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DEVELOPING AN INTEGRATED MODEL FOR THE BACKYARD ECONOMY TO SUSTAIN FOOD SECURITY IN MALAYSIA: A SYSTEMATIC LITERATURE REVIEW

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Abstract:

The backyard economy is an important but little-studied aspect of sustainable food systems, especially in fast-urbanizing countries like Malaysia. This study reviews the literature to determine how an integrated model of the backyard economy can be developed to support Malaysia's food security agenda. The results show that although backyard farming increases household food self-sufficiency, current practices are fragmented because of regulatory barriers, knowledge gaps, resource constraints, and economic disincentives. The study identifies enabling factors like technological innovation, policy integration, community mobilisation, financial support mechanisms, and ecological sustainability as crucial elements of an integrated model. Finally, it suggests a conceptual framework that connects these aspects holistically to position backyard farming as a strategic pillar of national food security. Policy recommendations include mainstreaming backyard farming into urban planning, investing in capacity-building, promoting inclusive technological adoption, developing innovative financing structures, embedding ecological practices, and culturally revalorizing backyard agriculture. This research contributes to advancing sustainable food systems discourse by offering a context-specific blueprint for Malaysia's backyard economy transformation.

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Keywords:

Backyard Economy; Food Security; Urban Agriculture; Sustainable Development; Integrated Model.

Introduction

Food security remains a major objective in Malaysia's national development strategy, especially as the country faces increased reliance on imported food, volatile global commodity prices, and disruptions caused by climate change and pandemics. According to the Department of Statistics Malaysia (2022), Malaysia imports around RM 55.5 billion of food each year, resulting in considerable outflows of foreign cash and subjecting the country to external shocks. Recent global events, such as the COVID-19 pandemic and the Russia-Ukraine conflict, have highlighted the risks of over-reliance on the global food supply system (Rahman et al., 2023). The backyard economy, which encompasses household-level food production activities such as vegetable gardening, small-scale livestock, aquaculture, and food processing, is widely recognized as a grassroots mechanism for increasing household resilience and contributing to national food security (Ahmed et al., 2021). Backyard farming has long been practiced in rural Malaysian communities. However, modernization, urbanization, and lifestyle changes have resulted in a progressive decline in this behavior (Tan & Yusof, 2022). The backyard economy has multiple benefits: it can supplement household income, diversify food sources, improve nutritional security, minimize food waste, and foster social cohesion through community-based activities (Lim & Chan, 2020).

Notably, backyard activities are consistent with Malaysia's sustainability objectives under the Twelfth Malaysia Plan (12MP), which prioritizes food security, environmental stewardship, and community development. Despite their promise, attempts to increase backyard food production in Malaysia have generally been fragmented and uncoordinated. Most projects are isolated, driven by non-governmental organizations (NGOs), community groups, or individual households, with little support from national policy frameworks (Leong, 2021). There is currently no comprehensive national policy that links backyard activities to larger food security goals, economic development programs, or climate resilience initiatives. Furthermore, critical challenges such as limited technical knowledge, lack of standardized guidelines, urban spatial constraints, and inadequate economic incentives hinder the full potential of the backyard economy as a sustainable food security mechanism (Mohd & Amin, 2019; Wong et al., 2020). Developing an integrated model for the backyard economy is critical. Such a model will require a multifaceted approach that combines regulatory support, technological innovation, financial mechanisms, ecological principles, and community capacity building. It should also be adapted to the diverse Malaysian settings, including densely populated urban areas, rural villages and indigenous Orang Asli communities.

While several international studies have investigated integrated urban agriculture and household production systems (e.g., Nguyen et al., 2021; Ahmed et al., 2021), there is little scholarship that contextualizes this framework within the distinct Malaysian socioeconomic, cultural and agro-ecological landscapes. There is an urgent need for a comprehensive review of existing materials to guide the development of a Malaysian-specific integrated model for the backyard economy. Against this backdrop, this paper conducts a Systematic Literature Review (SLR) with the following objectives: To investigate global and Malaysian scholarly

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perspectives on the backyard economy and their contributions to food security; To identify key success factors, barriers, and gaps in current practices and to present a conceptual framework for an integrated backyard economy model adapted to the Malaysian setting. This review aims to provide both theoretical insights and practical recommendations for policymakers, researchers and practitioners committed to improving Malaysian food security through sustainable community-based solutions.

Literature Review

The concept of backyard economies has received much attention worldwide as a long-term, grassroots approach to improving family resilience and food security. Backyard economies are generally defined as small-scale, household-centred production systems that include activities such as vegetable gardening, poultry farming, aquaculture, and small-scale food processing (Ahmed et al., 2021; Nguyen et al., 2021). Historically, such practices have existed across many cultural and geographical settings, from ancient kitchen gardens in Africa and Latin America to contemporary urban farming programs in Europe and North America (Food and Agriculture Organization [FAO], 2020). These programs are credited not only with increasing food availability, but also with fostering environmental sustainability, income diversification, and social cohesion (Mougeot, 2015; Frayne et al., 2014). International experience has shown that effective backyard economic models often rely on cross-sector collaboration, strong government frameworks, technical advancements, and active community participation. For example, Cuba's urban agricultural reforms during the "Special Period" following the fall of the Soviet Union demonstrated how backyards and urban farms could dramatically reduce reliance on imported food (Zezza & Tasciotti, 2010). Similarly, Singapore's use of vertical farming technology to maximize limited space has been hailed as a paradigm for future urban agricultural systems (Ahmed et al., 2021).

Malaysia's backyard economy has significant historical roots, particularly among rural and semi-rural inhabitants. Traditionally, households engaged in backyard gardening to support their subsistence needs, growing fruits and vegetables, and raising chickens and small cattle (Abdullah & Sulaiman, 2020). However, Malaysia's fast urbanization with over 77% of the population currently living in cities (Department of Statistics Malaysia, 2022) has led to the decline of these traditional customs. Recent initiatives, such as the Kebun-Kebun Bangsar community farm in Kuala Lumpur and the Ministry of Agriculture and Food Industries' (MAFI) "Laman Edible" program, demonstrate a revived interest in revitalising backyard food production (Lim and Chan, 2020). Eco Knights, a non-governmental organisation, has encouraged household and community gardening through awareness campaigns and seed distribution initiatives. Nonetheless, scholarly reviews show that these efforts are scattered, with no systemic integration with national food security policies or urban development goals (Leong, 2021). Backyard economies contribute to food security in a variety of ways that are consistent with the FAO's (2010) four pillars of availability, access, utilisation, and stability. Backyard activities can improve food availability by boosting the domestic supply of perishable items such green vegetables, herbs, eggs, and chicken meat (Othman and Hashim, 2022). They also increase food access by lowering household food expenses and, in certain cases, generating additional revenue through the sale of surplus produce (Nguyen et al., 2021).

Backyard farming diversifies diets, increases consumption yields by addressing both malnutrition and developing public health challenges including obesity (Zainal et al., 2022). Furthermore, household-level food production enhances food security by acting as a buffer

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against external shocks such as economic recessions, epidemics and supply chain disruptions, as demonstrated during the COVID-19 pandemic (Rahman et al., 2023). However, several fundamental barriers hinder the effective growth of Malaysia's backyard economy. Policy and regulatory barriers, such as strict land-use zoning regulations and lack of clear legal recognition for household-level food production, restrict widespread participation, especially in urban areas (Rahman et al., 2023). Knowledge and skills gaps exist, as many urban residents lack key agricultural competencies, resulting in high failure rates of household gardening (Wong et al., 2020). Resource constraints, such as limited access to quality seeds, water scarcity, and small plot sizes, especially in high-density residential areas, exacerbate this issue (Mohd & Amin, 2019). Economic disincentives, such as lack of access to microfinance, inadequate market linkages, and limited entrepreneurial training, reduce the attractiveness of backyard gardening as a source of income (Othman & Hashim, 2022). Furthermore, environmental problems such as soil contamination and pest infestation hinder urban farming experiments and require specific mitigation techniques (Zainal et al., 2022). Based on best practices around the world, an integrated model for the backyard economy must address these difficulties holistically, including policy integration, technological innovation, community mobilization, financial support systems, and ecological sustainability. Backyard agriculture is integrated into national food security strategies, urban planning frameworks, and climate resilience agendas (Ahmed et al., 2021). Technological advances such as Internet of Things (IoT)-based smart gardening systems, vertical farming techniques and aquaponics can optimize resource use and productivity even in space-limited areas (Ali et al., 2021). Community mobilization efforts, such as cooperative groups and community-supported agriculture (CSA), can help with resource sharing and collective action (Lim & Chan, 2020). Financial mechanisms such as microcredit programs, grants, and public-private partnerships are important to encourage household involvement (Othman & Hashim, 2022). Finally, ecological sustainability must be prioritized by implementing organic farming practices, permaculture concepts, and promoting local agrobiodiversity (Zainal et al., 2022).

Despite growing academic and policy interest, a large research gap persists. There are few empirical studies examining the long-term economic and social benefits of backyard gardening projects in Malaysia. Furthermore, the incorporation of backyard gardening into formal urban development plans and food security programs is limited. The potential of digital technologies to transform backyard farming techniques in Malaysia has also received little attention. Finally, longitudinal research is essential to analyse the impact of backyard gardening in enhancing household and community resilience during long-term crises such as pandemics and climate change-related disasters. Addressing this deficiency is essential to establish a comprehensive evidence-based integrated backyard economic model that can make significant contributions to Malaysia's food security, economic resilience, and sustainable development objectives.

Methodology and Data Analysis

In order to support Malaysia's food security agenda, this study examines the literature to determine how an integrated backyard economy model can be created. With an emphasis on the Malaysian context, this study uses a Systematic Literature Review (SLR) methodology to thoroughly examine the body of research on the backyard economy and its role in food security. Numerous scholarly databases, including Scopus, Web of Science, Google Scholar, and ScienceDirect, were thoroughly searched. To find pertinent literature, the search employed a combination of keywords and Boolean operators:

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"Food security" AND "backyard economy"
"Malaysia" AND "urban agriculture"

- "sustainable food systems" AND "household food production"
- "community farming" AND "integrated model"

Only peer-reviewed English-language publications were included in the search. The inclusion and exclusion criteria are also used in the study. Research on backyard farming, urban agriculture, or household-level food production; studies investigating the connection between backyard economy practices and food security outcomes; studies carried out in Malaysia or in areas with comparable socioeconomic and environmental conditions; and articles published in peer-reviewed journals are the following criteria for inclusion. Exclusion criteria: research that has no direct bearing on food security or the backyard economy; publications that are not available in English, as well as articles that lack empirical support or explicit methodological frameworks.

Finding and Discussion

This comprehensive literature review reveals several important conclusions about the creation of an integrated backyard economy model to ensure Malaysian food security. The review highlights that, while the backyard economy has great potential, current practices in Malaysia are fragmented, immature, and lack systematic integration into larger national food security policies. The investigation yielded several topical findings, including the benefits of the backyard economy, structural and operational constraints, potential enablers, and conceptual needs for an integrated model. To begin with, the literature repeatedly highlights the important benefits of the backyard economy for improving food security. According to research, backyard farming projects increase household access to fresh and healthy food, reducing reliance on external food supply chains (Ahmed et al., 2021; Nguyen et al., 2021). In Malaysia, projects such as Kebun-Kebun Bangsar and other community gardens have shown that urban households that engage in backyard farming have higher food self-sufficiency and better dietary diversity than households that do not participate (Lim & Chan, 2020). These findings are consistent with international studies that show that local food production systems can effectively protect households from external shocks such as economic downturns or supply chain disruptions during crises such as the COVID-19 pandemic (Rahman et al., 2023).

Second, despite these advantages, many key barriers to establishing an effective backyard economy are often encountered. Regulatory barriers, such as strict urban land use regulations and zoning ordinances, often hinder the spread of backyard agriculture, especially in densely populated urban areas. Furthermore, knowledge and capacity gaps severely limit the success of family food production projects. Urban residents, especially those in younger demographics, often lack essential agricultural knowledge and technical skills required for sustainable food production (Wong et al., 2020; Mohd & Amin, 2019). This knowledge gap is exacerbated by resource constraints, such as inadequate access to quality seeds, limited planting space, unpredictable water supplies, and a lack of specialized urban agriculture supplies (Othman & Hashim, 2022). Furthermore, the economic viability of backyard farms remains uncertain in the absence of supportive financial mechanisms such as access to microcredit, subsidized inputs, and organized markets for surplus produce (Othman & Hashim, 2022; Zainal et al., 2022).

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Third, research identifies many enabling features that are important for the effective implementation of integrated backyard economic models. Policy support is critical; examples from Cuba and Singapore show that well-coordinated policies that integrate backyard agriculture into larger urban development, food security, and sustainability objectives are essential (Zezza & Tasciotti, 2010; Ahmed et al., 2021). Technological advances, particularly smart farming systems, vertical gardens, aquaponics, and hydroponics, provide scalable solutions to the spatial and resource constraints of Malaysian cities (Ali et al., 2021). Community mobilization emerges as another important enabler. Cooperatives, urban farming networks and community-supported agriculture (CSA) models can help backyard farmers gain social support, shared resources and market access (Lim & Chan, 2020). Financial incentives, such as subsidies for initial start-up costs, subsidised inputs and market integration techniques, increase the viability and attractiveness of backyard farming (Othman & Hashim, 2022).

According to the research, for the backyard economy to have a real impact on Malaysia's food security, it must be seen as a strategic component of the national food system rather than a hobbyist activity. This requires the creation of a comprehensive integrated approach that addresses systemic constraints while maximizing identified enablers. This approach includes a multi-sectoral framework that links urban planning, agricultural innovation, education and training, financial services, and community development. For example, integration with urban development plans may require new residential projects to include space for community gardens, while agricultural extension services could be scaled up to provide technical training geared toward urban and peri-urban farmers (Leong, 2021). Furthermore, digital technologies offer great opportunities to improve backyard farming techniques. Mobile apps that provide step-by-step farming instructions, IoT sensors for soil and water monitoring, and online produce marketplaces can transform backyard farming into a more efficient, data-driven activity (Ali et al., 2021). However, the literature emphasizes that the use of technology must be inclusive, ensuring that marginalized groups such as low-income households and the elderly are not left behind (Nguyen et al., 2021).

The discussion also suggests that ecological sustainability must be incorporated into an integrated approach. Adopting organic farming techniques, fostering biodiversity through multi-crop systems, and promoting waste-to-resource activities such as composting are essential to ensure that backyard farming contributes to environmental resilience and food security (Zainal et al., 2022). In Malaysia, where challenges such as urban land pollution and climate vulnerability are prevalent, incorporating environmental health considerations is critical. Finally, the data suggest that backyard farming should be culturally re-evaluated. Public education initiatives, urban food festivals, school gardening programs, and media promotions can all help to rebrand backyard farming as a prestigious, forward-thinking activity aligned with the ideals of sustainable living, rather than a waste of rural subsistence techniques (Tan & Yusof, 2022). In conclusion, this assessment reveals that, while Malaysia's backyard economy has great potential to improve food security, realizing that promise requires a paradigm shift. Policymakers, urban planners, community leaders, and households must work together to create a comprehensive, integrated system. Only through such targeted strategic initiatives will the backyard economy grow from a small, informal activity to a strong component of Malaysia's sustainable food security architecture.

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Integrated Model Proposal: Backyard Economy for Sustaining Malaysian Food Security

The integrated backyard economy model for sustaining Malaysian food security aims to make household-level food production a fundamental component of Malaysia's food security policy. At its core, the concept emphasizes the importance of incorporating backyard agriculture into the national food security framework and urban development strategy. Policy integration is a key component of this model, which requires the incorporation of backyard agriculture into national urban planning, food security plans and environmental sustainability initiatives. To achieve this, regulatory reforms are needed, such as the relaxation of land-use zoning restrictions to enable urban agriculture, as well as the formation of a National Urban and Peri-Urban Agriculture Council to coordinate efforts across sectors. Technological innovation is essential to modernize backyard agriculture, with an emphasis on accessible smart farming technologies such as IoT-based irrigation systems, hydroponics and smartphone apps that provide real-time assistance on cultivation, pest management and market access. In addition, community mobilization through the formation of Backyard Farm Cooperatives and urban gardens promotes social networking, resource sharing and collective marketing. Financial support tools, such as microfinance schemes, grants and government buyback programmes, help reduce economic barriers that prevent households from producing food. To maintain sustainability, this approach incorporates ecological concepts that promote organic farming, soil health management, and the cultivation of climate-resilient crops. The model also emphasizes the importance of building capacity through national agricultural extension services and educational programs targeted at urban populations. By implementing this strategy, the model envisions a more resilient, self-reliant, and sustainable food system, which will ultimately help achieve Malaysia's food security goals as well as the larger Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger) and SDG 11 (Sustainable Cities and Communities). This integrated strategy provides a holistic answer to Malaysia's food security concerns, enabling households and communities to play a key role in ensuring their local food supply while also contributing to the larger national effort.

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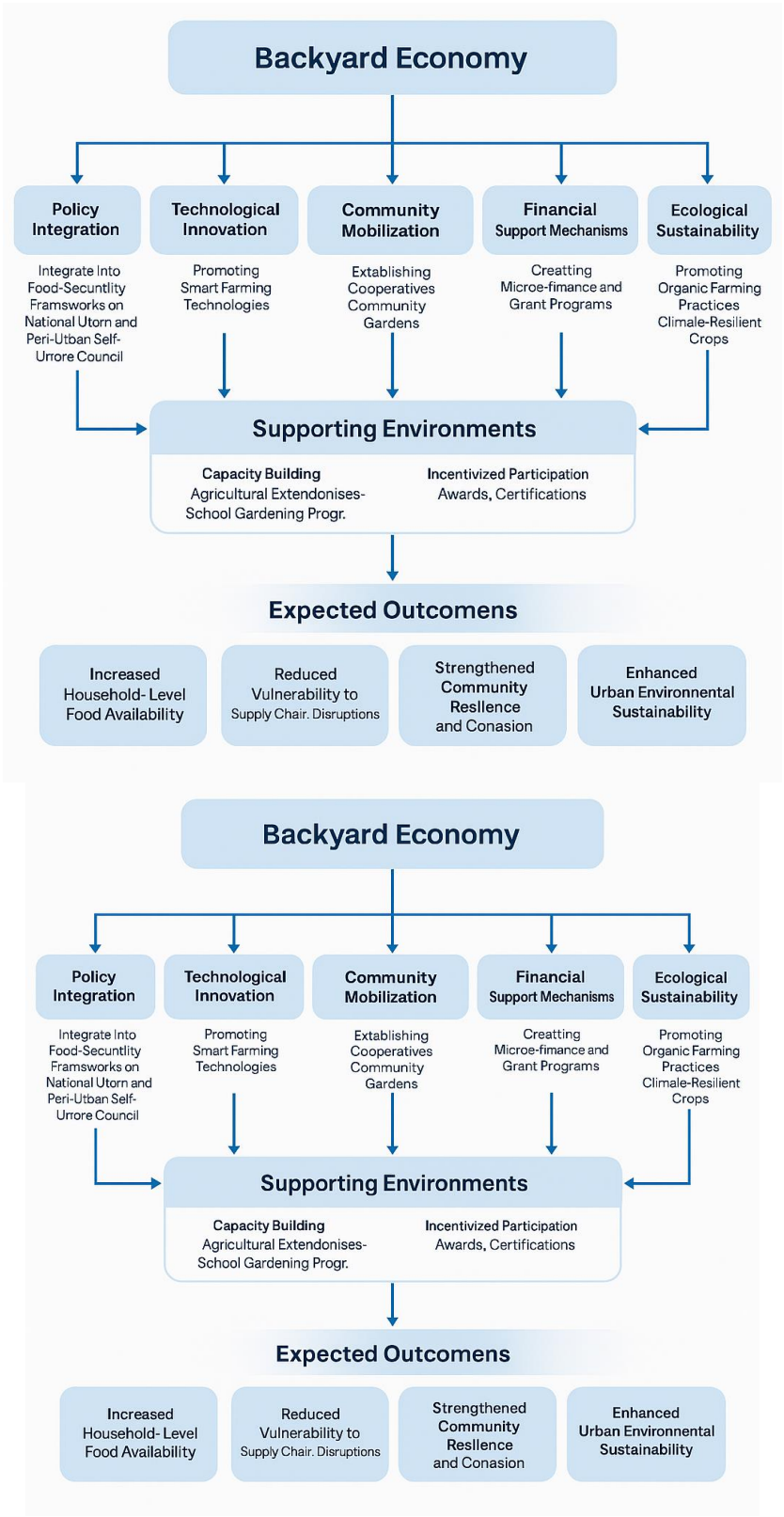

Backyard Economy
Policy Integration
Integrate Into Food-Secuntlity Framsworks on National Utorn and Peri-Utban Self-Urrore Council
Technological Innovation
Promoting Smart Farming Technologies
Community Mobilization
Extablishing Cooperatives Community Gardens
Financial Support Mechanisms
Creatting Microe-fimance and Grant Programs
Ecological Sustainability
Promoting Organic Farming Practices Climale-Resilient Crops
Supporting Environments
Capacity Building
Agricultural Extendonises-School Gardening Progr.
Incentivized Participation
Awards, Certifications
Expected Outcomens
Increased Household- Level Food Availability
Reduced Vulnerability to Supply Chair. Disruptions
Strengthened Community Resllence and Conasion
Enhanced Urban Environnental Sustainability

Figure 1: Integrated Model Proposal: Backyard Economy for Sustaining Malaysian Food Security

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The integrated backyard economy model for sustaining Malaysia's food security focuses on empowering households and communities to engage in small-scale food production, with the goal of increasing food self-sufficiency and contributing to overall food security. The strategy aims to address food security at the national level while simultaneously empowering local communities, ensuring Malaysia's food production system is resilient, sustainable and self-sufficient. The model is based on five key pillars: Policy Integration argues for the recognition of backyard agriculture in national policies, ensuring its inclusion in urban planning and agricultural strategies; Technological Innovation promotes modern agricultural technologies and accessible platforms to increase production; Community Mobilization, which encourages the formation of local networks such as cooperatives and community gardens to pool resources and foster collaboration; Financial Support Mechanisms, which reduce financial barriers by providing microfinance, grants, and buy-back programs; and Ecological Sustainability, which ensures environmentally responsible practices such as organic farming and climate-resilient crops. The supporting environment consists of Capacity Building, which provides households with essential information and skills, and Incentive Participation, which motivates households to succeed through recognition, rewards, and financial incentives. This strategy aims to address food security at the national level while simultaneously empowering local communities, ensuring Malaysia's food production system is resilient, sustainable and self-sufficient. The end results of this model include increased household food availability, reduced vulnerability to supply chain disruptions, strengthened community resilience and enhanced urban environmental sustainability, resulting in a more self-sufficient, resilient and environmentally conscious food system in Malaysia.

Conclusions and Policy Recommendations

This study examined the feasibility of building an integrated backyard economy model to ensure Malaysian food security. The findings reaffirm that backyard economies are an important, but underutilised, option for increasing food supply, access, utilisation, and stability, especially in the face of external shocks like pandemics, economic crises, and climate change impacts. However, the practice in Malaysia remains mostly dispersed, hampered by legislative restraints, knowledge gaps, resource limitations, economic disincentives, and environmental issues. Without deliberate and systematic intervention, the backyard economy is unlikely to become a major component of Malaysia's food security architecture. As a result, an integrated paradigm is urgently needed one that combines policy, technology, community, financial, and ecological components. Such a program must shift backyard farming from an informal, individual activity to a strategically supported system integrated with national development priorities. Drawing lessons from worldwide best practices and contextualising them in Malaysia's socioeconomic circumstances is crucial to ensuring the model's relevance, scalability, and sustainability. Based on the findings, numerous policy proposals are proposed:

First, incorporate backyard farming into national food security and urban development programs. To formally recognise and encourage household-level food production, regulatory reforms are required, such as changes to land-use zoning, incentives for urban agriculture, and the integration of food production areas into residential planning. Second, invest in capacity-building efforts to help bridge the knowledge and skill gap. Nationwide training programs, urban agriculture extension services, and school-based gardening curriculum should be created to provide individuals, particularly urban youth, and marginalised areas, with practical skills in sustainable food production. Third, encourage technological use in backyard farming. Collaboration between the government and the business sector may make smart agricultural

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technology, vertical farming systems, and digital platforms that provide advisory services and market connections more accessible.

Special effort must be paid to making technology accessible and inexpensive. Fourth, create innovative finance tools to assist home food production. These tools could include microcredit facilities, start-up kit grants, and the formation of cooperatives to assist backyard farmers in pooling resources and more efficiently accessing markets. Fifth, include eco-friendly principles into backyard agricultural projects. Policymakers should encourage organic farming, biodiversity conservation, water-saving technologies, and waste-to-resource activities like composting and rainwater collection. Finally, elevate home farming through public awareness campaigns and cultural initiatives. Rebranding backyard farming as a respectable, sustainable lifestyle choice that aligns with Malaysia's larger environmental and health goals would be vital to gaining wider community support. To summarise, Malaysia's creation of an integrated backyard economy model provides a chance to improve food security, boost community resilience, and contribute to sustainable development goals. Strategic, coordinated action by the government, commercial sector, civil society, and households is required to realise the revolutionary potential of backyard economies in guaranteeing Malaysia's food future.

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