

Urban-Rural linkages in the sweet potato (*Ipomoea batatas* L.) commodity value chain: A socioeconomic perspective

Nurul Amirah, Afifathu Rahmah Fajriyah*, and Baiq Wardani Hidayati

Rural Sociology Program, Faculty of Human Ecology, IPB University, 16680 Bogor, Indonesia

Abstract. Cikarawang Village in Dramaga, Bogor, is a sweet potato production center with a marketing system involving various actors, such as farmers, middlemen, wholesalers, and retailers. This study aims to analyze the sweet potato value chain, factors that influence prices, and challenges faced by farmers. This study employs a qualitative approach, utilizing in-depth interviews with farmers, middlemen, and traders, as well as direct observations of the distribution process. The findings reveal that urban market conditions significantly influence sweet potato prices. Farmers, with limited access to market information, have weak bargaining power. Despite government subsidies for fertilizers, inconsistent and delayed distribution reduces productivity. In addition, the problem of unstable price fluctuations and inadequate irrigation infrastructure hinders farmer welfare. The absence of formal production contracts means that middlemen and wholesalers have the power to determine prices, which often harms farmers. The conclusion of this study emphasizes the need to strengthen farmer institutions, increase access to capital sources, and improve infrastructure to support the productivity and sustainability of farming businesses in Cikarawang Village. These findings offer valuable insights for policymakers and agricultural practitioners in developing effective strategies to enhance farmer welfare and strengthen local food security.

1 Introduction

Projections indicate a massive migration of people to major cities, which are expected to host up to 2.3 billion residents by 2100, reflecting a significant surge in global urbanization throughout the 21st century [1]. This creates a need for food supply in cities. Although consumers in large cities greatly influence food consumption patterns, they are not food-independent and require outside supplies. Jakarta is the center of the national food market, which plays a vital role in shaping prices and becoming a market barometer. The Jakarta market has a close relationship with the surrounding markets, affecting the turmoil of the local market in the region. Apart from being a large consumer, Jakarta is also a distribution point for various food commodities from the surrounding area. Jakarta's important food distribution structure includes patterns of needs, fluctuations, and market dynamics,

* Corresponding author: afifathurahmah@apps.ipb.ac.id

especially for several strategic food commodities.

The natural resource potential of rural areas is key to driving economic diversification, local entrepreneurship, and sustainable development in response to the challenges of transitioning to a knowledge-based economy [2]. Topography plays a key role in shaping the spatial patterns and multifunctionality of rural settlements, influencing their distribution, structure, and functional dynamics, which are crucial for rural planning and revitalization [3]. Population activities are influenced by geographical conditions such as climate, topography, and soil type. Settlement patterns are also influenced by topography and soil fertility. There are various agricultural, industrial, and trade activities in the highlands and lowlands. Socio-economically and environmentally, villages have a dynamic relationship with other regions, especially cities [2]. The development of agropolitan areas based on agribusiness in developing countries plays a crucial role in accelerating local economic growth, strengthening productive rural economies, and preserving ecosystem sustainability [4]. Individual capacity building, especially the role of mothers, is a key factor in improving the economy. At the same time, families with economic stability have the potential to support the economic capabilities of the community as a whole. Local foods like sweet potatoes and corn are expected to improve the village economy significantly. Urbanization drives changes in global food systems and creates opportunities for rural livelihoods when supported by strong urban connectivity, adequate infrastructure, and robust social networks [5]. Rural areas adjacent to cities are experiencing a shift from subsistence agriculture to a more commercial system [11]. The origins of the population, which originally came from outside the region, are now finding new interest in the service and self-employed sectors, changing the dynamics of the economy and land use. Factors such as education, technology, economic conditions, strategic location, and population density are the main drivers of this change. Changing farmers' strategies face the challenge of maintaining a balance between agriculture and urban needs, requiring holistic and sustainable solutions from governments to ensure balanced and sustainable development in the region.

In addition to impacting the need for food, urban-village relations also impact on the cultural sector, closely related to agriculture and rural communities [15]. As the center of agricultural commodity production, the village is the guardian of local traditions and knowledge passed down from generation to generation. Agricultural activities in the village not only include cultivation techniques but also involve various traditional rituals and ceremonies that reflect the beliefs and cultural identity of the local people. On the other hand, the city serves as a distribution and consumption hub that introduces culinary innovations and expands the reach of agricultural products through modern markets and social media. This interaction strengthens and enriches the cultures of both parties; the village enriches the city with its agrarian cultural heritage, while the city offers economic opportunities and innovations that can revive and modernize the village's agricultural tradition. Globalization accelerates this cultural exchange, creating opportunities and challenges for rural farmers to maintain traditions while meeting the demands of urban markets.

The relationship between urban and surrounding areas' development has been the focus of attention in various studies [1]. One approach is the oil drip theory, which looks at economic growth's impact on the surrounding region's center [13]. The agropolitan concept in Indonesia also try to integrate rural development with urban development. However, its implementation still needs to be improved, especially regarding economic disparities and resource access. International organizations such as FAO have formulated the concept of rural-urban linkages in urban food systems to address the problems of poverty, malnutrition, and the impact of urbanization. Programs such as the City Region Food Systems (CRFS) aim to strengthen the relationship between villages and cities by developing sustainable food systems. A multidisciplinary approach is expected to improve the community's welfare in urban and rural areas.

Some rural residents adopt livelihood diversification strategies in response to the lack of profits generated by subsistence agriculture [6]. Farmers take advantage of opportunities outside of agriculture to improve their standard of living. Changes in the dynamics of farmers' lives, especially due to the expansion of cities to the suburbs, have encouraged the transfer of land use from agriculture to settlements or industry. As a result, some farmers have switched to other jobs such as trading, becoming motorcycle taxi drivers, or starting a livestock business [14]. However, there are still farmers who choose to continue their efforts in agriculture while looking for additional sources of livelihood.

The sweet potato commodity business has a strategic role in improving economic connectivity between urban and rural areas. First, it can provide a stable food supply to meet the needs of both regions. Second, the production and trade of sweet potato commodities stimulates local economic growth by providing a significant source of income for rural communities. Third, the processing and packaging of sweet potatoes increases the added value of products, creates new business opportunities, and strengthens selling prices in urban markets. Fourth, the business encourages the adoption of modern agricultural technologies and practices, increasing productivity and knowledge in rural areas. So, it is interesting for the author to analyze the strategic role of the sweet potato commodity business in improving economic connectivity between urban and rural areas.

2 Research methods

This study uses a qualitative approach with in-depth interview methods and participatory observation to understand the socio-economic and cultural dynamics of sweet potato farming in Cikarawang Village, Bogor, Indonesia. Data was collected through interviews with farmers, middlemen, community leaders, and supporting institutions such as Agribusiness and Technology Park (ATP) IPB to explore aspects of distribution, pricing mechanisms, and institutional roles. Participatory observation is carried out to observe agricultural activities and local traditions such as *ambengan*. The data obtained were analyzed using a thematic approach, economic interaction analysis, and socio-cultural analysis to obtain a comprehensive view of the impact of village-city relations on farmers' welfare and cultural changes in the village.

3 Research result

3.1 Location overview

Cikarawang Village in Dramaga District has an altitude of 193 meters above sea level and an average temperature of 25-30 °C, with an area of 226.56 hectares, mainly used for agriculture and plantations (70%) (Fig 1). At the same time, the rest consists of settlements and public facilities. The Cisadane and Ciapus Rivers and Situ Gede Village border this village. Agriculture is the primary sector with commodities such as cassava, sweet potato, rice, corn, and peanuts, although farmers often face problems with pests, diseases, and water availability from Situ Gede. Each hamlet has a different commodity focus, such as cassava cultivation in Hamlet 1, sweet potato in Hamlet 2, and rice in Hamlet 3.



Fig. 1. Map of Cikarawang Village

Since 1975, the village has had several active farmer groups that have helped increase agricultural productivity, including the Hurip Farmers Group led by Ahmad Bastari and women farmer groups such as KWT Melati. In addition to the agricultural sector, the potential of fisheries and livestock has also begun to be developed. However, road infrastructure is often damaged due to the passage of large trucks, which is the main obstacle. Community leaders play an essential role in advancing the village, such as Ustadz H. Ali in the field of religion, Chairman of Linmas Digun in security, and Ustad Wardi in education. The various potential resources owned by this village can still be maximized to support economic sustainability and community welfare.

3.2 Urban village relations in the economic dimension

Economic flows are divided into spatial and sectoral flows. Spatial flows include the movement of people, goods, money, and other resources between regions, including water and nutrients, from a biophysical perspective. Meanwhile, sectoral flows involve interactions between different economic sectors, such as the relationship between the agricultural sector in the village and the industrial sector in the city [7]. The economic relationship between the village and the city is symbiotic, where the village is the supplier of raw agricultural materials, and the city provides markets and industrial products that support village productivity. Villages supply food products such as vegetables, fruits, and livestock to the city. In contrast, cities supply consumer goods and industrial tools to the village, creating a mutually beneficial economic cycle for regional and national development.

The relationship between Cikarawang Village and surrounding cities is established through the distribution of agricultural products, especially sweet potatoes, which are sold to factories and markets in Jakarta through the role of middlemen. Instead, these cities provide industrial products such as agricultural tools and consumer goods that support life and productivity in villages. This interaction also includes significant cash flows, where village communities use income from the sale of agricultural products for daily needs and agricultural investments. This reciprocal relationship creates a mutually beneficial economic cycle and reflects the importance of efficient distribution and integrated markets between villages and cities. The people of Cikarawang Village who do not work as farmers often choose to work or open businesses outside the village. Based on Precision Village Data, as many as 117 villagers have businesses outside the Cikarawang area [8]. The location of Cikarawang Village, which is close to urban areas, allows them to run a business in the city

more easily. This proximity provides a strategic advantage for villagers to access larger markets, resources, and more diverse business opportunities in the city. By opening a business in the city, villagers not only get a higher additional income compared to working in the village but can also contribute to the village economy through remittances and reinvestment in the village. These businesses can be trade, services, or small industries that are easier to reach due to the geographical proximity between villages and cities. This relationship shows flexible and adaptive economic dynamics, where villagers can take advantage of strategic locations to improve their well-being.

The exchange system felt by the city is related to the people of Cikarawang Village, who open businesses outside the village and have a significant impact on several important aspects. First, businesses established by Cikarawang Village residents in the city not only access a wider market but also provide goods and services needed by city residents. This creates a revenue stream that revitalizes the local economy in the city, expands employment opportunities, and increases the purchasing power of urban people. Second, the presence of businesses from Cikarawang Village in the city helps diversify the city's economy by increasing the variety of industries and services offered, reducing dependence on specific economic sectors, and encouraging more balanced and sustainable economic growth. Third, the additional income obtained by Cikarawang Village residents from businesses in the city benefits individuals and the village. Remand sent back to the village to help improve the welfare of the village community, while investment back to the village can be used for infrastructure development, education, and health. Fourth, this economic relationship shows a strong interdependence between villages and cities, where villages take advantage of their proximity to cities for business expansion, while cities rely on villages as a source of labor and potential markets for their products and services. Finally, these flexible and adaptive economic dynamics reflect how the advantages of geographical location can be optimally utilized to improve the well-being of individuals and communities, supporting inclusive and sustainable economic growth at the regional level.

3.3 The practice of distributing sweet potatoes from farmers to consumers

Agricultural marketing can be described as a set of functions required to flow inputs or products from the primary production level to the final consumer. The definition describes agricultural marketing as a system consisting of sub-systems of marketing functions, including exchange, physical, and facility or facilitation functions, which are carried out by marketing institutions [9]. Cikarawang Village is one of the villages in Dramaga District where most residents work in the agricultural sector, especially sweet potato farming. The type of sweet potato variety widely grown by farmers in Cikarawang Village is generally AC sweet potato (*Ipomoea batatas*, L.). In terms of price, AC sweet potatoes have a relatively low price compared to Cilembu varieties of sweet potatoes.

In Cikarawang Village, every marketing institution, except farmers, is involved in buying and selling activities. Most farmers sell their crops to collectors through a slashing system. Buying and selling transactions between farmers and collectors occur at the collection point using an evidence system [10].

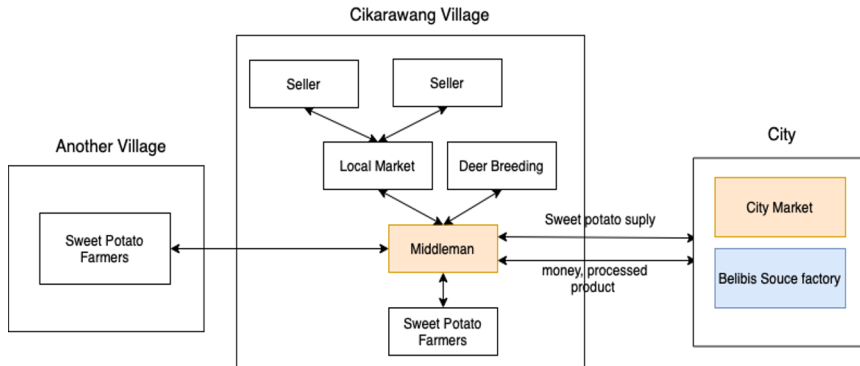


Fig. 2. Sweet potato commodity flow chart

The process of distributing sweet potatoes in Cikarawang Village involves several marketing channels that include various parties, such as farmers, middlemen, wholesalers, retailers, and sauce factories. "Initially, there were those looking for a middleman from the Belbis company who were looking for a middleman to collect tubers. It turns out that here it is ready, the sweet potato has been peeled" (PP, 65 years old). This marketing channel helps identify marketing institutions involved in transferring goods from producers to consumers. The first marketing channel involves direct sales from farmers to middlemen, sending the peeled sweet potatoes to the sauce factory. In the second channel, the middleman sells the sweet potato to wholesalers, who pass it on to retailers before reaching consumers. The third channel involves direct sales from middlemen to retailers in the market so that sweet potatoes can directly reach consumers through retailers [10].

Wholesalers buy sweet potatoes by coming directly to the sweet potato collection point owned by collectors. The sweet potatoes that have been purchased are transported to the wholesaler's stall using his pick-up truck. Sales activities are carried out at stalls owned by wholesalers, especially at the Kramat Jati Main Market, to retail traders in urban markets such as Ciputat South Tangerang. Retailers buy sweet potatoes directly from collectors or some through wholesalers. Furthermore, the retailer carries out sales activities to the end consumer at the retailer's place. Overall, this distribution system includes several stages, from farmers to end consumers, involving collectors, wholesalers, and retailers in buying and selling sweet potatoes.

Farmers in Cikarawang Village usually sell their sweet potato crops directly to middlemen, who then distribute them outside the Bogor area in several ways. First, middlemen sell sweet potatoes directly to markets in Bogor and the main market in Jakarta by picking them from collection points before delivering them to the market. Second, sweet potatoes are sold to factories as an additional ingredient for making sauces, where sweet potatoes must be peeled first before being sent to factories, such as sauce factories in Tangerang, with the help of a liaison between middlemen and factories. Third, sweet potatoes that do not pass sorting or are not suitable for sale are used as deer feed so that all sweet potatoes that have been collected from farmers can still be used and reduce potential losses for middlemen.

3.4 Sweet potato pricing system

Generally, the sweet potato marketing pricing system in Cikarawang Village follows a bargaining pattern between sellers and buyers. Prices at the farmer level are determined by collector traders, who have access to more market information compared to farmers.

Collector traders obtain price information from fellow collectors and wholesalers in the

Market. Wholesalers determine pricing at the level of collector traders and retailer traders because they are the highest institutions in the marketing system. Pricing is based on the amount of sweet potato supply in the market, marketing costs, as well as the amount of profit desired by each marketing agency. The selling price of sweet potatoes from farmers to middlemen is usually Rp. 5000 per kilogram. Sweet potatoes not passing the sorting will usually be sold for Rp. 2000 per kilogram, which can then be used for deer food.

Meanwhile, the price of sweet potatoes sold at the sauce factory has been determined through an agreement process between the factory and the middleman as a sweet potato supplier. The agreed price of sweet potatoes is Rp. 7000 per kilogram. The selling value of sweet potatoes sold in factories tends to be more stable than in the market. This is because there is already an official agreement between the middleman and the factory, so it is not easy to change the price of sweet potatoes, either increased by the middleman or lowered by the factory.

Sweet potato farmers in Cikarawang Village, as the party that receives the price (price taker) from the collector, have a low bargaining position in determining the price. Payment systems are diverse, involving cash payments and later payments. Cash payments are made by marketing institutions such as retailers in Ciputat Market, wholesalers at Kramat Jati Main Market, retailers in the Jakarta area (Klender Market), sauce factories, and consumers. Meanwhile, the payment system occurs at the level of collector traders who pay a portion of the farmers one to two days after all the sweet potatoes are sold.

3.5 Relationship between village and city

The relationship between the village and the city is complex and multidimensional. Villages and cities are two areas where people live and settle down and have their respective roles in the production, processing, and marketing processes. Villages are the main places of production, while cities are places of processing and marketing. The city obtains raw materials in the form of agricultural products from the village, while the village obtains raw materials in the form of processed products from the city. The rural-urban relationship is interdependent and mutually needy. Cities depend on villages to meet the needs of raw materials, while villages depend on cities to obtain processed products and marketing¹¹. A city is a location whose population density is higher than the surrounding area, where community activities are not in the agricultural sector; the location is a cultural, administrative, or economic center for the surrounding areas. The function of the city is as an organizer and provider of services for the surrounding area so the city is referred to as a service center that depends on the countryside¹¹.

Village-city relations can also be seen from economic, social, and political perspectives. From an economic perspective, rural-urban relations affect the distribution of money, goods, and information. From a social perspective, village-city relations affect relations between communities, as well as the role of communities in the regional development process. From a political perspective, village-city relations affect the role of the government in regional management, as well as the role of the community in the regional development process. In sweet potato distribution, rural-urban relations are essential to create an effective and efficient marketing network. Local economic development in Bogor Regency includes the development of a superior sweet potato industry, which requires good spatial interaction between villages and cities to ensure the availability of raw materials and markets. The relationship between the village and the city can be seen through economic interaction involving the sale of sweet potatoes from Cikarawang Village. First, middlemen supply sweet potatoes to urban markets, where market traders sell them to consumers in whole form. Second, middlemen distribute sweet potato supplies to grouse sauce factories in Tangerang.

The results of this transaction include farmers' income from the sale of sweet potatoes in

urban markets. In addition to financial transactions, exchanges between urban and rural areas involve processed products, such as grouse sauce, which are remarketed to stalls and shops in Cikarawang Village.

The main markets also influence the determination of agricultural commodity prices in villages in urban areas. As is well understood, the market in the city is the place where buying and selling transactions take place, and the price set in the city market is a reference for the selling price in the countryside. Urbanization affects the price of agricultural commodities in the countryside in several ways. First, through demand and supply, if the demand for commodities in cities is high, then selling prices in the countryside will also rise. On the other hand, if the supply of commodities in cities is high, then the selling price in the countryside will also fall. Second, the selling price set in the city market is a reference for the selling price in the countryside. If the market price in the city is high, then the selling price in the countryside will also rise. On the other hand, if the market price in the city falls, then the selling price in the countryside will also fall. Third, Logistics Factors: The market in the city is a place where commodities can be managed, stored, and distributed to the countryside. If the logistics factor in the city is good, then the selling price in the countryside will also be more stable. On the other hand, if the logistics factor in the city is bad, then the selling price in the countryside will also be unstable [11].

The price of sweet potatoes in Cikarawang Village is influenced by market conditions in urban areas, where farmers have a lower bargaining position than middlemen due to the lack of direct access to the market. Middlemen, who have information from large markets, often determine prices based on agreements with factories, so selling prices to factories tends to be stable, while prices in the local market can fluctuate. The sales of sweet potatoes are highly dependent on the market demand of the city, which is influenced by consumer needs, market trends, and the demand of the food processing industry. According to interviews with middlemen, the quantity sent to the factory depends on demand, with the maximum delivery reaching one ton and the price being around Rp 7,000 per kilogram. If demand increases and the supply from Cikarawang Village is insufficient, middlemen will look for sources from other areas, such as Mount Bunder Ciampea, to meet the factory's needs. This is due to a decrease in productivity due to weather changes that cause delays in harvesting.

3.6 Political system in sweet potato commodities

The analysis of the political dimension of the sweet potato commodity in Cikarawang Village includes various aspects related to government policies, access to funding, institutional roles, technical challenges, farmer education, and agricultural ecosystem management. Every field in Cikarawang Village has key figures who contribute significantly through roles and dedication. The following are the main actors in Cikarawang Village and their roles in various fields, from agriculture to education, who collectively collaborate to improve the welfare of the village community.

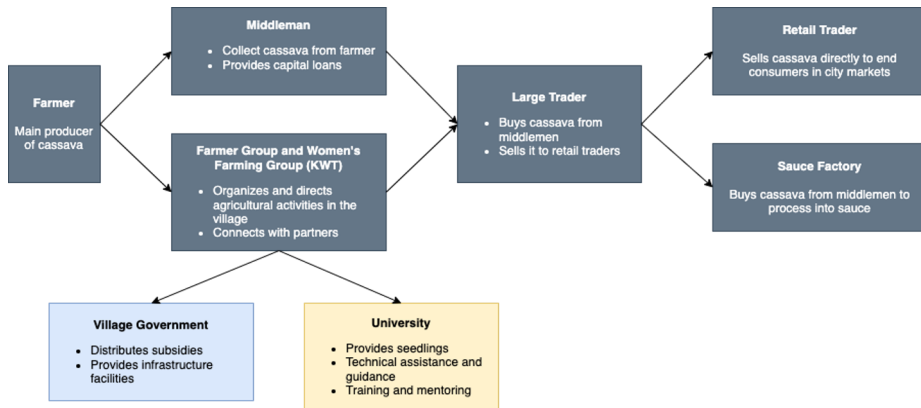


Fig. 3. The role of sweet potato commodity actors

Before reaching the end consumer or sauce factory, sweet potatoes in Cikarawang Village are produced by several actors, including farmers, middlemen (collectors), wholesalers, and retailers. This process involves adding value through sorting, cleaning, packaging, storage, and transportation, although more significant added occurs at the processor level. The absence of formal production contracts and strong farmer cooperatives gives middlemen and wholesalers the power to set prices, often to the detriment of farmers [12]. Uneven market information and lack of access to capital are the main obstacles. The main physical transformation occurs at the processor level, with the addition of basic values such as cleaning and sorting to improve processing and consumer convenience. The formation of a group of actors along the value chain in Cikarawang Village is essential to improve coordination and integration, while policy interventions to improve access to credit and capital sources are needed to improve governance and reduce high costs and working capital constraints.

In Cikarawang Village, the distribution of fertilizer subsidies from the government is often late and uneven, making it difficult for farmers to meet their fertilizer needs on time, negatively impacting the productivity of sweet potato farming. In addition, technical assistance from government agricultural extension workers is not optimal because the number of extension workers is limited, so not all farmers get adequate assistance. The availability of irrigation water is also affected by drought, making it difficult for farmers to keep their land fertile. The problem of unstable price fluctuations makes farmers' incomes difficult to predict, and the government's absence of a basic price setting makes them vulnerable to losses. Therefore, more effective policies are needed, including timely distribution of subsidies, increasing the number and quality of agricultural extension workers, developing better irrigation infrastructure, and setting a fair base price to protect farmers. With the right support, sweet potato farmers in Cikarawang Village can increase productivity and welfare and contribute to local and national food security.

Most farmers in Cikarawang Village have difficulty accessing credit from banks due to the lack of guarantees and complicated administrative requirements. This makes them tend to rely more on middlemen to get capital loans. However, through assistance from the Agribusiness and Technology Park (ATP) IPB, several farmers have managed to get assistance even though their income is still limited. This effort reflects the importance of collaboration between educational institutions and the private sector in supporting farmers in developing farming businesses. However, more initiatives are still needed to expand access to more affordable and equitable funding for farmers in Cikarawang Village so that they can be more independent in managing agricultural businesses and sustainably improving economic welfare.

The chairman of the gapoktan in Cikarawang Village plays a crucial role in organizing farmers and bridging relationships with ATP IPB. Not only acting as the main liaison between farmers and educational institutions but also ensuring that the programs implemented run well and farmers get the maximum benefits from the collaboration. In addition, farmer institutions such as Gapoktan and farmer groups such as Hurip, Setia, Mekar, Subur Jaya, and KWT Melati have an important role in coordinating production and marketing and advocating for policies that benefit farmers. The gapoktan is a forum for farmers to share knowledge, experience, and resources, thereby helping to improve the efficiency and competitiveness of farming businesses. Nevertheless, internal management and human resources challenges are still a focus of improvement in this institution.

Strategies and principles applied by ATP IPB in supporting sustainable agriculture and empowering village communities. With a focus on collaborating with farmer groups, ATP IPB seeks to ensure a wider and inclusive impact and optimize crop yields through partnerships with Gapoktan to meet the needs of a wider market. This approach not only improves the welfare of farmers but also supports the overall sustainability of the village economy. By strengthening internal management and empowering its members, farmer institutions can become more effective in supporting Cikarawang Village farmers in facing various challenges and opportunities in agricultural development.

Low education level is one of the main challenges faced by many farmers in Cikarawang Village. The majority of farmers only have a basic education. This limits the ability to adopt modern agricultural technologies and implement better business management practices in agricultural activities. Nevertheless, ATP IPB has routinely organized mentoring programs that cover various aspects, such as cultivation techniques and post-harvest management. However, in practice, the direct application of such training materials in the field still varies. This can be due to a variety of factors, including resource limitations, changing soil and weather conditions, and varying levels of understanding among farmers. Therefore, there is a need for a more holistic and sustainable approach to providing training and support that is in accordance with the real needs and conditions faced by farmers in Cikarawang Village

4 Conclusion

Cikarawang Village in Dramaga, at 193 meters above sea level with temperatures of 25-30°C, is a key agricultural area for sweet potatoes and cassava, covering 226.56 hectares. Bordered by the Cisadane River, Situ Gede Village, and the Ciapus River, the village faces road damage from large vehicles but remains agriculturally driven. Since 1975, active farmer groups have managed various crops despite pest and water resource challenges. Institutional support and community leaders, like Ahmad Bastari, play a vital role in village progress. While religious traditions don't influence farming, the ambengan culture persists. Urban-rural interactions have introduced changes in technology, knowledge, and livelihoods.

Cikarawang is a primary producer of AC-variety sweet potatoes, using a slashing system for farmer-collector transactions. Distribution involves middlemen, sauce factories, local markets, and animal feed. Prices vary farmers sell at Rp 5,000/kg, non-standard potatoes at Rp 2,000/kg, and sauce factories pay Rp 7,000/kg. Urban demand influences pricing and sales. Sweet potatoes are central to the local economy, involving farmers, middlemen, traders, farmer groups, and institutions like ATP IPB. Key challenges include uneven fertilizer subsidies, poor irrigation, and price fluctuations. Strengthening farmer institutions and improving literacy and education are crucial for economic sustainability and well-being.

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