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EMPOWERMENT OF FARMER GROUPS THROUGH THE UTILIZATION OF BACKYARD GARDENS FOR THE CULTIVATION OF CASH CROPS TO SUPPORT FOOD SECURITY: A LITERATURE REVIEW IN PAYA PASIR VILLAGE

by
Turino Januar Budyanto
Program Studi Agribisnis, Institut Teknologi Sawit Indonesia (ITSI)
Email: rino.januar@gmail.com

ABSTRACT

Household food security in urban coastal areas such as Paya Pasir Village, Medan Marelan District, faces pressures from land conversion, limited yard size, and high dependence on food purchased from the market. On the other hand, the potential of unoptimized yard land and the existence of local farmer groups open up opportunities for empowerment strategies based on yard-scale plantation cultivation. This study aims to systematically examine the concept of farmer group empowerment, types of plantation crops that are appropriate to the characteristics of coastal agroecology, empowerment strategies and stages, and their contribution to food security in Paya Pasir Village. The study used a literature review method (library research) with a descriptive qualitative approach, reviewing accredited journal articles, community service results, and policy documents published between 2013 and 2026 through the Google Scholar, Garuda, and DOAJ databases. The study results indicate that empowering farmer groups through the cultivation of plantation crops such as coconut, citronella, betel nut, cocoa, and pepper in their yards can increase the diversification of food sources and household income if supported by ongoing extension, strengthening group institutions, and cross-sector partnerships. The main inhibiting factors include limited technical cultivation knowledge, sandy soil conditions and high salinity typical of coastal areas, minimal access to capital, and weak ongoing mentoring. This study recommends a phased empowerment model that integrates institutional capacity building, the introduction of appropriate cultivation technologies, and diversification of economically valuable plantation crops as a path towards sustainable family and community food security in Paya Pasir Village.

Keywords: *Empowerment of Farmer Groups, Plantation Crop Cultivation, Food Security.*

PEMBERDAYAAN KELOMPOK TANI BERBASIS PEMANFAATAN PEKARANGAN MELALUI BUDIDAYA TANAMAN PERKEBUNAN DALAM MENDUKUNG KETAHANAN PANGAN: KAJIAN LITERATUR DI KELURAHAN PAYA PASIR

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ABSTRAK

Ketahanan pangan rumah tangga di kawasan pesisir perkotaan seperti Kelurahan Paya Pasir, Kecamatan Medan Marelan, menghadapi tekanan berupa alih fungsi lahan, keterbatasan luas pekarangan, serta ketergantungan tinggi terhadap pangan yang dibeli dari pasar. Di sisi lain, potensi lahan pekarangan yang belum dioptimalkan dan keberadaan kelompok tani setempat membuka peluang strategi pemberdayaan berbasis budidaya tanaman perkebunan skala pekarangan. Penelitian ini bertujuan untuk mengkaji secara sistematis konsep pemberdayaan kelompok tani, jenis tanaman perkebunan yang sesuai dengan karakteristik agroekologi pesisir, strategi dan tahapan pemberdayaan, serta kontribusinya terhadap ketahanan pangan di Kelurahan Paya Pasir. Penelitian menggunakan metode kajian literatur (library research) dengan pendekatan kualitatif deskriptif, menelaah artikel jurnal terakreditasi, hasil pengabdian masyarakat, dan dokumen kebijakan yang dipublikasikan pada rentang tahun 2013-2026 melalui basis data Google Scholar, Garuda, dan DOAJ. Hasil kajian menunjukkan bahwa pemberdayaan kelompok tani melalui budidaya tanaman perkebunan seperti kelapa, sereh wangi, pinang, kakao, dan lada di lahan pekarangan mampu meningkatkan diversifikasi sumber pangan dan pendapatan rumah tangga apabila didukung oleh penyuluhan berkelanjutan, penguatan kelembagaan kelompok, dan kemitraan lintas sektor. Faktor penghambat utama meliputi keterbatasan pengetahuan teknis budidaya, kondisi tanah berpasir dan salinitas tinggi khas wilayah pesisir, minimnya akses permodalan, serta lemahnya pendampingan berkelanjutan. Kajian ini merekomendasikan model pemberdayaan bertahap yang mengintegrasikan penguatan kapasitas kelembagaan, introduksi teknologi budidaya tepat guna, dan diversifikasi tanaman perkebunan bernilai ekonomi sebagai jalan menuju ketahanan pangan keluarga dan komunitas yang berkelanjutan di Kelurahan Paya Pasir.

Kata Kunci: *Pemberdayaan Kelompok Tani, Budidaya Tanaman Perkebunan, Ketahanan Pangan.*

INTRODUCTION

Food security is one of the main pillars of national development which is a prerequisite for the realization of public welfare. Based on Law Number 18 of 2012 concerning Food, food security is defined as a condition of fulfilling food needs for the state down to the individual, which is reflected in the availability of sufficient food, both in quantity and quality, safe, diverse, nutritious, equitable, and affordable and does not conflict with the religion, beliefs, and culture of the community to be able to live healthy, active, and productively in a sustainable manner. This definition emphasizes that food security is not solely about food availability at the macro level, but also concerns the accessibility and utilization of food at the household level as the smallest unit of society. Amidst the challenges of population growth, conversion of agricultural land to residential areas, and fluctuating food prices in

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the market, optimizing yard space has long been promoted by the government as a strategy to mitigate household food risks. Programs such as the Sustainable Food Home Area (KRPL) and Sustainable Food Yard (P2L) were launched with the belief that every inch of land around the home, including unused and unproductive vacant land, has the potential to be developed as a food producer and source of additional family income. Yard utilization is considered relevant because it is easily accessible, does not require large areas of land, and can be managed independently by household members, particularly female farmers who have traditionally played a significant role in yard management (Alpandari & Prakoso, 2022; Nizar, Amalia, & Ulfa, 2024).

Various studies have shown that yard utilization programs implemented through farmer groups and women's farmer groups have been proven to contribute to household food security. Research by Harianti, Sari, and Yusuf (2024) in Tinanggea District found that the implementation of a sustainable food yard program increased the availability of fresh and nutritious food for participating households. Similar findings were presented by Musdalipa, Sulfiana, Zaenal, Sessu, Ariyani, and Reski (2026), who confirmed that strategies for empowering women's farmer groups in yard utilization contributed to reducing the prevalence of nutritional problems in children. However, most previous research has focused on the cultivation of seasonal horticultural crops such as vegetables and family medicinal plants (Sangadji, Rosalina, Fathurrahman, & Febriadi, 2023; Suhendar et al., 2022), while studies on empowering farmer groups through yard-scale plantation cultivation, which has a longer production cycle but higher long-term economic value, are still relatively limited. Plantation crops such as coconut, betel nut, cocoa, pepper, and citronella actually have their own comparative advantages when cultivated on a yard scale, especially in areas with coastal agroecological characteristics. Paya Pasir Village, located in Medan Marelan District, Medan City, is one area with these characteristics. Geographically, Paya Pasir Village directly borders Sicanang Village, Medan Belawan District to the north, and covers an area of approximately 1,000 hectares with nine neighborhoods (National Population and Family Planning Agency, 2016). This area is a suburban area with a majority of residents making a living as farmers and fishermen, and has established farmer groups that have not optimally utilized the potential of yard land (Medan City Regional Research and Innovation Agency, 2022). The sandy soil conditions (as the village name "Paya Pasir") and the influence of salinity from the Belawan coastal area require the selection of adaptive plant species, where plantation crops such

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as coconut and citronella are known to have relatively good tolerance to these marginal soil conditions.

Reforestation and productive plant planting efforts in Paya Pasir Village have actually been initiated by various parties. For example, the planting of one hundred durian, matoa, and honey guava trees involving residents, the Indonesian National Armed Forces (TNI), and the Indonesian National Police (Polri) in the Medan Marelan area at the end of 2025 demonstrated the existence of social capital and community enthusiasm for productive agricultural activities (Tobasatu.com, 2025). Furthermore, the presence of the Mutiara Mangrove Farmers Group in the Siombak Lake area adjacent to Paya Pasir also demonstrates that conservation-based and productive plant-based farmer groups have established social roots in this region (AnalisaDaily.com, 2026). This existing social and institutional capital provides an important basis that can be strengthened through empowerment programs that are more focused on cultivating high-value plantation crops in yards. The empowerment of farmer groups itself is understood as a systematic effort to improve the ability, knowledge, skills, and access to resources of farmers so that they are able to manage farming businesses independently and sustainably (Mardikanto & Soebiato, 2015). The legal umbrella for farmer empowerment in Indonesia is explicitly regulated in Law Number 19 of 2013 concerning the Protection and Empowerment of Farmers, which mandates that farmer empowerment includes education and training, extension and mentoring, development of agricultural product marketing systems and facilities, agricultural land consolidation, easy access to science, technology, and information, strengthening farmer institutions, easy access to financing, and agricultural insurance facilities. In practice, as shown by Ardian, Nasution, Adela, Lubis, Sanusi, and Suhendri (2026) in a study of farmer group empowerment in Tanjung Morawa A Village, Deli Serdang Regency, the synergy between technological innovation and strengthening farmer group institutions has been proven to accelerate the achievement of community-based food security in areas that are agro-ecologically close to Medan City.

The issue of limited agricultural land in urban areas is not a new issue in the food security literature. The concept of urban agriculture has long been promoted as an adaptive strategy to provide food production amidst limited urban space. Urban farming is defined as the practice of growing, harvesting, and distributing agricultural products within a city or urban area with the aim of providing fresh food for local residents while strengthening social cohesion and reducing the carbon footprint

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resulting from long-distance food distribution chains (jurnal.surakarta.go.id, 2024). The Medan City Government itself has initiated a study on the development of an urban farming program as a solution to urban food security, considering the increasing pressure for agricultural land conversion in the Medan urban area along with residential growth (Pemerintah Kota Medan, 2024). In line with this, Sudjawoto (2022) emphasized that the implementation of urban farming as an urban agriculture concept requires the active involvement of community groups, not just individual initiatives, so that its impact on food security can be felt collectively and sustainably. Within this framework, Paya Pasir Subdistrict as a suburban area of Medan City that still has relatively large yard areas compared to dense areas in the city center occupies a strategic position as a pilot location for the development of plantation-based urban farming, which has not been the focus of many urban farming programs in Indonesia which tend to be dominated by hydroponic models and vertical cultivation of seasonal vegetable plants.

Based on the description above, there is a research gap that needs to be filled, namely the lack of a literature review that specifically synthesizes the concept of empowering farmer groups with yard-scale plantation crop cultivation strategies as an instrument for strengthening food security in urban coastal areas such as Paya Pasir Village. Therefore, this study aims to: (1) examine the profile and potential of Paya Pasir Village for the development of productive yards; (2) analyze the concept and model of farmer group empowerment based on relevant literature; (3) identify types of plantation crops that are appropriate to the characteristics of the yard agroecology in Paya Pasir Village; (4) formulate strategies and stages of farmer group empowerment through plantation crop cultivation; and (5) analyze the contribution and supporting and inhibiting factors of yard-scale plantation crop cultivation to food security. This study is expected to provide an academic contribution in the form of a conceptual synthesis that can be a reference for the preparation of community empowerment programs and yard-based food security policies in coastal urban areas.

RESEARCH METHODS

This research uses a literature review method or library research, namely a series of activities related to library data collection methods, reading, recording, and processing research materials from relevant written sources (Zed, 2008). The approach used is qualitative descriptive-analytical, which aims to

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describe and analyze in depth the concept of farmer group empowerment, yard-based plantation cultivation, and its relationship to food security based on a synthesis of various published literature sources (Adlini, Dinar, Sarah, & Ahmadi, 2022). The data sources in this study consist of secondary data obtained from three categories of library materials. First, legal and policy materials in the form of relevant laws and regulations, namely Law Number 18 of 2012 concerning Food and Law Number 19 of 2013 concerning the Protection and Empowerment of Farmers. Second, academic materials in the form of scientific journal articles accredited by Sinta or indexed in Google Scholar, Garuda, and DOAJ that discuss the themes of farmer group empowerment, yard utilization, plantation and horticultural crop cultivation, and household food security. Third, contextual materials in the form of regional profile documents and official news reports regarding the geographical, demographic, and institutional conditions of agriculture in Paya Pasir Village and Medan Marelan District, including studies published by the Regional Research and Innovation Agency (BRIDA) of Medan City.

Literature searches were conducted using the keywords "farmer group empowerment", "yard utilization", "food security", "plantation crops", and "Paya Pasir Village" on the Google Scholar academic search engine and the Garuda Kemdikbudristek database. The inclusion criteria used included: (1) articles published between 2013 and 2026 to maintain data up-to-dateness, except for classic conceptual references that are still relevant; (2) having a direct thematic link to farmer empowerment, yard land utilization, or plantation crop cultivation; (3) originating from scientific journals, official government agency study reports, or credible policy documents that can be searched online. Articles that did not have direct thematic relevance or whose full text could not be accessed were excluded from the analysis process (exclusion criteria). Data analysis was conducted through four stages as stated by Adlini et al. (2022), namely: (1) the orientation and formulation of research questions, in which the researcher determined the focus of the study on the relationship between farmer group empowerment, plantation crop cultivation, and food security; (2) the exploration and collection of library data, namely searching and downloading relevant articles according to the inclusion criteria; (3) the data reduction and categorization stage, in which the collected literature was grouped based on major themes (the concept of empowerment, characteristics of plantation crops, empowerment strategies, and impacts on food security); and (4) the synthesis and writing stage, namely the process of integrating findings from various sources into a coherent and systematic

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analytical narrative. To maintain the credibility of the study results, source triangulation was carried out by comparing findings from various studies discussing similar themes in different regional contexts, so that a comprehensive picture of the general patterns and specificities of the local context of Paya Pasir Village was obtained.

RESULTS AND DISCUSSION

1. Profile and Potential of Paya Pasir Subdistrict for Productive Yard Development

Paya Pasir Village is one of five villages in the administrative area of Medan Marelan District, Medan City, North Sumatra Province. Geographically, this village borders Sicanang Village, Medan Belawan District to the north, Rengas Pulau Village to the south, and Labuhan Deli and Rengas Pulau Villages to the east (National Population and Family Planning Agency, 2016). With an area of approximately 1,000 hectares and consisting of nine neighborhoods, Paya Pasir Village has a strategic position in the suburbs of Medan City, approximately 25 kilometers from the city government center. Medan Marelan District as a whole had a population of approximately 197,627 people in mid-2024 with population density continuing to increase along with the growth of residential areas (Wikipedia, 2026).

The name "Paya Pasir" itself etymologically reflects the physical characteristics of the local land: a swampy area with sandy soil texture influenced by its proximity to the coastal area of Belawan. These agroecological characteristics have important implications for the types of crops that can be optimally cultivated. Sandy soil with rapid drainage and relatively low natural fertility, coupled with the potential for brackish water intrusion in some areas, requires a cultivation strategy that adapts to the conditions of this marginal land, rather than forcing commodities that require fertile soil conditions and consistent freshwater irrigation. Sandy soil conditions that are poor in organic matter can improve the physical and chemical properties through the continuous application of organic matter, as demonstrated by Hanafiah, Anwar, and Syakur (2018) that organic matter plays a crucial role in improving soil structure, water-holding capacity, and nutrient availability for plants. This finding is supported by Sufardi, Syakur, and Arabia (2017), who confirmed that the application of organic matter significantly increases the soil's cation exchange capacity, which in turn supports plant growth on sandy soils.

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The profile data of the Quality Family Village in Paya Pasir Village shows that the population's livelihoods are quite diverse, with some working as farmers and home business owners, in addition to the trade and service sectors (National Population and Family Planning Agency, 2016). A study conducted by the Medan City Regional Research and Innovation Agency (BRIDA) (2022) also confirmed the existence of active farmer groups in Paya Pasir Village as part of the local economic potential of Medan Marelan District, as also found in neighboring villages such as Rengas Pulau and Tanah Enam Ratus. The existence of these farmer groups is an important institutional capital that can serve as a basis for implementing empowerment programs, considering that farmer groups function as learning platforms, collaboration platforms, and joint production units for their members.

Another potential that supports the development of productive yards in Paya Pasir Village is the growing collective awareness of the community towards reforestation and the planting of productive plants. The planting of one hundred durian, matoa, and honey guava trees involving TNI personnel, Polri, the local sub-district head, and residents in October 2025 is a concrete example of social capital that can be converted into active participation in farmer group empowerment programs based on plantation crops and fruits (Tobasatu.com, 2025). In addition, the activities of the Mutiara Mangrove Farmers Group in the Siombak Lake area, which synergizes with the PLN Peduli program in planting thousands of mangrove seedlings, demonstrates that the Medan Marelan community, including residents around Paya Pasir, already has experience organizing in farmer groups based on environmental conservation and productive plants (AnalisaDaily.com, 2026). This social capital and institutional experience serve as a starting point that can be further strengthened through technical assistance in plantation crop cultivation specifically directed at the household yard scale, so that the benefits can be felt directly by each family, not just limited to greening activities in public areas.

In terms of food needs, the characteristics of Paya Pasir Village as a densely populated suburban area that still has yard land around homes makes this area a relevant location for implementing the concept of sustainable food yards. As emphasized by the Food Security Agency (2018, as cited in various studies on sustainable food yards), the utilization of yards and unused land that is not yet optimal has significant benefits, especially for lower-middle economic groups, because it can improve family nutrition while increasing income without requiring additional land investment.

2. The Concept of Farmer Group Empowerment: A Theoretical Review

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Etymologically, the term empowerment is rooted in the concept of power, which refers to the ability of individuals and groups, especially those in disadvantaged positions, to have the capacity to meet their basic needs, be free from poverty and underdevelopment, and be able to access productive resources to improve welfare (etheses.iainkediri.ac.id, 2022). Mardikanto and Soebiato (2015) define community empowerment as an effort to improve the dignity of communities who, under certain conditions, are unable to escape the trap of poverty and underdevelopment, through a process of awareness, capacity building, and providing access to resources. This definition is relevant to the context of farmer groups in Paya Pasir Village, where limited technical knowledge of plantation crop cultivation and minimal access to information are among the obstacles to optimizing yard land. In the agricultural context, the empowerment of farmer groups is specifically mandated in Law Number 19 of 2013 concerning the Protection and Empowerment of Farmers. The law emphasizes that farmer empowerment is carried out through education and training, extension and mentoring, development of agricultural marketing systems and facilities, easy access to science, technology, and information, strengthening farmer institutions, easy access to financing, and agricultural insurance facilities for farmers. This regulatory framework provides a strong legal basis for local governments and non-governmental organizations to design structured farmer group empowerment programs, including in sub-districts such as Paya Pasir.

Farmer groups themselves are understood as a collection of farmers who are informally bound together on the basis of harmony, common interests in utilizing agricultural resources, and familiarity to work together to increase the productivity of farming businesses and the welfare of its members. Indardi's (2016) research on communication models in empowering farming communities in the Lestari Makmur Mushroom Farmer Group shows that the effectiveness of farmer group empowerment is largely determined by participatory communication patterns between extension workers, group administrators, and members, which allows for two-way knowledge transfer, not just one-way extension from the top down. This participatory principle is crucial in the context of Paya Pasir Village, considering that the success of the empowerment program is highly dependent on the suitability of the approach to the socio-cultural characteristics and economic conditions of the local community. In line with this, research by Ardian, Nasution, Adela, Lubis, Sanusi, and Suhendri (2026) conducted in Tanjung Morawa A Village, Deli Serdang Regency—an area geographically close to

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Medan City found that farmer group empowerment would be more effective in promoting food security management if integrated with institutional social innovation, rather than merely training or technical counseling. The study emphasized that many farmer empowerment programs have so far been trapped in a partial approach that only touches on the training aspect without detailing how institutional and technological innovation can accelerate the process of innovation adoption by farmers and its impact on food security outcomes in real terms. The synergy between strengthening village institutions, for example through collaboration between Village-Owned Enterprises (BUMDes) and cooperatives, with technical assistance in cultivation has been proven to accelerate the realization of community-based food independence.

The stages of farmer group empowerment can generally be classified into three main phases, as synthesized from various farmer empowerment studies (Empowerment of Rice Farmer Groups Through Agricultural Extension, in the Lifelong Education Journal). The first phase is the awareness stage, which includes the formation or strengthening of farmer groups, the development of participatory and rotating leadership, and comparative studies with other successful farmer groups. The second phase is the capacity building stage, which includes the preparation of joint extension plans, the implementation of extension and technical cultivation training, strengthening the ability to adopt innovations, and holding regular group meetings as a forum for evaluation and sharing experiences. The third phase is the stage of increasing intellectual capacity and independence (empowerment), where farmer groups have been able to manage their farming businesses independently, including in terms of decision-making, crop management, and market access, without relying entirely on external assistance.

The principle of participatory and locally driven empowerment is a key factor that distinguishes empowerment approaches from charitable or one-way aid approaches. In a study on the empowerment of small-scale female farmers in Ethiopia through participatory potato seed management, Oumer, Tiruneh, and Tizale (2014) emphasized that the active involvement of farmers in every stage of decision-making, from variety selection to marketing strategies, significantly increases the sustainability of empowerment programs compared to approaches that position farmers as passive recipients of assistance. This principle is relevant for application in the context of farmer group empowerment in Paya Pasir Village, where the selection of plantation crops to be cultivated should

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involve the aspirations and practical considerations of the farmer group members themselves, rather than being determined unilaterally by external parties.

3. Plantation Crops as an Alternative to Optimizing Yard Land

Conceptually, estate crops are a group of plants cultivated to produce high-value commodities, generally with annual to decades-long production cycles, and produce products that can be further processed into various derivative products. This group differs from seasonal horticultural crops such as vegetables and medicinal plants, which have typically been the focus of sustainable food garden programs (Sangadji et al., 2023; Suhendar et al., 2022). However, in the practice of garden empowerment in various regions, the boundaries between the two categories are often fluid, as many sustainable food garden programs integrate fruit trees and long-lived plantation crops as part of diversification. Given the agroecological characteristics of Paya Pasir Village, which has sandy soil and is adjacent to coastal areas, several types of plantation crops are agronomically highly suitable. First, the coconut (Cocos nucifera) is widely known for its high tolerance to sandy soil conditions, high salinity, and periodic drought, making it suitable for cultivation in yards in coastal areas like Paya Pasir. Besides producing fruit that can be consumed directly or processed into coconut milk, oil, and other derivative products, coconut trees also provide shade in yards without requiring intensive maintenance.

Second, the areca nut (Areca catechu) is a plantation commodity with high economic value in both domestic and export markets and is relatively tolerant of marginal land conditions. The nutmeg farmer empowerment strategy by the plantation office, as studied by Naisin and Asyik (2022) in Fakfak Regency, shows that consistent technical assistance from the relevant office, covering aspects of seeding, maintenance, and post-harvest handling, can significantly improve the quality and productivity of smallholder plantation crops. A similar assistance model can be adapted for the development of areca nut plantations and other plantation crops in Paya Pasir Village through a partnership with the Medan City Food Security, Agriculture, and Fisheries Office. Third, citronella (Cymbopogon nardus) is an attractive alternative because it has a relatively short growing season compared to other annual plantation crops, is tolerant of less fertile soils, and can be processed into essential oils that have high sales value and stable market demand for the aromatherapy and cosmetics industries. These characteristics make citronella a plantation crop option that can provide faster

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economic returns for beginner farmer groups, thus fostering initial motivation before farmer groups develop long-lived plantation crops such as coconut and cocoa.

Fourth, cocoa (Theobroma cacao) and productive fruit crops such as the green honey guava (Syzygium aqueum) are also highly relevant given their geographic and agroecological proximity to established cultivation practices in the Deli Serdang region of North Sumatra. Research by Budi, Nurlaela, and Yulianto (2023) on the application of benchmarking methods to increase the production of green honey guava (Deli honey guava) shows that replicating superior cultivation practices from successful farmer groups to other farmer groups is an effective strategy to accelerate productivity increases without requiring research from scratch. This benchmarking approach can be adapted for the Paya Pasir farmer group by studying the practices of established plantation farmer groups in the Deli Serdang and Langkat regions that share similar agroecologies. Fifth, to support food diversification and short-term income, banana plants, particularly the Raja Bulu banana variety, are also relevant when combined with annual plantation crops as intercrops. Research by Marlin, Alnopri, and Anggraini (2024) in Harapan Village, Pondok Kelapa District, showed that empowering women's farming groups through planting Raja Bulu bananas in their yards was able to produce harvests in a relatively short time while increasing household income. Meanwhile, research by Harahap, Nasution, and Siregar (2019) emphasized the importance of adequate water availability for the vegetative growth of banana plants, so that water management aspects require special attention considering the characteristics of the sandy soil in Paya Pasir which has fast drainage and low water retention.

Table 1 below summarizes the suitability of a number of types of plantation crops and supporting crops to the agro-ecological characteristics of yards in Paya Pasir Village based on a synthesis of the reviewed literature.

Table 1. Suitability of Plantation Crop Types with the Agroecological Characteristics of Paya Pasir Village Yards

No.	Types of Plantation Crops	Suitability with the Agroecological Characteristics of Yards	Potential Benefits and Economic Value
1	Coconut (Cocos nucifera)	Tolerant of sandy soil and high salinity, minimal maintenance	Source of food, oil, and shade for the yard
2	Areca nut (Areca catechu)	Tolerant of marginal land, high economic value	Additional source of income from selling areca

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			nuts
3	Citronella (Cymbopogon nardus)	Relatively short growing period, tolerant of less fertile soil	High value essential oil raw materials
4	Cocoa (Theobroma cacao)	Requires shade and scheduled nutrient management	Source of income from processed cocoa beans
5	Green Deli Honey Guava (Syzygium aqueum)	Requires adequate irrigation, replication of best practices	Diversification of fresh food and income
6	Raja Bulu Banana (Musa sp.)	The harvest period is relatively fast, requiring water availability.	Short-term food diversification

Source: Synthesis of Literature Review, 2026

4. Strategies and Stages of Empowering Farmer Groups through Plantation Crop Cultivation

Based on a synthesis of various literature on empowering farmer groups and women's farmer groups, a phased empowerment strategy model can be formulated that is suitable for application to farmer groups in Paya Pasir Village in developing yard-based plantation cultivation. This model consists of five interconnected stages.

The first stage is identifying potential and mapping needs (assessment). At this stage, agricultural extension workers, along with farmer group administrators, map the area and condition of members' yards, soil characteristics, water availability, and member preferences for the types of crops they wish to grow. A participatory approach at this stage is crucial to ensure that the designed program truly aligns with the real conditions and needs of the community, as emphasized by Oumer et al. (2014) regarding the importance of farmer involvement from the initial planning stage of an empowerment program. The second stage is socialization and awareness building. This stage aims to build a shared understanding of the benefits of cultivating garden crops for food security and the family economy. Socialization can be conducted through group meetings, demonstration plots, or comparative studies with other farmer groups that have successfully developed similar plantation crops, such as the farmer group in Deli Serdang that has successfully developed honey guava and other plantation crops (Budi et al., 2023).

The third stage is training and technical assistance for cultivation (capacity building). This stage includes training in nursery techniques, planting, fertilization with organic materials to improve sandy soil structure (Hanafiah et al., 2018; Sufardi et al., 2017), pest and disease control, and harvesting and

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post-harvest handling techniques. Continuous assistance from agricultural extension workers, academics, and relevant agencies is key to the success of this stage, as demonstrated by the Plantation Agency's mentoring model for empowering nutmeg farmers in Fakfak Regency (Naisin & Asyik, 2022). The fourth stage is institutional strengthening and partnership networks. This stage includes strengthening the organizational governance of farmer groups, including the division of roles and responsibilities of administrators, the development of group business plans, and the development of partnerships with external parties such as village governments, agricultural offices, universities, and the private sector. This type of institutional synergy has been proven to accelerate the achievement of community-based food security, as demonstrated in a study of collaboration between Village-Owned Enterprises (BUMDes) and cooperatives in the farmer group empowerment program in Tanjung Morawa A Village (Ardian et al., 2026).

The fifth stage is value addition and market linkage. At this stage, farmer groups are encouraged to not only sell their crops in raw form but also develop simple processed products, such as coconut oil, citronella essential oil, or processed cocoa and areca nut products, to achieve higher economic value. Developing market access, whether through traditional markets, partnerships with micro, small, and medium enterprises (MSMEs), or digital marketing platforms, is a determining factor in the long-term sustainability of group farming businesses. Table 2 below summarizes the five stages of the farmer group empowerment strategy through yard plantation cultivation along with the expected outputs at each stage.

Table 2. Stages of the Farmer Group Empowerment Strategy through Yard Plantation Crop Cultivation

No.	Stages of Empowerment Strategy	Form of Activity	Expected results
1	Identifying Potential and Needs	Mapping of yard land, soil conditions, water sources, and member preferences	Map of yard potential and list of priority commodities
2	Socialization and Awareness Building	Group meetings, demonstration plots, comparative studies	Collective agreement and commitment to member participation
3	Training and Technical Assistance	Nursery training, organic fertilization, pest control, post-harvest	Improving technical skills of members' cultivation
4	Institutional Strengthening and	Organizational structure of groups, partnerships between	A stronger and more independent group

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	Partnerships	government agencies/academics/private sector	institutional structure
5	Value Added Development and Marketing	Processing of derivative products, strengthening market access	Increasing income and sustainability of farmer group businesses

Source: Synthesis of Literature Review, 2026

5. Contribution of Yard Plantation Crop Cultivation to Food Security

The contribution of home-based plantation crop cultivation to food security can be analyzed through three main dimensions of food security: food availability, access, and utilization, as formulated in Law Number 18 of 2012 concerning Food. In the availability dimension, cultivating plantation crops and supporting crops in home gardens directly increases alternative food sources for households, particularly products such as coconuts and bananas that can be consumed directly without requiring complex further processing. In line with this, research by Pratama, Witjaksono, and Raya (2022) in Gunungkidul Regency found that the active participation of women's farming groups in sustainable food garden activities significantly contributed to improving the expected dietary pattern scores of participating households. In terms of food access, home-garden plantation cultivation contributes through economic channels, namely increasing household income from the sale of plantation commodities such as areca nut, citronella, and cocoa. This increased income directly strengthens household purchasing power for food that cannot be produced independently, thus ensuring food access despite fluctuations in market prices. Alpandari and Prakoso (2022) confirmed that home-garden optimization by women's farming groups significantly contributes to family food security, both through direct food provision and increased income from the sale of surplus production.

In terms of food utilization, diversifying the types of crops cultivated in yards also supports improvements in family food consumption patterns, making them more diverse and nutritious. In a study of empowerment strategies for women's farming groups, Musdalipa et al. (2026) found a positive correlation between optimal yard utilization and a reduced prevalence of chronic nutritional problems in toddlers, given that access to fresh, nutritious food from one's own yard is easier and more sustainable than relying solely on market purchases. In addition to these three main dimensions, cultivating garden crops also indirectly contributes to food security through environmental sustainability. Long-lived plantation crops such as coconut and cocoa act as greening elements that help maintain the quality of the yard's microclimate, reduce surface temperatures, and potentially

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reduce the risk of abrasion and seawater intrusion in coastal areas such as Paya Pasir, similar to the role played by mangroves in preventing seawater abrasion in the Siombak Lake area (AnalisaDaily.com, 2026). These ecological functions, in turn, help support the long-term sustainability of food production in coastal areas vulnerable to climate change and environmental degradation. However, it is important to note that the contribution of plantation crops to food security is more gradual and medium- to long-term than that of annual horticultural crops. Most plantation crops, such as coconut and cocoa, require several years to reach optimal production. Therefore, an effective empowerment strategy requires combining long-term plantation crops with annual food crops or short-cycle plantation crops such as lemongrass, so that farming households continue to receive food and economic benefits in the short term while waiting for the main plantation crop to reach its productive stage.

6. Supporting and Inhibiting Factors for Implementation

A literature review identified several factors supporting the success of farmer group empowerment through yard plantation cultivation. First, the existence of social capital in the form of established farmer group institutions and the community's collective experience in reforestation activities, as demonstrated by the participation of Paya Pasir residents and the surrounding area in productive tree and mangrove planting activities (Tobasatu.com, 2025; AnalisaDaily.com, 2026). Second, adequate regulatory support through Law Number 19 of 2013 concerning the Protection and Empowerment of Farmers, which provides a legal framework for structured farmer empowerment programs. Third, the existence of successful precedents for similar programs in other areas of North Sumatra, such as the institutional innovation-based farmer group empowerment in Tanjung Morawa A Village (Ardian et al., 2026), which can serve as a reference for best practices for the Paya Pasir farmer group. On the other hand, the literature review also identified several inhibiting factors that need to be addressed. First, the sandy soil conditions with low natural fertility and potential salinity due to the influence of the Belawan coastal area require sustainable soil improvement efforts through the application of organic matter, as emphasized by Hanafiah et al. (2018) and Sufardi et al. (2017), which requires consistency and adequate technical knowledge from farmer group members. Second, limited technical knowledge of plantation crop cultivation among farmer group members, considering that most yard programs that have been implemented in various regions have focused more on seasonal horticultural

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crops, which are technically simpler than perennial plantation crops (Sangadji et al., 2023).

Third, limited access to capital and agricultural production facilities, such as superior seeds, organic fertilizers, and cultivation equipment, can hamper the scale and quality of program implementation. Fourth, challenges in coordination and sustainable mentoring, given that many yard empowerment programs cease after the project or community service program ends, without a clear sustainability mechanism. This is in line with the findings of Ardian et al. (2026) who emphasized the importance of strengthening village/sub-district institutions, for example through synergy with local economic institutions, so that empowerment programs do not stop at the project stage alone, but are institutionalized sustainably within the local community's economic structure. Fifth, the relatively long lead time for annual plantation crop production has the potential to reduce the motivation of farmer group members if not balanced with a short-cycle crop combination strategy that can provide short-term economic and food benefits. Therefore, the crop diversification strategy described in the previous section is crucial for maintaining the continued motivation and participation of farmer group members throughout the empowerment program cycle.

7. Relevance of Findings to Previous Research

This study is both related to and differs in emphasis from previous studies on farmer group empowerment and yard utilization. Research by Alpandari and Prakoso (2022) and Musdalipa et al. (2026) emphasized the importance of optimizing yards for family food security. However, both studies focused on horticultural crops and seasonal vegetables, while this study specifically highlights the potential of plantation crops, which have received little attention in the yard empowerment literature. Research by Sangadji et al. (2023) on community empowerment through horticultural crop cultivation shares a similar empowerment approach, but differs in the types of commodities developed. Ardian et al.'s (2026) study in Tanjung Morawa A Village has high geographic relevance to this study because both are located in the buffer zone of Medan City, but focuses on aspects of social and institutional innovation in general without specifying specific plantation crop commodities or emphasizing coastal agroecological characteristics. This study complements these findings by providing specifications for plantation crop commodities that are appropriate to the characteristics of sandy soil and high salinity typical of coastal areas such as Paya Pasir, which differ from the characteristics of the relatively more fertile soil in the Deli Serdang area.

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Meanwhile, research by Naisin and Asyik (2022) on nutmeg farmer empowerment strategies by the plantation office in Fakfak Regency and research by Budi et al. (2023) on benchmarking methods for developing green honey guava provide adaptable technical assistance models, although both studies were conducted on a larger plantation scale than the household yard scale that is the focus of this study. This difference in scale requires strategic adjustments, particularly in terms of the intensity of assistance and the scale of investment required, given that household yards have limited land area compared to commercial plantations. Overall, the novelty of this study lies in the cross-theme synthesis between the concept of farmer group empowerment, the characteristics of urban coastal agroecology, and the selection of plantation crop commodities that are specifically adapted to the context of Paya Pasir Village, which has not been widely discussed in an integrated manner in previous yard empowerment literature which predominantly discusses seasonal horticultural crops in areas with fertile soil characteristics.

8. The Position of Empowerment of the Paya Pasir Farmers Group within the Framework of Urban Farming

The study of urban farming provides a broader conceptual framework for positioning the Paya Pasir farmer group empowerment program within the constellation of Medan City's food security policy. Urban farming is theoretically grounded in sustainability theory, which emphasizes the integration of three main pillars: economic, environmental, and social. Developing agricultural activities within the city can create new economic activities, reduce the carbon footprint through local food production, and strengthen social cohesion among residents (jurnal.surakarta.go.id, 2024). The Medan City Government, through a study on the preparation of the urban farming program, emphasized the urgency of this strategy as a response to the pressure of agricultural land conversion due to the growth of residential areas in Medan's urban areas, including in suburban areas such as Medan Marelan District (Pemerintah Kota Medan, 2024). Unlike most urban farming models in Indonesia that focus on hydroponic technology, vertical farming, and fish farming in buckets (budikdamber) for very limited land in densely populated areas (Journal, Tyas, Sulistyowati, & Tani, 2024), the characteristics of Paya Pasir Village, which still has relatively large yard areas in the suburbs, opens up opportunities for implementing urban farming models based on plantation crops that agronomically require larger planting spaces but provide higher economic value and long-term ecological functions than

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hydroponic systems. This approach is in line with Sudjawoto's (2022) assertion that the success of urban farming as an urban agricultural concept for food security depends heavily on the suitability of the cultivation model to the characteristics of land resources and the socio-economic conditions of the local community, rather than the application of a uniform model throughout the city without considering local characteristics. Thus, the empowerment of the Paya Pasir farmer group through the cultivation of yard plantations can be positioned as a unique variant of semi-extensive urban farming that complements the intensive urban farming models based on hydroponics and vertical farming that are more commonly applied in densely populated areas. This positioning is important from a policy perspective, because it provides justification for the Medan City Government to develop diversified urban farming models tailored to the typology of the area, rather than applying a single, uniform approach to all sub-districts with varying land characteristics.

CONCLUSION

This literature review concludes that Paya Pasir Village, Medan Marelan District, has agroecological potential and institutional social capital that can be optimized through a farmer group empowerment program based on homestead plantation cultivation. The sandy soil characteristics and the influence of coastal salinity require the selection of adaptive commodities, such as coconut, areca nut, lemongrass, cocoa, and supporting fruit crops such as honey guava and banana, which can be combined to balance short- and long-term food and economic benefits. The concept of effective farmer group empowerment requires a participatory and phased approach, encompassing identifying potential and needs, fostering collective awareness, training and technical assistance in cultivation, strengthening institutions and partnership networks, and developing added value and marketing products. The legal framework of Law Number 19 of 2013 concerning the Protection and Empowerment of Farmers provides a strong foundation for the program's structured and sustainable implementation.

Home garden plantation cultivation has been conceptually and empirically proven (based on various reviewed studies) to contribute to all three dimensions of food security: food availability, access, and utilization, while also providing ecological benefits for coastal environmental sustainability. However, the successful implementation of this program depends heavily on addressing inhibiting

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factors, particularly limited technical knowledge, marginal land conditions, access to capital, and sustainable post-program support. This study recommends that the Medan City government, particularly the Department of Food Security, Agriculture, and Fisheries, together with universities and non-governmental organizations, design an integrated empowerment program for Paya Pasir farmer groups by combining technical assistance for cultivating adaptive coastal plantation crops, strengthening farmer group institutions through synergy with village economic institutions, and facilitating access to capital and markets for production. Further field research is needed to empirically test the effectiveness of the empowerment model formulated in this literature review in the real context of farmer groups in Paya Pasir Village.

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