STRATEGY FORMULATION OF FARMERS CAPACITY BUILDING THROUGH TECHNOLOGICAL INNOVATION IN DISADVANTAGED REGIONS OF INDONESIA

Perumusan Strategi Peningkatan Kapasitas Petani melalui Inovasi Teknologi di Daerah Tertinggal di Indonesia

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ABSTRAK

Permasalahan utama daerah tertinggal adalah kemiskinan. Oleh karena sebagian besar masyarakatnya menggantungkan hidup pada pertanian, maka strategi yang tepat untuk meningkatkan kesejahteraan masyarakat daerah tertinggal ialah memacu peningkatan produktivitas pertanian melalui inovasi teknologi. Penelitian ini bertujuan merumuskan strategi peningkatan kapasitas petani melalui inovasi teknologi untuk mengakselerasi pembangunan pertanian di daerah tertinggal. Penelitian dilakukan dengan metode analisis SWOT berdasarkan data primer yang dikumpulkan melalui survei di Provinsi Jawa Barat, Bengkulu, dan Kalimantan Selatan pada tahun 2015. Hasil penelitian menunjukkan bahwa strategi melaksanakan gerakan inovasi teknologi Pengelolaan Tanaman Terpadu (PTT) secara berkelanjutan merupakan prioritas pertama di tiga provinsi contoh. Prioritas berikutnya adalah meningkatkan fasilitas penyuluh disertai sanksi pelanggaran disiplin, menyediakan bimbingan teknis melalui sekolah lapang PTT, melaksanakan program percontohan usaha tani (*demfarm*) di tiap desa, menyediakan skim kredit lunak, menegakkan kebijakan Harga Pembelian Pemerintah (HPP), dan meningkatkan partisipasi petani dalam pembangunan pertanian. Implikasinya bahwa harus ada upaya khusus untuk mempertahankan penerapan teknologi PTT yang didukung oleh kredit lunak dengan prosedur sederhana, penerapan HPP secara konsisten, dan bimbingan teknis melalui program *demfarm*.

Kata kunci: *daerah tertinggal, peningkatan kapasitas, petani, SWOT*

ABSTRACT

The main problem of disadvantaged areas is poverty. Since most are dependent on agriculture, then the most appropriate strategy for increasing the population welfare in disadvantaged areas is by increasing agriculture productivity through technological innovation. This study aimed to formulate strategies to improve farmers' capacity through technological innovation to accelerate agricultural development. The analysis was conducted using the SWOT method based on primary data collected through surveys in West Java, Bengkulu, and South Kalimantan provinces in 2015. The results showed that strategy to pursue sustainable movement of the Integrated Crop Management (ICM) technology was the first priority in these three provinces. Other priorities were to improve extension workers' facilities, provide technical guidance through ICM field school, conduct farm demonstration (demfarm) program in each village, provide soft loan schemes, enforce the Government Purchasing Price (GPP) policy, and increase farmer participation in agricultural development. Consequently, there should be a special effort to maintain ICM technology application, supported by a simple procedure of formal loan, consistent implementation of GPP, and technical guidance through the demfarm program.

Key words: *capacity building, disadvantaged areas, farmers, SWOT*

INTRODUCTION

According to the Ministry of Disadvantaged Region Development (PDT), disadvantaged areas are defined as relatively less developed regions or districts than other regions (Kemendesa 2005). The common characteristics of disadvantaged regions include (1) relatively high poverty, (2) economic activity limited to agriculture, (3) limited and poor infrastructure conditions, (4) low quality of human resources, and (5) the location is physically isolated. Some weaknesses in the development process exacerbate the disadvantaged regions' vulnerabilities. The weaknesses, among others, are characterized by (a) small allocation of development fund, (b) inefficient use of development funds, and (c) natural

disasters as well as social conflicts that hinder development process (Agustin 2012). In Indonesia, disadvantaged regions generally exist in isolated geographic areas such as inter-country borders, small islands, rural areas, hazard-prone and post-conflict areas with limited and poor infrastructure conditions, and the major livelihood in the agricultural sector.

Spatial approach may be the appropriate strategy for disadvantaged regions. In addition to allocating sufficient funds with proper agricultural development planning and infrastructure, efforts to improve human resources as development actors should be made. For the agricultural sector, capacity building of farmers through technological innovation is a strategic policy to accelerate the achievement of agricultural development goals.

Poverty is the main development issue in disadvantaged regions. In Indonesia, poverty is caused by various socio-economic problems, particularly lacking infrastructure to support community economic activities, including agricultural infrastructure, technological innovation system, and financial institutions.

In the past, infrastructure development had been more focused on advantaged regions, mainly urban areas. Hinterland areas, inter-state borders, and small isolated islands where most of the population work as farmers, got lack attention and development priorities, resulting in economic disparities between disadvantaged and advantaged regions. As a result, these areas remain poor and isolated. In order to spur social and economic development, the rural development programs should be balanced by prioritizing three main aspects: (1) improving the people's economy for poverty alleviation, (2) supporting infrastructure for economic activities, and (3) improving the quality of human resources especially farmers (Syahza and Suarman 2013). According to Muchtar et al. (2011), the development programs that have been carried out included seed support and technical guidance. However, the capacity of agricultural human resources, especially farmers, is still weak, making it difficult to absorb and apply a developed technological innovation.

So far, various studies have been conducted on the improvement of farmers' capacity in agricultural development. Susanto (2010) found that community capacity building can be done by involving reliable, professional companions. But it was also revealed that it was not easy to find the ideal and competent community development companions to meet the community's expectations and needs. Anantanyu (2011) disclosed that farmer capacity-building strategies could be undertaken through (1) enhancing agricultural extension capacity, (2) using participatory approaches which oriented to farmer needs, and (3) strengthening agricultural extension institutions. Yunita et al. (2012) reported that the strategy of increasing the capacity of farm households to achieve household food security could be done through (1) improvement of empowerment process based on participatory approaches, and decentralization following conditions, potential, and resources owned by the community; (2) social activities through strengthening farmer institutions and strengthening farmers' access to production facilities; and (3) improving the performance of agricultural extension workers to improve the development of innovative farmer behavior. Another study of Aminah (2015) using an econometric model revealed that the smallholder capacity of the low-income group produces a low level of food security.

In contrast to previous studies, this article raises the issue of farmers' capacity building based on their internal (strengths and weaknesses) and external (opportunities and threats) factors. The analysis method used to formulate strategies in this study was SWOT (Strengths, Weaknesses, Opportunities, and Threat) analysis. This model of analysis has not been widely used in farmers' capacity building studies. The objective of this research was to formulate strategies to improve the farmers' capacity to accelerate agricultural development in disadvantaged areas.

RESEARCH METHOD

Theoretical Framework

In general, the concept of capacity building can be interpreted as a process of building the capacity of individuals, groups, or organizations through the enhancement of skills, potential, and talent, as well as competency. In this study, capacity building of farmers is an individual dimension, and farmer groups are one form of organizational dimension.

Capacity building of human resources can be seen as an important strategy for an institution or individual to be able to (1) develop a strategic plan so that an individual or organization has a clear vision; (2) formulating policies with regard to the efficiency, effectiveness, responsiveness, participation, and sustainability; (3) designing businesses to ensure efficiency and effectiveness, more appropriately; and (4) implementing managerial activities to be more efficient, effective, flexible, adaptive, and developed. Network development is a strategy to increase the capacity of cooperation or collaboration with

outsiders on the principle of mutual benefit (Pratama et al. 2014). According to Basrowi and Siti (2010), the socio-economic condition in disadvantaged areas indicated by (1) occupied house types that are permanent, semipermanent, and nonpermanent; (2) a closely related kinship system characterized by high levels of mutual cooperation, and social stratification; (3) most people are farmers; and (4) community education is relatively low. Andri (2014) revealed that the socio-economic aspects of farmers who also need to be considered are the accessibility to the development, financing, and the market. Isolation of disadvantaged areas causes less access of the community to the results of development. One reason is the lack of development priorities in disadvantaged areas, so it remains behind.

Anantanyu (2008) disclosed that the support of agricultural extension influences farmers' capacity building, farmer participation in farmers group, and institutional capacity of farmer groups. Improving agricultural extension support is done through awareness, empowerment, organizing, stabilizing, and strengthening of farmers and farmers groups. Capacity building of farmers can be done through non-formal learning process, especially through interaction with social environment and participation in farmers groups. Beaulieu and Cordes (2014) suggested that extension workers play an important role in capacity building of communities in disadvantaged areas, especially in improving economically viable life, fostering entrepreneurial spirit, encouraging the development of local food systems, promoting ecotourism, and building regional competitiveness. Besides, extension workers can help local government and community to find alternatives in overcoming problems. Therefore, the existence and empowerment of extension workers is also an important factor in improving the capacity of farmers.

According to Suseno and Suyatna (2007), the slow growth of agricultural sector, especially in disadvantaged areas, was due to the government's pro-industrial sector, while agricultural policies since the 1980s tend to be distorted. The import policy to cover the food deficit has always been used as a solution to meet food needs. This policy is only one example of various agricultural development policies in Indonesia that were not aligned with the interests of farmers. Agricultural policies launched did not teach farmers the right strategy to produce competitive products. Meanwhile, an important aspect that is needed by farmers is the improvement of ability or capacity to manage agriculture and increase the added value of the products. Therefore, a strategy to increase farmers' capacity, especially in remote areas, becomes very important.

Syahza and Suarman (2013) revealed that the main priority to spurring economic growth should be given to empowering the people's economy, in this case, the development of the agricultural economy. This is because most people, especially in disadvantaged areas, rely on agriculture. The agricultural economy will grow if the farmers, especially in the disadvantaged areas, have the capacity to do agribusiness to produce competitive commodities.

Farmers and their groups play a very important role in accelerating agricultural development through the application of advanced technological innovation. The study of Wastika and Hariadi (2014) revealed that the role of farmer groups in the application of SRI (System of Rice Intensification) technology reached 72.17%. They further reported that farmer groups often play their roles as learning media, co-operation media, and production units. Therefore, the capacity of farmers and their groups should be improved.

Anantanyu (2008) suggested that there are at least two farmers' capacity-building strategies. First, consolidation in the form of facilitation of necessary infrastructure, improvement of innovation, and facilitation of the development of cooperation patterns. Second, the scaling-up of business improvement, entrepreneurship development, and partnership with various stakeholders including business people. This strategy is needed to improve the capacity of farmers in disadvantaged areas.

In Indonesia, the existing condition of farmers in disadvantaged areas is as presented in Figure 1. Most people in disadvantaged areas are small farmers. Farmers are faced with poor condition of transportation infrastructure, making them remote areas, low education, small scale farming, less access to sources of finance, and other poor condition. For some decades, development programs have been concentrated in highly accessible urban areas. So that the disadvantaged areas remain undeveloped, and poverty is mainly in these areas. There should be a massive priority on rural development to spur the economics of people in these areas, consisting of agricultural development supported by infrastructure development. Improvement of the quality of human resources (in this case, farmers' capacity building) is highly important since most people are dependent on the agricultural sector.

In addition to some development programs launching by the government, the extension workers playing an essential role as a development agent in farmers' capacity building. However, the extension workers are constrained

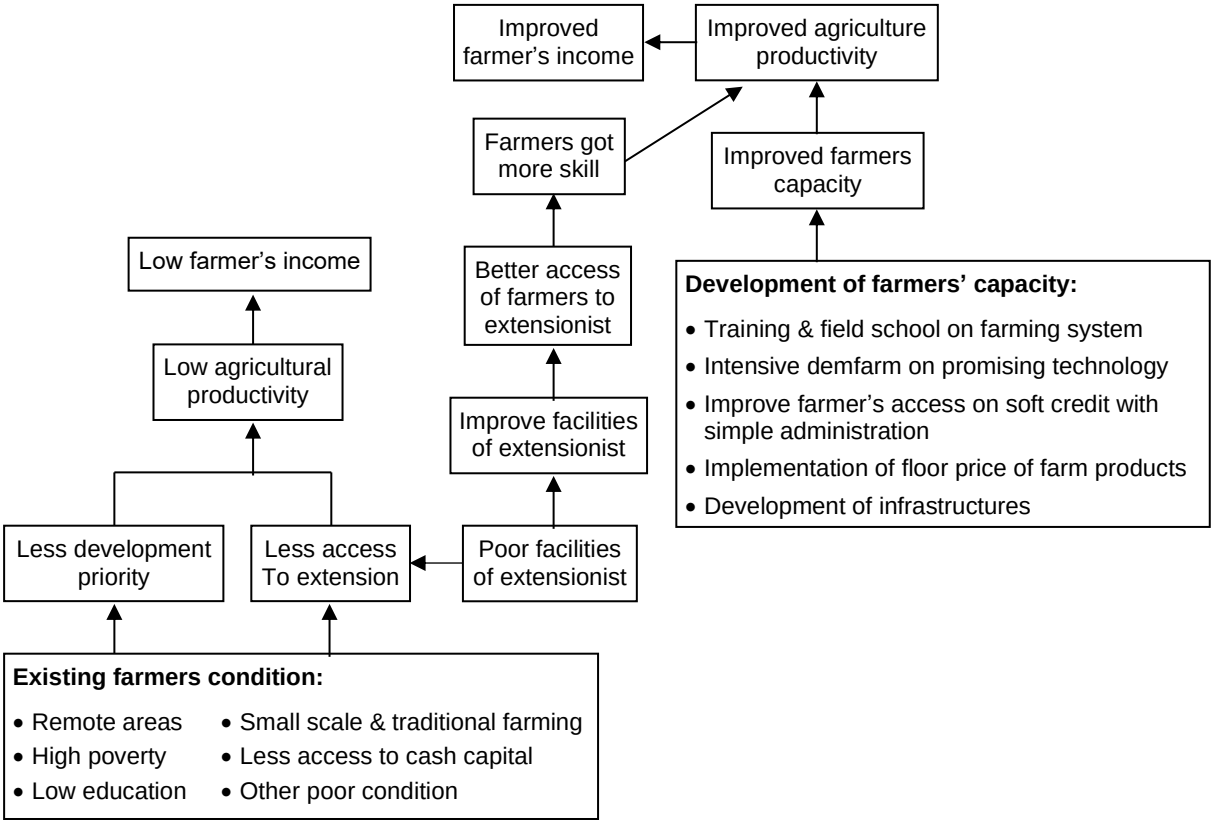

Figure 1. Logical framework on farmers' capacity building in disadvantaged areas of Indonesia

with limited facilities to reach a wide area of villages, where they have to guide farmers. Most extension workers have no facilities yet, like a motorcycle and other tools, to guide farmers. There is a need to improve the facilities of extension workers to make their job well done.

In summary, agricultural development, especially in disadvantaged regions, works well, as in non-lagging regions, when initiated by an increase in agricultural human resource capacity, especially farmers. Therefore, capacity building of farmers is very important in accelerating agricultural development in disadvantaged areas.

Data Collection

The research was conducted from March to December 2015, in three provinces: West Java (Garut and Sukabumi Districts) representing Java Island, Bengkulu (Lebong District) representing the western outer Java, and South Kalimantan (Barito Kuala District) representing the eastern outer Java. These four districts in the three provinces were the districts at the time of this study were still classified by the Ministry of PDT as disadvantaged areas.

Respondents in this study consisted of policy-makers and farmers groups. The policymakers consisted of three Provincial Agricultural Services and four District Agricultural Services. General discussions were done with these policymakers regarding the villages categorized as disadvantaged areas as well as farmers' characteristics in these areas. Based on these discussions, two disadvantaged villages were selected in each district, and one farmer group was taken in each village. The selected villages that categorized as disadvantaged areas were Lebakagung and Mekarjaya in Garut, Mangunjaya and Tanjung Sari in Sukabumi, Sukau Rajo and Taba Anyar in Bengkulu, and Karangbuah and Sawahan in Barito Kuala.

Data and information regarding farmer groups' characteristics were obtained through participatory group discussions. Each discussion with a farmer group was attended by an average of 10 members and administrators of the farmer group. Thus, group discussions in four districts to identify the performance of internal and external factors involved 80 farmers in a participatory approach.

Data Analysis

This study used the analysis of Strengths (S), Weaknesses (W), Opportunities (O), and Threats (T), commonly referred to as SWOT analysis. This

method of analysis was used to formulate strategies to improve farmers' capacity to apply improved technology. According to Rauch (2007), before formulating a new strategy, it is necessary to analyze the situation, both internal (strengths and weaknesses) and external (opportunities and threats) factors. SWOT encourages people to learn about the situation and plan strategies that can be done to achieve their goals.

The initial stage of SWOT analysis was the inventory of factors for strengths (S), weaknesses (W), opportunities (O), and threats (T). The second step was to weigh and score all identified factors, done by a team participatorily. The total weight is 1.00 or 100%, while the score is ranging from 1 (low support to the policy strategy) to 4 (very high support to the policy strategy). The third step was the calculating values as the results of multiplication between the mean weight and mean score for each factor, to obtain the resultants of internal factors (strengths and weaknesses) and external factors (opportunities and threats). From this calculation, the resultants indicate the position or quadrant (performance map) of the community. If the total value of strengths is greater than that of weaknesses, then the sum of internal factors (Ri) is positive. Conversely, if the total value of weaknesses is greater than that of strengths, then the Ri is negative. For external factors, if the total value of the opportunities is greater than that of threats, the sum of external factors (Re) is positive. Otherwise, Re is negative.

If there is a combination of positive Ri with positive Re, then the performance map of a community is in quadrant I (e.g., point A in figure 2). Quadrant II is a combination of positive Ri with negative Re. Quadrant III is a combination of negative Ri with positive Re, while quadrant IV is a combination of negative Ri with negative Re. The calculation method to obtain the resultants of internal and external factors is presented in Table 1, while the community's performance map is presented in Figure 2.

The fourth step was to determine three main factors by choosing the top three of the values of each factor that has been done in the third step. In formulating policy strategies, the selected three main factors of S, W, O, and T were used. The principle of a policy-making strategy is to harness the strengths and opportunities that exist and minimize the negative effects of weaknesses and threats.

The various alternative strategies that can be generated from the SWOT analysis are (1) taking advantage of opportunities using strengths (SO strategies); (2) using strengths and minimizing threats (ST strategies); (3) overcoming weaknesses to exploit opportunities (WO strategies) and (4) overcoming weaknesses and minimizing threats (WT strategy). In more detail, the formulation of policy strategies is presented in Figure 3.

The formulation of policy strategies resulted in various alternative policy strategies. The screening to determine the priority of policy alternatives was done based on three criteria, namely (1) estimated contribution to the selected strategy; (2) cost estimates required to implement the selected strategy; and (3) probability of success of the selected strategy.

Table 1. Method of calculating resultants

Factors	Mean weight	Mean score	Value
Strength			
S1	0.25	4	1.00*
S2	0.35	3	1.05*
S3	0.10	3	0.30
S4	0.20	2	0.40*
S5	0.10	3	0.30
Total	1.00		3.05
Weaknesses			
W1	0.25	2	0.50*
W2	0.20	3	0.60*
W3	0.07	3	0.21
W4	0.10	2	0.20
W5	0.15	3	0.45
W6	0.20	4	0.80*
W7	0.03	3	0.09
Total	1.00		2.85
Internal resultant (Ri)			0.20
Opportunities			
O1	0.25	4	1.00*
O2	0.10	3	0.30
O3	0.10	3	0.30
O4	0.25	2	0.50*
O5	0.05	3	0.15
O6	0.25	3	0.75*
Total	1.00		3.00
Threats			
T1	0.25	2	0.50
T2	0.20	4	0.80*
T3	0.20	3	0.60*
T4	0.10	2	0.20
T5	0.25	3	0.75*
Total	1.00		2.85

Source: Primary data (2015), processed

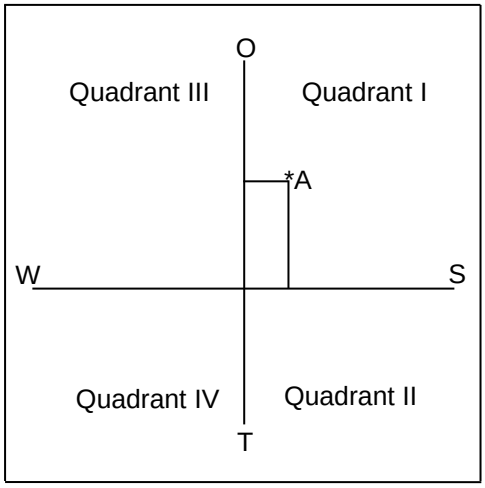

Figure 2. The performance map of a community

Internal factors / External factors	Strength **(S)**	Weakness **(W)**
	S_1	W_1
	S_2	W_2
	S_3	W_3
Opportunity (O)	**S-O Strategy**	**W-O Strategy**
O_1	SO_1	WO_1
O_2	SO_2	WO_2
O_3	SO_3	WO_3
Threat **(T)**	**S-T Strategy**	**W-T Strategy**
T_1	ST_1	WT_1
T_2	ST_2	WT_2
T_3	ST_3	WT_3

Figure 3. Formulation of policy strategies using SWOT

Each strategy was weighted and scored. Score 1 was given to a very low estimated contribution, very expensive cost, and very low chance of success, while score 4 was given to a very high estimated contribution, very cheap cost, and very high chance of success. The final assessment of this screening was the multiplication of the mean weight by the mean score of each strategy. The policy priority was determined based on the screening results.

RESULTS AND DISCUSSION

Existing Condition of Farmers

All sample villages at the time of study were located in remote areas with poor transportation facilities. Farmers were doing farming on a small scale with traditional technology. The main crop was rice. Most farmers had a low yield of rice. In addition to low yield, they also had a low quality of rice due to simple traditional threshing and drying. In some villages, there was late threshing resulting in a poor quality of rice. Farmers have never seen the demonstration farm of improved rice technology.

Most farmers groups in the study areas have experience in joining field school of the integrated crop management (ICM) on rice cultivation. However, after joining field school, they cannot adopt this kind of technology due to resource limitation, especially cash capital. They have low access to formal credit from banks due to complicated procedures with collateral so that they are still using traditional techniques. On the other hand, the extension intensity was also low due to the lack of facilities for extension workers. It was very hard to reach the working areas of extension workers since they were not facilitated with transportation facilities. The extension workers were also not able to do a farming demonstration due to the lack of a program on that. Therefore, agricultural productivity and farmers' income were still low.

Apart from introduction of ICM through field school, there was very limited rural development, including agricultural development programs. Most of the farmer groups did not familiar with Upsus program launched by the Ministry of Agriculture.

The Performance Map

Participatory weighting and scoring for West Java resulted in a total value of weighted strengths of 3.00 and a weighted weakness of 3.32. Thus, the weighted resultant of the internal factor was -0.32. The influence of the weakness factor in West Java was greater than the strength factor.

In terms of external factors, the participatory weighting and scoring results showed that the total value of weighted opportunity factors was 3.53, and the weighted threat was 2.78. Thus, the resultant of weighted external factors was 0.75. This means that the opportunity factor's effect was greater than that of the threat factor, so efforts to increase farmers' capacity become more prospective. The coordinate of farmer capacity building performance in West Java was (-0.32,0.75). Thus, the position of farmer capacity building performance in West Java's dis-advantaged areas was in quadrant III, which is at point B of Figure 4. The performance of farmers' capacity improvement in disadvantaged areas of West Java was in a less conducive condition characterized by the dominance of internal weaknesses factors. However, the influence of external opportunities was stronger than threats. It is necessary to strengthen the internal factors

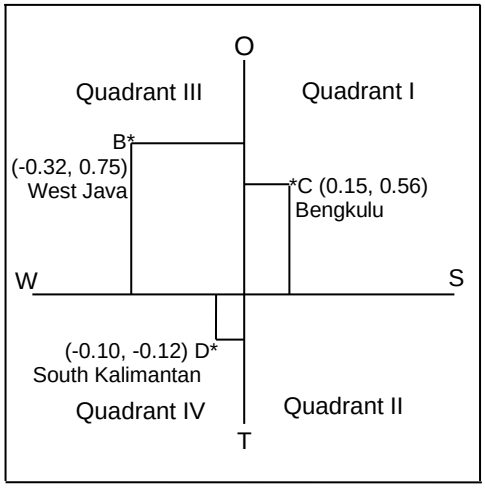

Figure 4. The performance map of farmers' capacity building in three provinces

to take advantage of existing opportunities to overcome this condition.

With the same analytical procedure as done for West Java Province, a performance map of farmer capacity building in Bengkulu Province was obtained at the point (0.15, 0.56). Thus, the position of farmer capacity-building performance in the disadvantaged region of Bengkulu Province was in quadrant I, which is at point C of Figure 4. The performance of farmer capacity building in disadvantaged region of Bengkulu was in conducive condition, which is characterized by the dominance of internal strength and external opportunity factors. This condition makes it easier for stakeholders to engage in aggressive strategies, i.e., using the strengths to exploit the opportunities.

Based on the same analytical procedures as the above two provinces, a performance map of farmers' capacity building in South Kalimantan's disadvantaged areas was in (-0.10; -0.12) coordinate. In other words, the position of capacity-building of farmers in the disadvantaged areas of South Kalimantan was in quadrant IV, which is at point D of Figure 4. The performance of farmers' capacity-building in disadvantaged areas of South Kalimantan was still more confronted with obstacles, both from internal weaknesses and external threats, which were slightly more dominant than strengths and opportunities. Under these circumstances, stakeholders should use defensive strategies, which are revamping the internal weaknesses and addressing external threats through farmer empowerment programs, before they can use the strength to exploit the opportunities. Schematically, the performance map of farmers' capacity building in disadvantaged areas of three provinces is presented in Figure 4.

Alternative Policy Strategies to Improve Farmers' Capacity

The ranking sequence was performed for all identified factors based on their values, then take each of the three main factors of strengths (S), weaknesses (W), opportunities (O), and threats (T). In more detail, each of the three main factors, as well as strategy formulation, are presented in Appendix 1 for West Java Province, Appendix 2 for Bengkulu, and Appendix 3 for South Kalimantan.

By using the main factors of strength (S), weakness (W), opportunity (O) and threat (T), the strategy formulation of capacity-building of farmers in disadvantaged areas in three provinces were developed. The policy strategies consist of four groups of strategies: S-O, W-O, S-T, and W-T strategies, as presented in Appendix 1, 2, and 3.

The formulation of policy strategies resulted in at least 12 policy alternatives in each province. Limited development funds requires the government to determine the policy priorities. The screening was performed to determine the priorities in this study, on the principle of benefit, by considering three criteria: (1) the estimated contribution, (2) the estimated cost required, and (3) the estimated chance of success of the selected policy strategies in increasing the capacity of farmers. Similar to the selection of internal and external factors, the screening of policy alternatives was also done by weighting and scoring each strategy based on all three criteria.

Based on the screening results, four policy priorities in each province were taken to increase farmers' capacity, especially in farmers' ability to increase agricultural production. Of the four priorities in each province, there are some common policy priorities. The policy strategy of continuous implementation of ICM technology is the first priority in the three provinces. This strategy is supported by conducive conditions, where all farmer groups have experience in attending the ICM field school (ICM-FS). Until now, there is an ICM technology development program in Indonesia. This policy strategy is also one of the strategies implemented in the Special Efforts (Upsus) program from the new government to achieve self-sufficiency in rice, corn, and soybeans. In the Upsus program, ICM technology, which is the result of technological engineering by IAARD (Indonesian Agency for Agricultural Research and Development), becomes a technological reference. This movement requires the presence of extension workers who can reach all disadvantaged areas to spread the movement of application of ICM technology throughout the country.

Another common strategy is to improve the facilities of extension workers with disciplinary sanctions in Bengkulu and South Kalimantan Provinces. This strategy is important to attract young people to become agricultural extension workers. This strategy is in line with that of Beaulieu and Cordes (2014), who disclosed that extension support greatly affects the capacity of farmers to improve their economic life through the growth of entrepreneurial spirit. Similarly, Yunita et al. (2012) revealed that one strategy to develop innovative behavior of farmers is through improving the performance of agricultural extension workers. The same thing was stated by Ruhimat (2017) that extensionists have an important role in increasing the capacity of farmer group members. Optimizing the role of extension workers (as educators, facilitators, and motivators) is essential for the successful development of agroforestry farming in Cukangkawung Village, West Java.

According to Faridhavin et al. (2016), extension workers play an important role in the implementation of Upsus program. In this program, the government provides assistance in various agricultural equipment and machinery (*alsintan*) such as rice milling units, combine harvester, corn sheller, power thresher, water pumps, and tractors. However, most farmers are still unable to operate this *alsintan* properly. Therefore, training and mentoring of the utilization of *alsintan* are needed. One agent in charge of escort and mentoring the implementation of *Upsus* is agricultural extension workers, besides Babinsa and students. The extension workers need to be facilitated to be able to perform their duties properly, at least for their mobility.

In the research sites, the condition of the extension workers in each *BPP* (office of extension workers) during the study was quite apprehensive. Approximately 80% of extension workers are daily freelancers (*THL*) who, at any time, have the potential to resign if there is more attractive job opportunities. The possibility of termination of *THL* extension workers due to two reasons, namely the small chance of being appointed to be civil servants (*ASN*) and the small honorarium received at that time. On the other hand, the existing civil servants are about 2−3 persons per *BPP* with the almost retired age. If there is no effort to provide adequate facilities and incentives for extension workers (in the form of appointment into civil servants and facilities such as motor-cycle), besides the low effectiveness of guidance and counseling to farmers, the number of extensionists will also be less. In the next 2−3 years, civil servants extensionists will be retired, causing a vacuum of agricultural extension workers with civil servant status at *BPP*. In addition, informal education in the form of training, guidance, and counseling of farmers by extension workers is needed to improve farmers' capacity.

Improving technical guidance through the ICM field school is an important strategy in compensating for the low level of formal education of farmers. Through technical guidance, farmers will understand the introduced technology to improve agricultural productivity more easily and quickly. Technical guidance can also be done through demonstration farms in farmers' lands, where technological innovation is demonstrated by extension workers (BPP) in collaboration with researchers and farmer groups. If technological innovation is introduced through the demfarm program in each village, it is expected that farmers will understand and adopt the technology more quickly. This is in line with the improved capacity of farmers through training and assistance disclosed by Viengxay et al. (2009). The research results of Putri and Santoso (2012) supported the findings of this research. The development programs of disadvantaged areas in Sampang District prioritize human resources improvement, in addition to infrastructure and economic development. With this strategy, capacity building of farmers to accelerate agricultural productivity will be faster.

To improve farmers' ability to apply ICM technology, a soft credit scheme that is easily accessible to farmers is also very important. So far, farmers have very difficult access to credit programs, both *KKPE* (Credit for Food and Energy Security) and *KUR* (People's Business Credit). Besides the complicated procedure for farmers, there is also the problem of collateral, which is difficult for farmers to meet. Without the support of soft credit facilities with simple administrative procedures, the ICM technology will be difficult to implement. A valuable lesson learned is the good performance of informal credit returns by farmers from middlemen with the paid after harvest (*yarnen*) system. Farmers rarely delinquent informal non-collateral loans provided by middlemen without administrative procedures, despite high-interest rates. This reflects that the commitment of farmers to pay off credit is very good. This phenomenon can be one of the social capital that must be considered in formulating formal credit policy without collateral. The importance of credit to finance farming is also expressed by Andri (2014).

To reduce yield loss, the development of power thresher through government aids, and training of the use of this machine is one of the important policy strategies. Yield loss generally occur in the primary post-harvest handling phase, especially threshing and drying. The most common threshing technology applied by farmers in disadvantaged

areas is simple technology by hitting paddy on a board or bamboo (called *gebot)*. The limitations of this simple technology often cause farmers to be unable to finish the threshing on the same day, so it is common for threshing delays that may cause yield loss, both weight and grain quality (Swastika 2012). Threshing technology considered as an advanced technology in Indonesia is threshing by using power thresher. Therefore, the development of power thresher in disadvantaged areas becomes an important strategy in reducing yield loss, both weight and quality. The policy strategy priorities are presented in Table 2.

Table 2. Policy strategy priorites to improve farmers capacity in three provinces

Provinces	Policy strategy priorities
West Java	1. Sustainable implementattion of ICM technology 2. Promotion of ICM technology through demfarm in the main program of extension 3. Improvement of farmers access to soft credit under counseling of extensionists 4. Implementation of floor price through rice procurement by Bulog
Bengkulu	1. Sustainable implementattion of ICM technology 2. Promotion of ICM technology through demfarm in the main program of extension 3. Improvement of facilities and welfare of extension workers, accompanied by disciplinary sanctions 4. Speeding up promotion on use of power thresher for rice threshing
South Kalimantan	1. Sustainable implementattion of ICM technology 2. Improvement of facilities and welfare of extension workers, accompanied by disciplinary sanctions 3. Improvement of farmers group participation in agricultural development planning 4. Promotion of ICM technology through demfarm in the main program of extension

Source: Primary data (2015), processed

In addition, a policy of applying floor price or government purchasing price (GPP) through the purchase of farmers grain by Bulog is to ensure price stability at the farm level. Government purchase price (GPP) is one of the policy instruments to protect farmers from falling prices during the harvesting season. It is a common phenomenon in Indonesia that the prices of agricultural products are almost always low during the harvesting season. To maintain price stability, the application of GPP through the purchase of grain by Bulog becomes a very strategic policy.

CONCLUSION AND RECOMMENDATION

Conclusion

From the SWOT analysis, several farmer capacity building strategies were obtained in accelerating agricultural development. From several strategies in each province, the policy strategy of sustainable implementation of ICM technology is the priority in three provinces. This movement is expected to improve farmers' capacity in terms of knowledge and skills to apply technological innovation of ICM to improve agri-cultural productivity. The movement is currently being implemented through a special effort program (Upsus) of rice, corn, and soybeans (Pajale) from the Ministry of Agriculture. This movement can continuously run if supported by the empowerment of agricultural extension, non-collateral farming credits, and GPP implementation. Three other important priorities that can enhance farmers' capacity to accelerate agri-cultural development are (1) technical guidance through the ICM field school program, (2) ICM demfarm programs in each village, and (3) increased farmer participation in planning and implementation of agricultural development programs.

Recommendation

The policy implication of this conclusion is that there is a special effort to maintain the application of technological innovation of ICM, especially in disadvantaged areas. The important supporting instruments that should be pursued are (1) improvement of extension workers facilities, (2) mitigation of collateral in soft credits for small farmers, (3) consistent implementation of GPP through the purchase of farmers' grain by Bulog, (4) technical guidance through demfarm programs in each BPP working area, as well as (5) improvement of farmers roles in the planning of agricultural development in disadvantaged areas.

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Appendix 1. Strategy formulation to improve farmers' capacity to accelerate agricultural development in West Java, 2015

Internal factors ⇨ / External factors ⇩	Strengths (S)	Weaknesses (W)
	• Long time formation of farmer groups • Sufficient number of farmer group members • Farmer groups have experience on ICM field school	• Small-scale farm • Low cash capital • Low productivity of rice
Opportunities (O)	S-O strategy (Aggressive)	W-O strategy (Diversified)
• There was technical guidance for farmers every season • There was a program of ICM field school • High intensity of farmers counseling	1. Sustainable implementattion of PTT technology 2. Determination of a technical guidance as a mandatory agenda for extension workers in each BPP 3 Promotion of ICM technology through demonstration farm in the main program of extension	1. Rice yield improvemant through a technical guidance of ICM technology 2 Involvement of more farmers on ICM-field school 3. Improvement of farmers access to soft credit under counseling of extensionists
Threats (T)	S-T strategy (Consolidative)	W-T strategy (Defensive)
• No price incentive for agricultural products • Low access of farmers to farm credit • No demonstration on power thresher use	1. Implementation of floor price through rice procurement by Bulog 2. Soft credit for farmers with ICM technology 3. Government support on power thresher with technical training for farmer groups	1. Implementation of floor price through rice procurement by Bulog 2. No collateral farm credit for small farmers 3. Government support on power thresher with technical training for farmer groups

Note: BPP = extension office at sub-district level
Bulog = National Board of Logistic

Source: Primary data (2015), processed

Appendix 2. Strategy formulation to improve farmers' capacity to accelerate agricultural development in Bengkulu, 2015

Internal factors ⇨ / External factors ⇩	Strengths (S):	Weaknesses (W):
	• Land size for farming was sufficient • Farmer groups have experience on ICM field school • Farmers have used power thresher for rice threshing	• Most farmers have not seen a technology demonstration farm • Most farmers back to a simple traditional technology • Farmers have low education
Opportunities (O)	S-O strategy (Aggressive)	W-O strategy (Diversified)
• There were sufficient extension workers • There was a program of field school on ICM • There was a demonstration farm conducted by BPTP	1. Sustainable implementattion of PTT technology 2. Promotion of PTT technology through a demonstration farm in the main program of extension 3. Speeding up promotion on use of power thresher for rice threshing	1. Increase the counseling agenda of extensionists 2. Improve cultivation technology through sustainable ICM field school 3. Improve farmers' knowledge and skills through training and demonstration farm
Threats (T)	S-T strategy (Consolidative)	W-T strategy (Defensive)
• No involment of farmer groups on agricultural development planning • Low intensity of counseling service due to limited facilities of extensionists • No program of technical guidance on agricultural technology	1. Increasing the role of farmer groups in agricultural development 2. Increasing intensity of PTT field school accompanied by technical guidance 3. Improvement of facilities and welfare of extensionists, accompanied by disciplinary sanctions	1. Increasing participation of farmer groups in ICM field school and demonstration farm programs 2. Improvement of facilities and welfare of extensionists with disciplinary sanctions 3. Promote technical guidance program to improve farmer knowledge and skills

Source: Primary data (2015), processed

Appendix 3. Strategy formulation to improve farmers' capacity to accelerate agricultural development in South Kalimantan, 2015

Internal Factors ⇨ / External Factors ⇩	Strengths (S):	Weaknesses (W):
	• Land size for farming was sufficient • Farmers group have an experience on ICM field school • Farmers have an experience in rice cultivation training	• Farmers back to a simple traditional technology • Low rice productivity (yield) • Low quality of rice due to simple traditional drying
Opportunities (O)	S-O Strategy (Aggressive)	W-O Strategy (Diversified)
• There was a program of field school on ICM • There were hand tractor aids from government • There was a floor price (GPP) policy of rice	1. Sustainable implementattion of ICM technology 2. Improvement of rice cropping index using hand tractor aids 3. Rice quality improvement through proper post-harvest technology, to meet quality requirement of GPP	1. Improve farmer knowledge and skills through ICM field school 2. Rice yield improvement through promotion of PTT technology 3. Government support on mechanical dryer and its training to improve rice quality to meet ICM requirement
Threats (T)	S-T strategy (Consolidative)	W-T strategy (Defensive)
• Limited technical guidance, due to limited facilities of extensionists • No involment of farmers in agricultural development planning • No program of demonstration farm	1. Improvement of facilities and welfare of extensionists with disciplinary sanctions 2. Improvement of farmer groups participation in agricultural development planning 3. Acceleration of dissemination of ICM technology through the demonstration farm program in each BPP	1. Acceleration of technical guidance on ICM through intensive demfarme 2. Determination of demonstration farm at all villages as a mandatory agenda for extension workers in each BPP 3. Government support on mechanical dryer and its training to improve rice quality to meet GPP requirement

Source: Primary data (2015), processed