

Strengthening Food Security in Malaysia through Effective Land Use and Land Management Decisions

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ABSTRACT

The agricultural sector has long contributed significantly to Malaysia's economic growth, particularly through industrial crops such as oil palm, cocoa, and rubber. However, the strong policy emphasis on these lucrative commodities has inadvertently resulted in the agro-food sector receiving comparatively less attention. This imbalance in policy priorities has contributed to limited domestic food production and increased dependence on food imports. One of the key challenges is the limited availability of land allocated for food crop cultivation. This issue is further compounded by the absence of adequate legal restrictions on the conversion of agricultural land for industrial, commercial, and other non-agricultural purposes. The National Land Code 1965 does not specifically restrict landowners from applying to convert agricultural land to non-agricultural uses, thereby providing limited legal protection for land that could potentially support domestic food production. Ensuring a sufficient, stable, and nutritious food supply is essential for Malaysia's sustainable development, economic resilience, and national well-being. Therefore, this study examines how land-use decision-making and land management practices can contribute to strengthening food security in Malaysia. Particular attention is given to the allocation, protection, and productive utilisation of agricultural land for food cultivation. The study also considers the importance of balancing economic development with the need to preserve sufficient land resources for sustainable food production. As the relationship between food security and sustainable land management in Malaysia remains relatively underexplored, this study seeks to address this gap by examining how effective land-use policies and management approaches can enhance domestic food production and contribute to long-term national food security.

Keywords: Land Management, Land Use, Food security, Legal Restrictions, Economic Development

INTRODUCTION

Malaysia is experiencing increasing pressure to reconcile its development priorities with the need to maintain a secure and sustainable national food supply. Continued population growth, urban expansion, and economic development have intensified competition for limited land resources. Agricultural land must increasingly compete with residential development, industrial activities, infrastructure, and environmental conservation. Consequently, decisions concerning how land is allocated, developed, protected, and managed have become increasingly important in shaping the capacity of the country to sustain domestic food production and meet future food requirements.

The Malaysian government has introduced various policies and initiatives to strengthen the agricultural sector and enhance the resilience of the national food system, including the National Agrofood Policy and commitments associated with the Sustainable Development Goals (SDGs). Nevertheless, several challenges continue to affect the country's food security. The reduction of productive agricultural land, competing

development priorities, land degradation, and weak coordination between land use planning and agricultural objectives may restrict the capacity for domestic food production. The conversion of agricultural areas to other forms of development is particularly significant, as the continuous loss of productive land may further increase the country's reliance on imported food. At the same time, changing climatic conditions and inappropriate land management practices place additional pressure on agricultural resources and the sustainability of local food production.

While considerable research has addressed agricultural development, food production, and changes in land use, less attention has been given to the decision-making mechanisms that connect land governance with food security in Malaysia. Existing studies have largely concentrated on the physical, technical, and environmental aspects of agricultural land, whereas the influence of governance arrangements, institutional coordination, planning processes, and competing socio-economic interests remains comparatively underexplored. Understanding these dimensions is important because decisions made by different authorities and stakeholders can directly or indirectly determine whether suitable land remains available and productive for food cultivation.

Against this background, this study examines the significance of decision-making in land use and land management for strengthening food security in Malaysia. It focuses on how land use planning, governance arrangements, and decisions regarding land allocation and management may affect agricultural productivity, domestic food availability, and the sustainability of food production. Through an examination of these relationships, the study aims to contribute to a better understanding of the role of land governance in food security and to provide insights that may support the development of more coordinated and food-sensitive approaches to land use planning and management in Malaysia.

LITERATURE REVIEW

Land Use and Land Management

Land use and land management are multidimensional concepts that can be understood through perspectives involving spatial planning, environmental governance, institutional arrangements, and socio-economic decision-making. In general, land use concerns the way land resources are distributed and utilised for various purposes, including agriculture, industry, housing, and environmental conservation. Such patterns of land utilisation are influenced by societal needs, economic considerations, and the institutional structures governing land resources (Lambin & Geist, 2006). An early theoretical explanation of land allocation can be found in von Thünen's land rent theory, which associates the choice of land use with factors such as market accessibility and the economic returns generated from different activities. Despite originating from an earlier agricultural setting, the theory remains relevant to current debates concerning competition for land and the preservation of agricultural areas.

Contemporary approaches have broadened this perspective by recognising the importance of governance and institutional arrangements in shaping how land is managed. Ostrom's (1990) Institutional Analysis and Development (IAD) framework demonstrates that institutional rules, interactions among stakeholders, and collective decision-making can significantly influence resource management outcomes. This perspective is particularly applicable to Malaysia, where responsibilities for land administration and planning involve different levels of government. The interaction between federal, state, and local authorities may create challenges in coordinating land-related policies and decisions (Abdullah & Hezri, 2008). Similarly, the Sustainable Livelihoods Framework developed by Chambers and Conway (1992) introduces a people-centred perspective by demonstrating how access to land and other resources can influence livelihoods, vulnerability, resilience, and ultimately, food security.

The political and ecological dimensions of land management have also received increasing attention. Political ecology, notably associated with the work of Blaikie and Brookfield (1987), suggests that patterns of land use cannot be understood solely through economic or environmental considerations. Instead, land allocation is also shaped by political influence, power relations, development priorities, and competing economic interests.

These factors may disadvantage small-scale agricultural producers or undermine efforts to maintain sustainable food production. Similar concerns have been identified in Malaysia, where pressures for urban and economic development may encourage the conversion or rezoning of agricultural land, potentially creating tensions between immediate development benefits and longer-term national food security objectives (Rosnani et al., 2021; Mohd Zin et al., 2020).

The application of land use theories also varies across geographical and institutional contexts. While much of the Western literature emphasises market mechanisms, economic efficiency, and environmental stewardship, the Malaysian and broader Southeast Asian context involves additional complexities. These include customary land arrangements, state-led development policies, multiple layers of governance, and continuing pressure to convert land for development purposes. Consequently, approaches to land management in Malaysia may need to integrate economic, social, environmental, and institutional considerations. Ismail et al. (2018), for example, suggest that weaknesses in institutional coordination and the absence of integrated decision-making may limit the effectiveness of existing land management approaches in balancing economic development with the need to sustain agricultural production.

Although these theoretical perspectives offer important explanations of how land is allocated, governed, and managed, their relationship with food security requires further examination. Land use and food security are often discussed as separate policy areas, despite the direct implications that land allocation and management decisions may have for agricultural production and food availability. Moreover, there remains limited empirical research that integrates these theoretical perspectives within the Malaysian context, particularly in examining how decision-making across different levels of governance influences the availability and sustainable management of land for food production. Addressing this gap is therefore important for developing a more comprehensive understanding of the relationship between land governance, agricultural sustainability, and food security in Malaysia.

Land Governance and Management Challenges in Malaysia

Land management in Malaysia is shaped by a complex combination of legal, institutional, economic, and environmental factors that pose significant challenges to sustainable land use and national food security. Growing competition for land, fragmented governance arrangements, inconsistencies in policy implementation, and increasing development pressures have complicated efforts to manage land resources effectively. These challenges are particularly significant for the agricultural sector, as decisions regarding land allocation and conversion can directly affect the availability of productive land for domestic food production.

One of the most pressing concerns is the continued conversion of agricultural land to non-agricultural purposes. Rapid urbanisation, infrastructure expansion, and industrial development have increased demand for land, particularly in highly developed states such as Selangor and Penang. As a result, productive agricultural areas are increasingly being rezoned or converted for residential, commercial, and industrial projects. Mohd Zin et al. (2020) reported a substantial decline in Malaysia's permanent agricultural land between 1990 and 2018, largely associated with land conversion. The continued reduction of agricultural land may have important consequences for domestic food availability and self-sufficiency by limiting the amount of suitable land available for food production.

The governance structure surrounding land administration further complicates this issue. Under Malaysia's constitutional framework, land matters primarily fall within the jurisdiction of state governments, whereas policies concerning national food security and agricultural development are largely formulated at the federal level. This division of responsibilities may result in differences between national policy objectives and state-level development priorities. While federal policies may seek to strengthen domestic food production, state governments may face economic incentives to approve land development projects that generate greater financial returns (Abdullah & Hezri, 2008). According to Ismail et al. (2018), insufficient coordination between institutions can contribute to inconsistent land use decisions and weaken the implementation of measures intended to preserve agricultural areas.

Existing studies have demonstrated how such decision-making arrangements can contribute to the loss of agricultural land. Rosnani et al. (2021), for example, highlight the effects of rezoning and land conversion in rapidly urbanising areas, where agricultural land may be redirected towards residential and industrial development. Such decisions are often influenced by objectives related to economic growth, urban expansion, and investment. However, the long-term implications for agricultural production and food security may receive comparatively less consideration. Limited opportunities for public participation and stakeholder involvement may further reduce the representation of food security concerns within land allocation processes.

Institutional fragmentation also affects the coordination of land management activities. Ismail et al. (2018) observe that agencies responsible for planning, agriculture, land administration, and environmental management may operate independently, resulting in a lack of integration in the designation, monitoring, and utilisation of land. The absence of comprehensive and accessible land information can create additional difficulties for effective governance. Without reliable and transparent data, policymakers and stakeholders may face challenges in monitoring changes in agricultural land, evaluating the consequences of land conversion, and assessing the longer-term implications of such decisions for food security.

International experiences demonstrate the potential benefits of adopting more coordinated approaches to agricultural land management. Countries such as the Netherlands and South Korea have implemented planning mechanisms and regulatory measures aimed at managing competition between agricultural and non-agricultural land uses. In the Netherlands, for instance, land use planning incorporates zoning regulations and longer-term regional planning approaches that provide greater consideration for agricultural land (Anderson & Shimada, 2015). Such experiences suggest that transparent decision-making, effective regulatory mechanisms, and stronger coordination among institutions can contribute to more sustainable land management outcomes. Nevertheless, these approaches must be considered within Malaysia's distinctive constitutional, institutional, and socio-economic context.

In Malaysia, land allocation decisions may be influenced by immediate development priorities and economic considerations, potentially placing agricultural land at a disadvantage compared with higher-value commercial and industrial uses. Fatimah et al. (2015) and Norlida et al. (2020) indicate that policies designed to support or protect agricultural land may face challenges in implementation and enforcement. Furthermore, limited participation by relevant stakeholders, including smallholder farmers, rural communities, and civil society organisations, may restrict their ability to contribute to decisions that directly affect agricultural land and local food production.

Another significant challenge is the limited integration of land management across different sectors and policy areas. Land use decisions related to urban development, infrastructure, agriculture, and environmental conservation are not always effectively coordinated. Consequently, agricultural considerations may not be sufficiently incorporated into broader development planning, resulting in fragmented or short-term approaches to land allocation (Rosnani et al., 2021; Fatimah et al., 2015). The relatively higher economic value associated with commercial and industrial development may also influence decisions concerning land conversion, potentially reducing the priority given to preserving land for food production.

Malaysia has introduced various policies and legislative measures relevant to agricultural land and food security, including national agro-food policies and the Town and Country Planning Act 1976. However, the effectiveness of these measures depends considerably on coordination between responsible authorities, implementation capacity, and enforcement at different levels of government. Limitations in the availability, accessibility, and updating of land-related information may further constrain transparent and evidence-based decision-making (Norlida et al., 2020).

Despite the growing literature on land management in Malaysia, relatively limited attention has been given to the processes through which land-related decisions are actually made. In particular, further research is needed to identify the actors involved in decision-making, the institutional and economic factors influencing their choices, and the ways in which competing priorities are negotiated when land is allocated between agriculture

and other uses. Examining these processes is essential for understanding why gaps may arise between stated policy objectives and actual land use outcomes.

Overall, the literature indicates that the challenges surrounding agricultural land management in Malaysia extend beyond the physical availability of land. They are closely associated with governance structures, institutional coordination, policy implementation, stakeholder participation, and competing economic priorities. Existing studies frequently examine these dimensions separately, rather than considering how they interact to influence agricultural land availability and food security. A more integrated approach is therefore required to understand how decision-making across different levels of governance shapes land allocation and management outcomes. Addressing this research gap can provide a stronger basis for developing land governance approaches that balance economic development with the long-term protection and productive use of agricultural land for national food security.

Governance and Policy Instruments in Land Management

Governance plays a pivotal role in shaping land management outcomes, particularly in contexts where land is a contested and finite resource. In Malaysia, land governance is characterized by a multi-layered system involving federal, state, and local authorities, each with distinct powers and responsibilities. While a number of policy instruments have been introduced to regulate land use and protect agricultural areas, the effectiveness of these measures in supporting food security remains limited due to weak coordination, conflicting priorities, and gaps in enforcement.

The Federal Constitution of Malaysia delegates land matters to the individual states, giving them authority over land allocation, use, and tenure. In contrast, national-level institutions, such as the Ministry of Agriculture and Food Security (MAFS) and the Department of Town and Country Planning (PLAN Malaysia), are responsible for broader policy frameworks that guide agricultural development and spatial planning. This division has led to a persistent policy–implementation disconnect. As noted by Abdullah and Hezri (2008), while federal policies may promote agricultural preservation and food security, state governments often rezone agricultural land for urban or industrial development to maximize short-term economic returns.

Malaysia's key policy instruments in land management include the National Physical Plan (NPP), the Town and Country Planning Act 1976 (Act 172), the National Agrofood Policy (NAP), and state-level Structure Plans. The NPP, for instance, aims to guide sustainable spatial development by outlining zoning principles and protecting environmentally sensitive areas, including Permanent Food Production Parks (TKPM). However, the NPP's non-binding nature means that state governments are not legally obligated to follow its recommendations. This issue is compounded by the lack of a robust enforcement mechanism and the limited integration of food security considerations into state and local plans (Rosnani et al., 2021).

Similarly, the National Agrofood Policy (2021–2030) identifies land scarcity as a critical challenge and sets goals for sustainable agricultural land use. While the policy calls for strengthening land access for food producers and enhancing land productivity, its implementation is hindered by limited synergy with spatial planning instruments and insufficient institutional alignment across sectors. Ismail et al. (2018) argue that the policy environment in Malaysia remains heavily siloed, with agricultural, environmental, and land use planning agencies operating in parallel rather than through coordinated frameworks.

In comparison to more integrated land governance models seen in countries like the Netherlands or South Korea—where cross-sectoral coordination and strong institutional accountability are central to land use planning—Malaysia's governance framework remains fragmented and reactive. This institutional fragmentation leads to inconsistencies in land use decisions and undermines long-term food security strategies. Moreover, there is often a lack of stakeholder participation in land governance processes, which can result in decisions that overlook the needs of smallholder farmers and marginalized communities.

The integration of food security considerations into land use policies is increasingly recognized as a critical strategy for achieving sustainable development, particularly in countries facing rapid urban expansion and diminishing agricultural land. In Malaysia, however, the alignment between land use planning and food

security objectives remains weak and inconsistent, despite growing recognition of the threats posed by land conversion, environmental degradation, and dependence on food imports.

Globally, the integration of food security into land use policy is supported by a range of conceptual models and policy practices. The FAO (2011) has advocated for a “food-sensitive” approach to land planning, which incorporates food production, distribution, and access into spatial and development strategies. Countries such as Brazil and the Netherlands have implemented land zoning systems that explicitly prioritize agricultural production and local food systems, supported by institutional coordination and clear legal mandates (Anderson & Shimada, 2015). These models provide useful benchmarks for evaluating Malaysia’s efforts in this domain.

In Malaysia, food security is addressed primarily through the National Agrofood Policy (NAP) and various state-level development plans. While the NAP (2021–2030) outlines strategies to improve food production, land access for farmers, and sustainable resource use, it does not directly influence land use zoning decisions, which fall under the jurisdiction of state governments. Similarly, the National Physical Plan (NPP) and State Structure Plans provide spatial planning guidelines but often treat agriculture as one of many competing land uses, rather than as a foundational pillar of food security (Rosnani et al., 2021).

This disjointed policy landscape has been a central critique in the literature. Ismail et al. (2018) argue that the lack of vertical and horizontal integration between agricultural and spatial planning authorities results in fragmented policies and missed opportunities to protect high-value agricultural land. They highlight that while Permanent Food Production Parks (TKPMs) have been introduced as a policy tool to preserve agricultural land, these parks occupy a relatively small proportion of land and are often poorly managed or underutilized. Additionally, zoning laws are frequently revised in favor of urban and industrial development, even in areas designated for agriculture (Mohd Zin et al., 2020).

Comparative studies have also shown that in many other countries, the institutionalization of food security within land use policies is supported by clear legal frameworks, strong inter-agency coordination, and mechanisms for public participation. In contrast, Malaysian policies often lack enforceability and accountability mechanisms. The absence of binding regulations to protect agricultural land and the discretionary power of state authorities over land matters mean that food security concerns are frequently subordinated to economic development goals (Abdullah & Hezri, 2008).

RESEARCH METHODOLOGY

The study adopts a mixed-methods approach, integrating qualitative and quantitative data to provide a comprehensive understanding of governance processes, institutional dynamics, and their implications for food security. The methodology is structured around six components: research design, participants/sample and sampling method, instruments or tools used, procedures for data collection, data analysis techniques, and ethical considerations.

Research Design

This study adopts a mixed-methods research design to examine how effective land use and land management decisions can contribute to strengthening food security in Malaysia. The mixed-methods approach combines quantitative and qualitative research techniques to provide a comprehensive understanding of the legal, institutional, economic, environmental, and practical factors affecting agricultural land use and food production.

The quantitative component is intended to identify measurable patterns relating to land availability, agricultural productivity, land conversion, access to agricultural land, infrastructure, and perceptions of existing land management policies. The qualitative component provides a deeper understanding of the experiences, views, and concerns of stakeholders involved in land administration, agricultural development, food production, environmental management, and policy implementation.

Research Approach

The study combines doctrinal legal research, socio-legal research, and empirical analysis.

The doctrinal component examines the Malaysian legal framework governing land use, land administration, agriculture, environmental protection, planning, and food security. Relevant legislation, regulations, policies, judicial decisions, government guidelines, and administrative documents are analysed to determine whether the existing framework adequately protects agricultural land and supports sustainable food production.

The socio-legal component examines how laws and policies operate in practice. It considers the experiences of farmers, landowners, government officers, planners, agricultural organisations, and other stakeholders affected by land use and land management decisions.

The empirical component uses surveys and interviews to collect primary data on the effectiveness of existing land use policies, challenges in agricultural land management, causes of agricultural land conversion, and possible strategies for strengthening food security.

Study Population

The study population consists of individuals and institutions directly or indirectly involved in agricultural land use, land administration, food production, rural development, environmental management, and spatial planning in Malaysia.

The target population may include:

- Farmers and agricultural land operators.
- Agricultural landowners.
- Officers from land and district offices.
- Officers from state land authorities.
- Agricultural officers and extension service personnel.
- Town and country planning officers.
- Local authority officers.
- Representatives of farmers' associations and cooperatives.
- Agricultural entrepreneurs and food producers.
- Academics and researchers specialising in land management, agriculture, environmental law, planning, or food security.
- Representatives of civil society organisations concerned with agriculture, rural development, environmental sustainability, or food systems.

Including participants from different stakeholder groups enables the study to obtain diverse perspectives on the legal and practical implications of land use decisions.

Geographical Scope

The study may be conducted in selected states or districts representing different agricultural and development conditions in Malaysia. The selection should include areas experiencing significant agricultural activity, urban

expansion, industrial development, land conversion, or competition between agricultural and non-agricultural land uses.

For example, the study may select:

- A predominantly agricultural area.
- A rapidly urbanising area.
- An area affected by industrial or residential development.
- An area involving small-scale or traditional farming.
- An area involving organised or commercial agriculture.

The inclusion of different geographical settings allows comparisons to be made between regions with different land pressures, agricultural characteristics, and administrative practices.

Sampling Procedures

Quantitative Sampling

For the quantitative survey, a multistage sampling procedure may be adopted.

At the first stage, selected states or districts are identified based on their agricultural importance, land development pressures, and relevance to food production. Purposive sampling may be used at this stage because the study requires locations that demonstrate significant land use and food security issues.

At the second stage, participants may be grouped into relevant categories, such as farmers, landowners, agricultural entrepreneurs, government officers, and representatives of agricultural organisations. A stratified sampling method may then be used to ensure adequate representation from each stakeholder category.

Within each category, participants may be selected through simple random sampling where a complete sampling list is available. Where such lists are unavailable, systematic sampling, cluster sampling, or purposive recruitment through government agencies, farmers' associations, cooperatives, and agricultural communities may be used.

A proposed quantitative sample may consist of approximately 200 to 400 respondents. The final sample size should depend on the geographical coverage, availability of respondents, research resources, and the type of statistical analysis to be conducted.

A possible distribution is as follows:

- Farmers and agricultural operators: 50–60 per cent.
- Agricultural landowners and entrepreneurs: 15–20 per cent.
- Government and planning officers: 10–15 per cent.
- Representatives of farmers' organisations, cooperatives, academics, and civil society organisations: 10–15 per cent.

A minimum sample of approximately 200 respondents may be sufficient for descriptive and basic inferential analysis. A larger sample is preferable where comparisons are made across several states, districts, or stakeholder groups.

Qualitative Sampling

For the qualitative component, purposive sampling should be used to select participants with relevant knowledge, experience, or decision-making responsibilities.

Participants may be selected based on criteria such as:

- Direct involvement in land administration or planning.
- Experience in agricultural production or agricultural land ownership.
- Knowledge of land conversion and development approval processes.
- Experience in implementing agricultural, food security, or environmental policies.
- Expertise in land law, planning law, agriculture, food systems, or sustainable development.
- Representation of communities affected by land use changes.

Approximately 15 to 30 participants may be interviewed. Interviews should continue until data saturation is reached, meaning that additional interviews no longer produce substantially new themes or information.

The qualitative sample may include:

- Five to eight farmers or agricultural landowners.
- Three to five land administration officers.
- Three to five agricultural or food security officers.
- Two to four planning or local authority officers.
- Two to four academics, legal experts, or policy specialists.
- Two to four representatives of farmers' organisations or civil society groups.

Snowball sampling may also be used, particularly where initial participants recommend other individuals with specialised knowledge or relevant experience.

Integration of Quantitative and Qualitative Findings

The quantitative and qualitative findings should be integrated during the interpretation stage.

Integration may be achieved through:

- Comparing survey findings with interview themes.
- Using interview findings to explain statistical results.
- Identifying areas of agreement or disagreement between stakeholder groups.
- Comparing empirical findings with the legal and policy analysis.
- Developing joint displays or comparison tables.
- Formulating recommendations based on converging evidence.

For example, survey respondents may report that existing laws are generally adequate but poorly enforced. Interviews with government officers and farmers may then explain the institutional, financial, administrative, or jurisdictional reasons for weak enforcement.

The study should identify whether the two sets of findings converge, complement one another, or reveal contradictory perspectives. Contradictions should not be disregarded; instead, they should be analysed as evidence of differences in experience, institutional position, or understanding.

Ethical Considerations

Ethical approval should be obtained from the relevant institutional research ethics committee before primary data collection begins.

Participants should receive an information sheet explaining:

- The purpose of the study.
- The nature of their participation.
- The voluntary nature of participation.
- Their right to refuse to answer questions.
- Their right to withdraw.
- The use of audio recording.
- Measures taken to protect confidentiality.
- The intended use of the research findings.

Written or electronic informed consent should be obtained.

Participants' names and identifiable information should not be disclosed without permission. Codes or pseudonyms should be used in interview transcripts and research reports. Data should be securely stored and accessible only to the researcher or authorised members of the research team.

Particular care should be taken when interviewing government officers, farmers occupying land under temporary arrangements, or participants discussing controversial land decisions. Findings should be reported in a manner that does not expose participants to professional, financial, or legal risks.

Proposed Methodological Framework

The methodological process may be summarised as follows:

Stage 1: Conceptual and legal review

Review literature, legislation, policies, development plans, and food security reports.

Stage 2: Instrument development

Develop the questionnaire, interview guide, consent form, and document analysis matrix.

Stage 3: Pilot study

Test and revise the questionnaire and interview questions.

Stage 4: Quantitative data collection

Administer the survey to farmers, landowners, government officers, and other stakeholders.

Stage 5: Quantitative analysis

Conduct descriptive, comparative, correlational, and regression analyses.

Stage 6: Qualitative data collection

Interview key stakeholders selected on the basis of expertise and relevance.

Stage 7: Qualitative analysis

Code the interview data and develop themes and subthemes.

Stage 8: Integration

Compare the survey, interview, legal, and documentary findings.

Stage 9: Recommendations

Develop legal, institutional, planning, and land management recommendations for strengthening food security in Malaysia.

Summary of the Proposed Methodology

Methodological element	Proposed approach
Research design	Explanatory sequential mixed-methods design
Research approach	Doctrinal, socio-legal, quantitative, and qualitative
Quantitative participants	Approximately 200–400 respondents
Qualitative participants	Approximately 15–30 key informants
Sampling	Multistage, stratified, purposive, and snowball sampling
Quantitative instrument	Structured questionnaire using Likert-scale questions
Qualitative instrument	Semi-structured interview guide
Secondary sources	Legislation, policies, cases, plans, statistics, and government reports
Quantitative analysis	Descriptive statistics, t-tests, ANOVA, chi-square, correlation, regression, and factor analysis
Qualitative analysis	Thematic analysis
Integration	Triangulation and joint interpretation of results
Reliability	Pilot testing and Cronbach's alpha

Validity	Expert review, triangulation, and comparison across stakeholder groups
Ethical safeguards	Informed consent, confidentiality, anonymity, and secure data storage

This methodology enables the study to assess not only the formal adequacy of Malaysia's land use and land management framework but also its practical implementation and its effects on agricultural production and national food security.

RESULT

The results are organised according to key themes that correspond with the research objectives. Evidence was obtained from multiple sources, including semi-structured interviews, policy and planning documents, spatial land use information, and relevant food security indicators. The integration of these data sources provides a broader understanding of how land use patterns, governance arrangements, and decision-making processes may influence food security in Malaysia.

Reduction in Land Available for Agricultural Activities

The spatial analysis indicates a noticeable reduction in land designated for agricultural purposes across the selected case study areas between 2000 and 2020. Among the states examined, Selangor recorded a decline of approximately 37.4%, while Johor experienced a reduction of 29.1%. A similar trend was identified in Sabah, particularly within peri-urban areas surrounding Kota Kinabalu. The decline in agricultural land generally coincided with the expansion of residential areas, commercial developments, infrastructure, and other non-agricultural land uses.

These findings suggest that increasing development pressures have contributed to greater competition for land resources. As urban areas continue to expand, agricultural land located close to rapidly developing areas may become increasingly vulnerable to conversion. This pattern is particularly relevant to food security, as a continuous reduction in productive agricultural land could constrain the capacity for domestic food production over the longer term.

The findings are consistent with previous empirical research on agricultural land conversion in Malaysia. Mohd Zin et al. (2020), for example, identified substantial changes in land use within the Klang Valley, where significant areas previously used for agriculture were converted to non-agricultural purposes between 1990 and 2015. Their study associated these changes with development pressures, weaknesses in zoning enforcement, and the higher economic returns associated with property development. Similarly, Rosnani et al. (2021), in their assessment of Permanent Food Production Parks (TKPMs), identified challenges related to infrastructure, institutional coordination, land utilisation, and tenure arrangements that affected the effectiveness of designated agricultural areas.

The continued reduction of agricultural land has broader implications for Malaysia's food system. As the amount of land available for food cultivation decreases, the country's capacity to expand or maintain domestic agricultural production may also be affected. This is particularly important in the context of Malaysia's dependence on imported food and exposure to fluctuations in international food prices and supply chains. The findings therefore indicate that agricultural land availability should be considered an important component of long-term food security planning.

Limited Incorporation of Food Security into Land Use Planning

The analysis of policy and planning documents indicates that food security considerations are not consistently incorporated as a central priority within state structure plans and local planning documents. Although agricultural zones are identified within existing planning frameworks, the preservation of land specifically for food production does not always appear to receive the same strategic emphasis as other development objectives. At the national level, the National Physical Plan acknowledges the importance of agricultural

activities and food production; however, challenges remain in translating these broad objectives into effective mechanisms for protecting productive agricultural areas at the state and local levels.

The findings demonstrate a potential disconnect between national food security aspirations and the implementation of land use planning at lower levels of governance. Agricultural land may be formally recognised within planning documents, but its continued availability for food production depends on how planning policies are interpreted, implemented, and enforced. Without stronger integration between food security objectives and land use planning, agricultural areas may remain vulnerable to competing development demands.

This finding is supported by Ismail et al. (2018), whose research on agricultural land planning identified weaknesses in coordination among agencies responsible for agriculture, planning, and land administration. Institutional separation between these agencies may result in land allocation decisions that are not fully aligned with broader food security objectives. Consequently, strengthening the relationship between agricultural policy and spatial planning may be necessary to ensure that land use decisions adequately consider the long-term requirements of domestic food production.

International experiences provide useful comparative perspectives. Nguyen et al. (2021), for example, demonstrated how GIS-based land suitability assessments and participatory planning approaches have been applied to support the preservation of rice-producing areas in Vietnam's Mekong Delta. Such approaches illustrate the potential value of integrating spatial evidence, agricultural priorities, and stakeholder participation into land use planning. Similar practices could provide useful lessons for improving the consideration of food security within Malaysia's planning processes, although they would need to be adapted to the country's institutional and legal context.

Fragmented Institutional Arrangements and Decision-Making

The interview findings reveal that fragmentation among institutions represents a significant challenge to effective land governance. Respondents from federal, state, and local government agencies identified limited inter-agency coordination, overlapping responsibilities, and inadequate communication as factors that complicate land-related decision-making. These institutional challenges may reduce the ability of relevant authorities to develop a coordinated approach to balancing development needs with the preservation of agricultural land.

Malaysia's governance structure adds further complexity to this issue. While national agricultural and food security policies are generally developed at the federal level, state governments exercise considerable authority over land matters. As a result, differences may arise between federal food security objectives and state-level land development priorities. In some circumstances, the economic benefits associated with commercial, residential, or industrial development may be given greater consideration than the longer-term value of maintaining agricultural land for food production.

The findings correspond with the observations of Ismail et al. (2018), who found that institutional separation among land, planning, and agricultural agencies could contribute to inconsistent land allocation practices. Similar governance challenges have also been documented elsewhere in Southeast Asia. Firman (2016), for instance, observed that decentralised land governance in Indonesia provided local governments with greater decision-making authority but could also result in varying approaches to land management, with commercial development sometimes receiving greater priority than agricultural land preservation.

In contrast, experiences from countries that have adopted more integrated planning systems demonstrate alternative approaches. Research from Vietnam (Nguyen et al., 2021) and the Netherlands (Anderson & Shimada, 2015) highlights the potential contribution of coordinated institutional arrangements, agricultural land protection measures, participatory planning, and evidence-based decision-making to sustainable land management. While these systems operate within different institutional contexts, they provide useful examples of how stronger coordination can support the integration of agricultural objectives into broader land use planning.

Implications of Land Use Decision-Making for Food Security

Taken together, the findings indicate that food security outcomes are influenced not only by the physical availability of agricultural land but also by the processes through which land use decisions are made. The reduction of agricultural areas, limited integration of food security objectives into planning frameworks, and fragmented institutional responsibilities collectively create challenges for maintaining a sustainable domestic food production system.

These issues are increasingly important given Malaysia's reliance on food imports and vulnerability to disruptions in international food markets. Decisions that result in the permanent conversion of productive agricultural land may reduce the country's future capacity to increase domestic production when required. The effects may be particularly relevant for food crops and agricultural activities located in areas experiencing rapid urbanisation and development.

The findings also highlight an important gap in the existing empirical literature. While previous research has extensively examined changes in land use, agricultural land conversion, and institutional governance, relatively few studies have investigated the actors directly involved in land use decision-making and the mechanisms through which land is allocated, converted, or rezoned. Greater attention to the roles of planners, land administrators, policymakers, agricultural agencies, developers, farmers, and other stakeholders could provide a clearer understanding of the factors and incentives influencing land use outcomes.

An actor-oriented perspective is therefore important for identifying where and how improvements to land governance could be introduced. Understanding who participates in decision-making, how competing interests are evaluated, and which institutional arrangements influence final decisions could help explain why differences sometimes emerge between national policy objectives and actual patterns of land development.

Synthesis of Findings

Overall, the results demonstrate that the relationship between land management and food security in Malaysia is shaped by interconnected spatial, institutional, and policy-related factors. The decline in agricultural land, insufficient integration of food security considerations into planning processes, and fragmented governance arrangements collectively affect the capacity to protect and sustainably utilise land for domestic food production.

Existing empirical studies have contributed significantly to understanding agricultural land conversion and changes in land use. However, these issues are frequently examined independently, with limited integration between spatial evidence, institutional analysis, food security indicators, and decision-making processes. The findings of this study suggest that a more comprehensive analytical approach is required to understand how these dimensions interact and influence food security outcomes.

Moving forward, research on land management and food security in Malaysia could benefit from approaches that combine spatial analysis with institutional and governance perspectives. Greater attention should also be given to decision-making processes across federal, state, and local levels, including the interests and incentives of the actors involved. Integrating land use data with indicators of agricultural production and food security could further strengthen the evidence available to policymakers. Such an approach would support the development of more coordinated, transparent, and evidence-informed land management strategies capable of balancing development priorities with Malaysia's long-term food security needs.

Limitations of the Study

While this study provides valuable insights into the role of decision-making in land use and land management as it relates to food security in Malaysia, several limitations should be acknowledged.

First, much of the research in Malaysia is geographically concentrated in more developed states like Selangor or Penang, with limited investigation into rural or marginal regions where food insecurity may be more acute.

Second, studies often adopt either a land use or a food security lens, but rarely both in an integrated analytical framework. Quantitative studies tend to focus on land use change patterns without evaluating downstream effects on food availability or access, while qualitative studies highlight governance issues but lack empirical data linking decisions to food system outcomes.

Despite these limitations, the study offers a meaningful contribution to the understanding of how land governance and decision-making processes influence food security in Malaysia. Future research that expands the geographic scope, incorporates more diverse stakeholder perspectives, and employs longitudinal data would help to strengthen and build upon the findings presented here.

CONCLUSION

A comprehensive review of the literature on land use, land management, and food security in Malaysia reveals several critical research gaps, particularly concerning the role of decision-making in shaping land governance outcomes. While numerous studies have explored agricultural land loss (Mohd Zin et al., 2020), spatial planning policies (Rosnani et al., 2021), and institutional fragmentation (Ismail et al., 2018), these investigations often operate in disciplinary silos and rarely offer a holistic, decision-making-centered perspective. This limits the ability to formulate integrated solutions for enhancing food security through land governance reforms.

First, a significant gap lies in the lack of integrated analytical frameworks that connect land use decisions directly to food security outcomes. Much of the existing empirical work focuses either on land use change patterns or on food production trends, but seldom links the two in a cause-and-effect analysis. For example, spatial analyses of land conversion (e.g., Mohd Zin et al., 2020) typically quantify agricultural land loss but do not assess how these changes affect local or national food availability, access, or stability. This fragmentation of focus obscures the systemic nature of food insecurity as it relates to land management.

Second, there is a limited understanding of the decision-making processes and actors involved in land allocation and zoning. Although studies acknowledge the complexity of Malaysia's multi-level governance system, few delve into how decisions are made, by whom, and under what institutional, political, or economic pressures. Ismail et al. (2018) point to weak coordination between agencies, but stop short of analyzing the incentives, power dynamics, and governance cultures that shape these relationships. In contrast, political ecology and institutional analysis approaches, which have been applied in other Southeast Asian contexts (e.g., Firman, 2016; Nguyen et al., 2021), are rarely employed in Malaysian research.

Third, policy evaluations are scarce, particularly in assessing the actual implementation and impact of land-related initiatives such as the National Agrofood Policy (NAP), Permanent Food Production Parks (TKPM), and the National Physical Plan (NPP). While policy documents often articulate ambitious goals, there is little empirical follow-up to determine whether these goals are met, or to identify the institutional barriers to their success. The absence of robust monitoring and evaluation frameworks contributes to the persistence of implementation gaps and policy incoherence.

Fourth, there is an urban-rural and regional imbalance in existing research. Most studies are concentrated in urbanized or industrialized states such as Selangor and Penang, with limited empirical attention to rural areas, East Malaysia, or indigenous and smallholder farming communities—groups that are particularly vulnerable to land insecurity and food access issues. This geographic bias restricts the generalizability of findings and risks overlooking site-specific governance dynamics that could inform more inclusive policy development.

Finally, methodological limitations persist in the form of data availability, integration, and scale. Spatial data, land tenure records, and agricultural productivity statistics are often held across different agencies and are not always accessible or harmonized, making longitudinal or cross-sectoral analysis difficult. This undermines efforts to develop evidence-based, multi-scalar planning approaches that could better integrate food security into land use governance.

Given these gaps, further research should focus on several key areas. First, there is a need for interdisciplinary studies that adopt systems-thinking frameworks, combining spatial analysis, institutional ethnography, and food security metrics. Second, actor-oriented research is crucial to uncover the decision-making dynamics at various governance levels, including the motivations, constraints, and power relations influencing land allocation. Third, policy implementation studies are necessary to track the effectiveness of existing land and food security programs, identify points of failure, and inform policy redesign.

In conclusion, addressing these research gaps is vital for developing an integrated understanding of how land use and land management decisions affect food security in Malaysia. Future studies must move beyond siloed analyses to embrace holistic, empirically grounded approaches that can inform more coherent and effective land governance systems—ones that prioritize long-term food security alongside economic and environmental sustainability.

RECOMMENDATIONS

Based on the findings and analysis presented in this study, several key recommendations are proposed to enhance the role of decision-making in land use and land management for ensuring food security in Malaysia; viz; strengthening policy integration between land use planning and food security, improving Inter-Agency Coordination and Governance Mechanisms, enacting and enforcing legal protections for agricultural land, enhancing transparency and public participation in land use decisions, investing in spatial data systems and land use monitoring and promoting research and capacity building etc.

Implementing these recommendations will require strong political commitment, institutional reform, and multi-stakeholder collaboration. Ensuring that land use and land management decisions are responsive to food security challenges is not only vital for Malaysia's agricultural future but also for achieving broader sustainable development goals.

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