculture sector is the natural development of many interlinked industries to promote the country's economy. A country can be considered developed if it has crops for its people and export to other countries. The effectiveness of the elements and tools that can influence the industry's development is critical to increasing its competitiveness. The most crucial aspect and tools for agricultural development are efficiently exploiting land and water resources (Shoimardonkulovich & Hamidovich, 2020). Researchers and practitioners are now paying special attention to the long-term performance and structure of the agriculture industry. Our study used evidence from the Malaysian economy to examine the contribution of agricultural irrigated land and raw material imports, labor force and capital formation to rice production. The impact of irrigated agricultural land and raw material imports, labor force and capital formation on rice production with evidence from the Malaysian economy has a grip in the literary world, as several authors have stated their views on the subject. This study presented its concepts about the agricultural irrigated land and raw material import, labor force, and capital formation to rice production with evidence from the Malaysian economy using previous literary arguments as a guide:

A scholarly article was presented by Magasumovna, Anasovna, and Alfirovna (2017) to focus on the increase in efficiency in agricultural production. Russia is a federal state made up of 85 primarily autonomous entities: territories, regions, republics, and counties. One distinguishing trait is the uneven distribution of Russian agricultural production over 79 areas—a limited specialty in various agriculture or animal fields husbandry. The total number of indications directly or indirectly related to one another impacts the agriculture industry's financial outcomes and the existence of a proper database on these indicators; 16 indicators were chosen for the investigation. The study has resulted in agriculture's fixed-asset investment, the profitability of sold items (works, services) in the animal husbandry industry, the fraction of agricultural businesses losing money, the capital area ratio, the capital-labor ratio, and the investment intensity. Thus, the agricultural irrigated land and high-quality raw material import, a trained labor force, and proper capital formation can increase rice production in Malaysia. The research study investigates Stuecker, Tigchelaar, and Kantar (2018a); (Stuecker, Tigchelaar, & Kantar, 2018b) climate change in agricultural production. This research was carried out in northcentral Vietnam, as part of a project on climate-smart agriculture and climate services. This study incorporated both primary and secondary data. The statistics featured data on the country's socioeconomic position, which could be used for research purposes. We performed in-depth interviews with 400 farmers

from various villages and used pre-made questionnaires to collect data.

The respondents were chosen using a stratified random selection approach with the village as the stratum. Respondents from all villages in Ky were included in the sample size. Son enclave. Each village's quantity of respondents was chosen. Based on the proportion of households in the overall household population commune. Additionally, responders in each group were randomly picked. Farmers made up the bulk of respondents. Agriculture and forestry are the economy's backbones. A pilot survey of twenty individuals was undertaken. Additionally, testing was conducted in several villages (non-project site).

3. The Questionnaire's Usefulness

The critical data gathered in this study included data on all of the study's livelihood assets and households. It also provides information on the extent of the damage caused by severe weather occurrences in agricultural production in families. Farmers have developed adaptive tactics in response to these situations. Three policy recommendations emerged from the study to assist small-scale farmers in the region in adapting to climate change. These include improving climate change education, implementing farming consolidation policies, and incorporating food security concepts. Local groups are incorporating climate change and adaptation into their activities. Agriculture's sustainable development is contingent upon the modernization of farming irrigated land and importing high-quality raw materials. A trained labor force and sufficient capital formation can help Malaysia enhance rice production. Although temperature variability is minor in the Philippines today, future climate projections suggest that if warming continues unabated, temperatures will regularly exceed known limits to rice production by the end of the century. As a result, reliable seasonal forecasting will likely become even more crucial in providing the knowledge necessary to guide agricultural management to alleviate soil moisture fluctuation and temperature stress. (Stuecker et al., 2018a). With the increase of abandoned fields and the resulting vegetation succession and loss of habitat variability, the detrimental effects of agricultural abandonment on farmland species have been fast-growing (Katayama, Baba, Kusumoto, & Tanaka, 2015). Nowadays, agriculture development needs to adopt the modernization of farming in irrigated land and raw material import, a trained labor force, and proper capital formation to increase rice production in Malaysia. Rice production is unaffected by technology. Other findings on the rice consumption model were influenced by human capital, per capita income, population, and previous year's consumption. Still, rice prices in Indonesia do not affect rice consumption. The government needs to consider when developing appropriate program policies, such as improving irrigation systems, empowering farmers through regular training, subsidizing material inputs for farmers, and extending land for farmers (Bashir & Yuliana, 2019). Imports were boosted by domestic demand for rice and domestic rice prices. Domestic rice productivity, foreign rice prices, and foreign exchange rates, on the other hand, harm rice imports (Putra, 2019). To develop rice production in Malaysia, the agriculture industry must embrace innovative machinery for farming with irrigated land and high-quality raw material imports, as well as a trained labor force and adequate capital formation. In central Asian rice-producing countries, precipitation and production factors such as planted area, fertilizer use, and rural labor force played a critical role in raising rice production and ensuring food security (Chandio, Gokmenoglu, Ahmad, & Jiang, 2022). The experience of rural-to-urban migration is beneficial to rice production since it reduces fertilizer need. The results would be skewed and inconsistent if self-selection bias and

endogeneity of the rural-urban migration experience were not considered. Furthermore, the rice-fertilizer pricing ratio has a favorable impact on fertilizer use. Adopting hybrid rice varieties and participation in technical training programs may reduce rice cultivation's fertilizer use (Zhang, Sun, Hu, Yang, & Shen, 2021). The study demonstrates that sustainable agricultural development requires modernization of farming irrigated land and the import of high-quality raw materials, a trained labor force, and adequate capital formation to enhance rice production in Malaysia. Capital investment, which includes seed and fertilizer, has a negligible effect on rice production in the Cyabayaga Watershed. It is proposed that agricultural education be used to assist these farmers in gaining access to inputs and financing. (Ingabire, Bizozza, & Mutware, 2013). Agriculture has a critical part in guaranteeing Poland's energy security, and this sector of the economy may thrive with the proper legal framework and promotion. Biomass is the most common form of renewable energy through agriculture (Bielski, Marks-Bielska, Zielińska-Chmielewska, Romaneckas, & Šarauskis, 2021). Regarding Ghana, agricultural growth via foreign direct investment helps create employment and overall economic development (Awunyo-Vitor & Sackey, 2018). The study identified that agriculture depends on upgrading the farming irrigated land and high-quality raw material import, a trained labor force, and proper capital formation can increase rice production in Malaysia. The agriculture industry, which employs the largest percentage of the workforce, generates less than 30% of overall GDP on average. In emerging countries, creating new job possibilities and providing a source of external money (Ehsan Houshyar, B Chen, & GQ Chen, 2019).

4. Methods and Material

Table 1. Variables with Measurements

S#	Variables	Measurement	Sources
01	Rice Production	The logarithm of rice production in a million metric tons	Statista
02	Agricultural Irrigated Land	Agricultural irrigated land (% of total agricultural land)	WDI
03	Agricultural Raw Material Import	Agricultural raw material import (% of merchandise import)	WDI
04	Labor Force	Labor force participation rate (% of total population age 15 to 64 years)	WDI
05	Capital Formation	Capital formation (% of GDP)	WDI

The current article uses a correlation matrix to examine the directional association among the constructs. Moreover, the bound test has also been applied to explore the co-integration among the variables. Finally, the ADF test was used to determine stationarity in this study, and the equation is as follows:

$$d(Y_t) = \alpha_0 + \beta t + \gamma Y_{t-1} + d(Y_t(-1)) + \epsilon_t \quad (2)$$

The ADF test has the feature of examining the unit root among the construct individually, and the separate equations are mentioned below:

Rice Production

$$d(RP_t) = \alpha_0 + \beta t + \gamma RP_{t-1} + d(RP_t(-1)) + \epsilon_t \quad (3)$$

Agricultural Irrigated Land

$$d(AIL_t) = \alpha_0 + \beta t + \gamma AIL_{t-1} + d(AIL_t(-1)) + \epsilon_t \quad (4)$$

Agricultural Raw Material Import

$$d(ARMI_t) = \alpha_0 + \beta t + \gamma ARMI_{t-1} + d(ARMI_t(-1)) + \epsilon_t \quad (5)$$

Labor Force

$$d(LF_t) = \alpha_0 + \beta t + \gamma LF_{t-1} + d(LF(-1)) + \epsilon_t \quad (6)$$

The research examines the impact on rice production in Malaysia of agricultural irrigated land, agricultural raw material imports, labor force development, and capital formation. The current paper collected data for analysis from 1981 to 2020 using secondary data collection methods and the WDI and Statista databases. The recent study's equation, which incorporates variables from the under study, is as follows: $RP_t = \alpha_0 + \beta_1 AIL_t + \beta_2 ARMI_t + \beta_3 LF_t + \beta_4 CF_t + e_t$ (1)

Where;

- RP = Rice Production
- t = Time Period
- AIL = Agricultural Irrigated Land
- ARI = Agricultural Raw Material Import
- LF = Labor Force
- CF = Capital Formation

The present paper is conducted on rice production and measured the logarithm of rice production in a million metric tons. Moreover, the article has taken four predictors such as agricultural irrigated land measured as the agricultural irrigated land (% of total agricultural land), agricultural raw material import measured as the agricultural raw material import (% of merchandise import), labor force measured as the labor force participation rate (% of the total population age 15 to 64 years) and capital formation measured as the capital formation (% of GDP). Table 1 presents all of these measurements of variables.

Capital Formation

$$d(CF_t) = \alpha_0 + \beta t + \gamma CF_{t-1} + d(CF_t(-1)) + \epsilon_t \quad (7)$$

Finally, the current paper has applied the ARDL model to examine the association between the constructs. The ARDL model has the feature of providing the long and short-run linkage among variables. In addition, the ARDL model has also suitable when some variables are stationary at I(0) and others are stationary at I(1). In addition, the ARDL model also covers the effects of heteroscedasticity and autocorrelation. The equation is given below:

$$\Delta RP_t = \alpha_0 + \sum \delta_1 \Delta RP_{t-1} + \sum \delta_2 \Delta AIL_{t-1} + \sum \delta_3 \Delta ARMI_{t-1} + \sum \delta_4 \Delta LF_{t-1} + \sum \delta_5 \Delta CF_{t-1} + \varphi_1 RP_{t-1} + \varphi_2 AIL_{t-1} + \varphi_3 ARMI_{t-1} + \varphi_4 LF_{t-1} + \varphi_5 CF_{t-1} + \epsilon_1 \quad (8)$$

5. Research Findings

The current article uses a correlation matrix to examine the directional association among the constructs. The results revealed that the agricultural irrigated land, agricultural raw material import, labor force, and capital formation have a positive and significant association with rice production in Malaysia. Table 2 presents the linkage among variables using a correlation matrix.

Table 2. Matrix of correlations

Variables	LRP	AIL	ARMI	LF	CF
LRP	1.000				
AIL	0.241	1.000			
ARMI	0.430	0.439	1.000		
LF	0.199	-0.111	-0.352	1.000	
CF	0.309	0.732	0.633	0.532	1.000

In addition, the present research has also applied the ADF test to check stationarity. The results exposed that the LRP and AIL have no unit root at level, but ARMI, LF, and CF have no unit

root at first difference. Table 3 presents the ADF unit root test results.

Table 3. Unit Root Test

Augmented Dickey-Fuller Test (ADF)	Level	t-statistics	p-values
LRP	I (0)	-2.763	0.031
AIL	I (0)	-2.532	0.038
ARMI	I (1)	-6.983	0.000
LF	I (1)	-6.829	0.000
CF	I (1)	-5.337	0.000

Moreover, the bound test has also been applied to examine the co-integration among the variables. The results exposed that the calculated f-statistic (5.722) value is larger than the critical

values, and exposed co-integration exists. Table 4 presents the bound test for co-integration.

Table 4: ARDL Bound Test

Model	F-statistics	Lag	Level of Significance	Bound test critical values	
				I (0)	I (1)
RP/ (AIL, ARMI, LF, CF)	5.722	4	1%	6.129	6.430
			5%	5.028	5.621
			10%	4.107	4.759

The results of the ARDL model revealed that the agricultural irrigated land, agricultural raw material import, labor force, and capital formation have a positive and significant association with rice production in Malaysia in the short run. In addition, R square 0.564 indicated that the 56.4 percent

of changes are due to the agricultural irrigated land, agricultural raw material import, labor force, and capital formation. Table 5 presents the ARDL model results that indicated short-run associations.

Table 5: Short Run Coefficient (Zhuang et al., 2019) nts

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AIL)	3.920	1.109	3.535	0.006
D(ARMI)	2.773	0.387	7.165	0.000
D(LF)	1.093	0.429	2.548	0.026
D(CF)	2.990	0.910	3.286	0.012
CointEq(-1)*	-1.634	0.428	-3.818	0.000
R-squared	0.564	Mean dependent var		-0.035
Adjusted R-squared	0.548	S.D. dependent var		2.192

The ARDL model results also revealed that the agricultural irrigated land, agricultural raw material import, labor force, and capital formation have a positive and significant association with rice production in Malaysia in the long run. Table 6 presents the ARDL model results that indicated long-run associations.

Table 6: Long Term Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AIL	3.911	0.922	4.242	0.000
ARMI	3.432	0.918	3.739	0.008
LF	1.908	0.529	3.607	0.010
CF	0.954	0.381	2.504	0.023
C	0.910	0.463	1.965	0.048

6. Discussions

The results showed that agricultural irrigated land positively relates to rice production. These results agree with [Zhuang et al. \(2019\)](#), which show that rice crops need water in large quantities. In the countries where the agricultural irrigated land is in a large area, the government can expand the cultivation of crops that need water appropriately. So, the production of rice can also be increased. These results also agree with [He, Wang, and Cui \(2020\)](#), which highlights that the agricultural area where it is possible to supply water to land or crops through pipes, ditches, sprinkles, or streams instead of just relying on the rainfall, a large piece of land can be arranged for the cultivation of rice crops. Hence, the larger the agricultural irrigated land, the larger the rice production to be cultivated.

The findings indicated that agricultural raw material imports positively correlate with rice production. These findings are corroborated by Soullier, Demont, Arouna, Lançon, and Del Villar (2020). They argue that agricultural raw material imports enable crop farmers to purchase fertilizers, seeds, growing media, inhibitors, chelates, dispersants, and lignosulfonates from other countries when needed and allow crop farmers to expand their crop production businesses where all of these raw materials are required. Sers and Mughal (2020) reinforce these findings by examining how, despite having some acreage for crop production, farmers cannot enhance crop production practices and total volume crop output due to a lack of high-quality agricultural raw materials. This agricultural raw material shortage can be alleviated through agricultural raw material imports. These results indicated that the labor force positively relates to rice production. These results match Chandio et al. (2022), which state that rice production has different stages like seed selection, seed-bed and preparation of paddy, rice transplanting, weeding, fertilizing, pest removal, harvesting, threshing, drying, and marketing. At all these stages, different practices are to be performed. For these practices, a large labor force is required. When the enterprises dealing in crop production can afford considerable labor, they can expand the crop cultivation and processing for ultimate use. These results also agree with Wang et al. (2020), which show that just the presence of a large number of labor-force is not enough to achieve desired productivity from crop cultivation, but it is also necessary that the labor force must be skilled and talented in the relevant field so that the optimal production can be from resources applied.

The findings indicated that capital formation is positively correlated with rice production. These findings corroborate Houshyar et al. (2019b), who demonstrate that when a large amount of capital goods is produced, such as instruments, equipment, technologies, transportation assets, infrastructure, and artificial intelligence, various crop production practices can be facilitated, such as the use of irrigation, transplantation, and cultivation technologies, which increases crop production agility and productivity.

7. Implications

The present study has excellent theoretical significance because of its immense contribution to literature. The current study explores the influences of agricultural irrigated land, agricultural raw material import, labor force, and capital formation on rice production. Exploring the impacts of agricultural irrigated land and agricultural raw material import on rice production have been an exciting topic among researchers. But very few studies have discussed the role of the labor force and capital formation in rice production. The current study evaluates the effects of all of these factors on crop yield and so adds to the body of knowledge. The current study explores the effects of agricultural irrigated area, agricultural raw material imports, labor force, and capital development on rice output in the Malaysian agricultural system, a significant contribution to the literature. Additionally, the current study is critical for the practical agriculture system, economic growth, and social wellbeing. This study assists policymakers in formulating policies that promote high rice production through the use of irrigated agricultural land, agricultural raw material imports, labor, and capital. It is a guideline to state authorities interested in the economic growth and social wellbeing how they must give rise

to rice production, which is the source of food, job creation, and revenues. This study shows that the effectiveness of agricultural irrigated land, raw material import, efficient labor force, and increased capital formation enhance rice production.

8. Conclusions and Limitations

The study explored the influences of agricultural irrigated land, agricultural raw material import, labor force, and capital formation on rice production. Following a quantitative research method, the authors made an empirical survey of the Malaysian economy to investigate agricultural irrigated land, raw material import, labor force, capital formation, rice production, and their relationship. The empirical data from the research survey showed a positive link between the influences of agricultural irrigated land, agricultural raw material import, labor force, capital formation, and rice production. The findings indicated that rather than relying exclusively on rainfall, an agrarian region might be set aside for rice crop development where water could be delivered to land or crops via pipelines, ditches, sprinklers, or streams. As a result, the more irrigated agricultural land available, the more rice can be farmed. The findings indicated that importing agricultural raw materials enables rice farmers to purchase fertilizers, seeds, growing media, inhibitors, chelates, dispersants, and lignosulfonates from other nations as necessary, hence promoting rice production sustainability. The increasing labor force that is highly skilled and gifted and the increased production of other capital goods all contribute to the country's enhanced rice production. The present study is exposed to several limitations that are to be removed to present a better and more reliable study. This study examines just three non-financial factors: agricultural irrigated land, agricultural raw material import, labor force, and capital formation to analyze rice production. Financial factors like capital structure, debt portfolio, and green finance are critical to crop production. Future authors must focus on enhancing the study scope by including these factors in the research. Moreover, it is expected from an excellent study to general to all nations. But this, which considers only the Malaysian agriculture system for crop production analysis, is not general and requires the attention of future researchers.

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