



Opportunity for Development of Chili in Peri-Urban Regions (Case Study: Lemah Duhur Village, Bogor Regency, West Java Province)

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Abstract. Large-scale development of chili cultivation highly requires social capital. On the contrary, an individual tendency that characterizes peri-urban citizens could be an obstacle. This study aimed to analyse the feasibility study of chili farming, the potency of community social capital, and the development strategy of chili commodities in peri-urban regions. It was conducted in Lemah Duhur Village, Caringin District, Bogor Regency in May–December 2019. The analytic descriptive method through farming economic analysis was used to interpret the data. The analysis of social capital elements, as well as the preparation of development strategies, were analysed using SWOT. The results of the economic analysis showed that chili cultivation is quite feasible to develop. The analysis of social capital consisting of trust, norm, and network pointed out that even though this community was from a peri-urban area, the people have good social capital. The elements that need developing in social capital are networks, norms, and social sanctions. The development strategy can be done by increasing the competence of farmers in cultivation, increasing added value, facilitating market networks and access to capital, and developing irrigation networks. Overall, the cultivation of chili commodities in peri-urban regions has the opportunity to be developed.

Keywords: Chili · Peri-urban · Social capital

1 Introduction

Peri-urban agriculture is an important part of cities to meet the challenges of increasing poverty, food insecurity, and environmental degradation such as those found mainly in rapidly developing cities in developing countries. There are several important notes related to peri-urban agriculture, namely (1) the number of farmers in peri-urban areas is increasing along with the expansion of settlements and economic activities of the lower-middle class community, (2) the small scale of agricultural businesses causes farmers to choose farming locations near settlements, (3) farmers prefer to sell their harvests to middlemen to reduce transportation costs or sell them directly to consumers or small traders [1].

As a link between the city and the countryside, the peri-urban area significantly influences urban transformation and expansion. In many countries, rapid urban growth has

overshadowed progress in agricultural development and the agricultural sector is usually disadvantaged when competing for labour and farmland. Peri-urban agriculture must be able to meet the new consumption needs of urbanites who are increasingly concerned with food quality, social and environmental values in suburban rural areas [2]. Therefore, peri-urban agriculture should be directed at activities to preserve and strengthen the socio-economic functions of agriculture as follows: (1) connectivity between Peri-Urban Agriculture (PUA) and Micro, Small and Medium Enterprises (MSMEs), focus on increasing production and productivity as well as farmer welfare, and financial support for improving the quality of cultivation and infrastructure development [1].

The socio-economic function of agriculture can run well if the community has good enough social capital, even though they live in the outskirts of urban areas which are heavily influenced by the values of urban life that tend to be individualistic. Social capital refers to a social organization consisting of networks, norms, and social beliefs that facilitate mutually beneficial coordination and cooperation [3]. Several research results show that social capital is needed in the development of farming. Social capital affects business commitment [4], production and productivity [5, 6], economic performance [7], income and the ease of obtaining modern agricultural input facilities and easier agricultural credit [8], the performance of rural producer groups [9], and the existence of trust that affects the performance of agribusiness companies and economic performance [10]. In addition, social capital is an important factor for opening networks, increasing the bargaining position of farmers so that farming should be carried out in groups and collectively [11].

The pressure on the availability of labour and land in peri-urban agriculture [2] needs to be anticipated by identifying the types of peri-urban agricultural activities that have the potential to improve farmers' welfare while supporting urban food security. Chili (*Capsicum annum L.*) is one of the vegetables whose demand is quite high, both for the domestic market and for export to foreign countries, such as Malaysia and Singapore [12]. The average per capita consumption of chili in Indonesia between 2008 and 2013 also shows an increasing trend (National Socio-Economic Survey 2014). Most Indonesians consume chili in fresh, dried, or processed form. Chili is a national superior commodity and a source of vitamin C [13–16].

The development of peri-urban agriculture can give good results if it is done collectively and selects commodities that have important economic value. Based on this, this study aims to analyse the economic feasibility of chili farming, the potential for social capital for the community, and the strategy for developing chili commodities in peri-urban areas.

2 Methods

This research was carried out in Lemah Duhur village, Caringin District, Bogor Regency. Lemah Duhur was chosen as the research location because this village has the highest proportion of agricultural area compared to other villages in Caringin District. This village has an area within an altitude of > 500 m above sea level and is starting to develop into tourist areas. The opportunity for conversion of agricultural land to other uses is quite high because it is close to the city of Bogor, close to Puncak Bogor, which has

the potential to develop tourist areas and close to industrial areas in Sukabumi Regency. Based on this, Lemah Duhur is quite representative of the PUA area.

Data collection was carried out from May to December 2019. Research respondents were members of farmer groups in Lemah Duhur who had experiences in chili cultivation and were able to communicate well, as many as 75 people.

The method used is descriptive analysis through farming analysis, analysis of the elements of social capital, and the development strategies using SWOT analysis. Farming analysis was conducted to determine the feasibility of chili farming, by calculating production input costs, farm outputs, and Revenue/Cost (R/C Ratio). The input and output values in the farming analysis are the average of the values given by the respondents.

Elements of social capital were analysed by scoring on (1) trust, consisting of trust between farmers, trust in farmer groups, trust in the government and the contribution of farmer group members, (2) social norms, consisting of willingness to help each other, willingness to in social spending and willingness to share information, (3) social networks consist of network size, cooperation between farmer groups, ease of obtaining assistance and (4) farm performance consists of farm household expenditures, farm productivity and farming commitment [3, 17]. Giving value to the social capital variable using a Likert scale, is a scale to measure the attitudes, opinions, and perceptions of a person or group of people about social phenomena [18].

SWOT stands for Strengths, Weaknesses, Opportunities, and Threats. SWOT analysis is considered the most widely used analytical tool in strategic management. This analysis was conducted to analyse the strengths and weaknesses, opportunities, and threats of chili farming development in the peri-urban area.

3 Results and Discussion

3.1 Characteristics of Farmers

Characteristics of farmers analysed were ages, area of land ownership, experiences in chili cultivation, and general condition of farming. Based on these data, the age of farmers who are members of farmer groups in Lemah Duhur village is productive age. The land ownership is quite varied. However, most of them said that the ownership of the land was not permanent, because the land actually belonged to people outside the Lemah Duhur village and could be requested by the owner at any time. This is a problem for sustainable chili development. The farming experience of the assisted farmer groups in Lemah Duhur village is 9.93 years. The data shows that most of the members of farmer groups have experience in farming. The success of developing the village of Lemah Duhur village as a chili centre is influenced by the experience of farmer group members in cultivating chili. The group members have experience in cultivating chilies, so the opportunity for chili development is quite large. The characteristics of farmers' group members are seen in Table 1.

As many as 54% of respondents explained that cultivating chili was their main source of income. As many as 46% of farmers explained that they want to cultivate chili because it has high economic value and can diversify products. Until now, all respondents stated that the problems they faced related to chili cultivation were the condition of chili plants that were susceptible to pests and the price of chili was very volatile. Another problem

Table 1. Characterize of farmers group members

Description	Average
Farmers age (years)	45.96
< 30 years old	7.6%
30–49 years old	48.1%
> 49 years old	44%
Land ownership (m ²) *most of farmers have 200–500 m ²	4,000
Farming experience (years)	9.93
< 3 years	34%
3–5 years	22%
> 5 years	44%
Average of experience in chili cultivation (years)	3.94

Source: Primary data

faced is related to product sales. As many as 85% of farmers sell chilies to middlemen, and the rest (15% of farmers) sell them directly to the market. The dependence of farmers on middlemen occurs because, during the cultivation process, farmers always borrow money from middlemen to buy production inputs. As collateral, the middlemen always agree to the loan if the farmers are willing to sell their chilies to the middlemen. This condition causes the selling price of chili to depend on the price set by middlemen. Due to limited working capital, farmers in the Lemah Duhur village are unable to get out of dependence on middlemen.

3.2 Chili Farming Productivity

Productivity is an indicator in determining the level of success or performance of an organization. In general, productivity implies a comparison between output and input, or it can be interpreted as the ratio between output and input in a certain time unit. The results of the analysis of chili farming carried out by weak farmers at noon show that the farming activities carried out are quite profitable because the average R/C value is 2. R/C with a value of 2 indicates that every increase of IDR 1 unit of input will produce an output of IDR 2 (Table 2). Some farmers stated that the land they used was leased, and it is quite worrying for the sustainability of farming in the future. One of the steps that can be taken is to optimize land use and improve cultivation technology so as to provide good results. This is expected to reduce the value of the land conversion.

3.3 Social Capital

Social capital is the values or norms that the community has in working together to increase productivity, consisting of mutual trust, social norms, and social networks [3]. A high level of trust will increase productivity because this trust will reduce transaction

Table 2. Average values and standard deviation of chili cultivation

Description	Average	Deviation Standard
Farmland (m ²)	4,238	3.375
Seeds (IDR)	732,241	400.271
Fertilizer cost (IDR)	5,659,224	4.419.931
Pesticide cost (IDR)	2,007,241	1.407.697
Labour (IDR)	1,450,172	1.069.070
Land rent (IDR)	2,605,172	1.659.246
Total cost (IDR)	1,454,052	6.996.748
Productivity (ton/ha)	4	1.277
Revenue (IDR)	30,150,517	3
R/C	2	31.930.350

Source: Primary data

costs and further increase productivity [19]. Values or norms can be in the form of honesty, attitude to maintain commitment, fulfilment of obligations, reciprocal ties, and so on, which are unwritten rules in a social system that regulates people's behaviour in their interactions with other people [20]. The level of trust can reduce transaction costs because trust encourages someone to comply with norms [21]. Social networks can help farmers to obtain information at a low cost, facilitate decision-making and implementation and reduce opportunistic behaviour from group members [8].

The results showed that farmers have a fairly high sense of trust. Trust in this study is divided into four elements, namely trust among farmers, trust in farmer groups, trust in the government (instructors, lecturers). The greatest value of the four elements of trust is trust in the government. Chili farmers in Lemah Duhur village have confidence in the government, in this case, are agricultural extension workers, and Bogor Agricultural Development Polytechnic (BADP) lecturers who carry out community service activities. The farmer groups in this village were formed with the facilitation of extension workers and lecturers. In addition, they receive various kinds of training according to the needs of farmers and the conditions of the village area. This means that chili farmers have a fairly good level of trust, including those outside the village. This condition is a good enough social capital for the development of chili farming, even though they are located in areas bordering urban areas.

Social norms are habits that have been inherent in society that has existed from generation to generation. The social norms referred to in this study are the willingness of farmers to help each other, contribute to social spending and share information. The results showed that the existing social norms in farming communities were in the high category. The lowest element of social norms is the availability of farmers in social spending. This is possible because the formed farmer groups are still relatively new, the farming carried out still tends to be done alone, and there is a fairly large variation in the analysis of farming. The high value of social capital indicates that the community has a

readiness to help others, mutual assistance, and strong mutual cooperation, and this is one of the important social capitals [22].

Social networks are formal or informal networks that exist in society, both relationships between people within an organization and relationships outside the organization, such as relationships built on the basis of mutual sympathy or friendship. The results showed that the elements of social networks consisting of network size and cooperation between farmer groups were in the high category. Farmer groups have an agenda to hold regular meetings and have group activities, including facilitating meetings with several agricultural entrepreneurs. This activity is a good capital for the development of farming. On the element of ease of getting assistance, the results of the study show a value in the medium category, meaning that the perception of farmers who are still doubtful will get help from other farmers if they experience difficulties. Activities that encourage openness among members of farmer groups need to be carried out so that they are more open to communicating their various problems and have the courage to offer assistance to fellow group members.

The results showed that the perception of farmers agrees that the existence of social capital can improve farm performance. The trust that exists in farmers can be in the form of a feeling of confidence created between farmers or with other people, those other people will want to do something as expected and provide mutual support to each other, especially for chili farming activities [11]. Social norms consisting of farmers' willingness to help each other, availability in social expenditures, and willingness to share information are important assets, because the characteristics of farming that require large business capital, large production risks [23], and high price fluctuations. The existence of a social network in the development of chili farming is very important because small farmers usually do not have a wide network [24], do not have regular subscriptions, and do not have access to various financing facilities and facilities to obtain modern infrastructure [1]. Table 3 showed the farmers' perceptions of the elements of social capital.

3.4 Development Strategy

Based on the characteristics of the respondents, a chili commodity development strategy was developed in Lemah Duhur village using a SWOT approach (Table 4).

The development of chili commodities in Lemah Duhur village can be carried out through several activities, according to the matrix above. The chili commodity development strategy that needs to be done is (1) Strengthening the roles and functions of farmer groups, (2) Strengthening farmers' social capital to support farm productivity, (3) Increasing the competence of farmers in the technical field of standardized chili cultivation (4) Introduction of knowledge for young farmers about smart farming so that they are interested in farming, and (5) facilitate farmers to build networks, including information, markets, access to financing/capital and access to modern infrastructure. The availability of poor assets and unfavorable farming conditions can hinder the development of farming families, therefore, to accelerate the regeneration process of farmers, it is necessary to realize modern family farming practices, or look for alternatives for farming families that are not in accordance with the modernization paradigm [25]. The

Table 3. Average score of elements of social capital

Elements of social capital	Average score
Trust	
• In each farmer	4.29
• In farmers group	4.48
• In government	4.67
• In contribution to farmers group members	4.14
Social norms	
• Willingness to help each other	4.43
• Willingness to contribute to social spending	4.00
• Willingness to share information	4.48
Social network	
• Network size	4.19
• Collaboration between farmers group	4.14
• Ease to get help	2.95
Farm performance	
• Farm household expenses	4.30
• Farm productivity	4.29
• Farming commitment	4.62

Description: 1 = strongly disagree, 2 = disagree, 3 = doubtful, 4 = agree, 5 = strongly agree

Source: Primary data

use of technology, market integration, and social organization has a positive correlation with farmers' income [25].

4 Conclusion

Conclusion of the research are:

- Chili cultivation is quite feasible to be developed
- Social capital of farmers of the peri-urban area is good enough
- The development strategies are increasing the competence of farmers in cultivation, increasing added value product, facilitating market networks and access to capital, and developing irrigation networks
- Overall, the cultivation of chili commodities in peri-urban regions has the opportunity to be developed.

Table 4. Development strategies using SWOT analysed

	Strengths	Weaknesses
	<ul style="list-style-type: none"> • Productive farmers • Experienced Farmer • Market access • Irrigation water • Suitable land characteristic • Existence of social capital 	<ul style="list-style-type: none"> • Land ownership is mostly rent • Farmer regeneration is slow Some of the locations is difficult to access irrigation water • Farmers borrow farming capital from middlemen so farmers have to sell their products to them

(continued)

Table 4. *(continued)*

Opportunities	S-O Strategies	W-O Strategies
<ul style="list-style-type: none"> • Many horticultural entrepreneurs • Agricultural extensions are available • BADP becomes a partner to develop agriculture in the village • The market location is relatively close 	<ul style="list-style-type: none"> • Improving roles and functions of farmer groups • Farmer training to improve their competences • Building market networks, access to finance, and access to modern infrastructure, including irrigation 	<ul style="list-style-type: none"> • Optimization of land use by intensive cultivation system • Facilitating farmers to the to capital access Developing irrigation infrastructure in the village
Threats	S-T Strategies	W-T Strategies
<ul style="list-style-type: none"> • The price of chili is fluctuating • Easily attacked by pests • High agricultural land conversion • Standardized product is needed by urban consumers 	<ul style="list-style-type: none"> • Networking with the market contract • IPM implementation • Farmer training to improve standardized quality product 	<ul style="list-style-type: none"> • Building marketing partnerships • Introduction smart farming system for young farmers • Farmer training to produce standardized quality products

Source: Primary data

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