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Replanting of smallholder palm oil plantations in Dharmastraya District, West Sumatera Province, Indonesia

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Abstract. This study aimed to formulate the steps of replanting preparation to empower the smallholders in palm oil plantation in Dharmastraya District. This study used a descriptive qualitative method with a case study. Primary data were collected by interview and discussion with famers who are the *Koperasi Unit Desa* (KUD, a rural cooperative institution) members and management, and key informants. Data were analyzed by strengths, weaknesses, opportunities, threats (SWOT) analysis. Empowerment of the smallholder's palm oil plantations can be carried out through: 1). Empowering of the smallholders' institutions by re-functioning the farmer groups and cooperatives with a new management formation; 2). KUD and farmer groups establish a replanting model (conventional, stage replanting, under planting or intercropping); 3). Preparing a standard operational technical procedure for the approved replanting model; 4). Preparing a budget and time planning for replanting implementation including the immature plantation period; and 5). Arranging the management of plantation after entering the production period. For those activities of the replanting program, the regional government supports are needed by facilitating, supervising and accompanying the implementation. Besides, the KUD requires training and assistance especially in cooperative management, financial management and guidance on implementing the principles of sustainability.

1. Introduction

Since the late 1970s, the Indonesian Government has continued to stimulate oil palm expansion in various ways, including through smallholder financing and support. McCarthy [1] distinguishes three phases of recent palm oil sector development in Indonesia. The first phase from the late 1970s to 1994, the development of the smallholder palm oil sector fueled by direct state investments via state-owned companies through the PIR-Trans scheme. The subsequent phase, during 1994–1998, the state gradually withdrawing, giving rise to private smallholder lending schemes, most notably the *Kredit Koperasi Primer untuk Anggota* (KKPA, Primary Credit Cooperative for Members), a scheme under which smallholders, organized in cooperatives, were able to access subsidized loans from banks. The final stage, known as the *Reformasi* era from 1998 onwards, sees a more neoliberal, market-driven model being established, with the aim of enhancing smallholders' access to technology and investment capital so they can expand their cultivation area.

Plantation development has succeeded in increasing the production of plantation commodities, however, it has not given a real influence on improving the welfare of smallholders. This is as a result of farmers' limitations in land ownership, technological mastery, access to capital and various business opportunities. As an effort to improve the ability of farmers to optimize their business in a sustainable



manner and to reduce the various limitations that exist, the empowerment of farmers and their institutions is one very important factor. Referring to this, since 2011 the Directorate General of Plantations has begun re-implementing the Facilitation of Empowerment and Annual Plant Institutions which continued until 2014. In the process of empowering farmers and institutions using the Economic Togetherness System (*SKE*), at the implementation stage it is necessary to prepare a Regional Facilitator Team (*FASDA*) which is very instrumental and determines the success of farmers' empowerment [2].

The characteristics of Indonesia palm oil smallholder are: 1) Smallholders account for about 40% of the total planted area, but only 30% of total output; increased productivity is critical; 2) Significantly lower production per hectare than large-scale plantations due to weaker farming skills and lower quality input; 3) Declining production yields and increased need for replanting: the average palm oil tree age is in Sumatra 20 years, nearing the end of economic life; 4) Average of 2 ha farmer-owned land per farmer; 5) Limited access to finance due to perceived high credit risks restricts the farmer's ability to invest and improve efficiency and production quality; and 6) Limited direct access to markets for most independent smallholders [3].

The last a decade, the plantations had planted in NES-PIR-Bun scheme have to be replanted because the tree age are more than 26 years and productivity has been declining. Replanting is the activities starting from planning to immature period which will determine the success of mature period palm oil. The Company in the PIR-Trans model in Dharmasraya District had carried out the replanting in 2015, without establishing and managing the smallholder's replantation, so the farmers continue to cultivate the unproductive palm oil plant. However, the smallholder's plantations in PIR-Trans needs to implement replanting for sustainability of its production and livelihoods. Therefore, the objective of the study was to formulate the strategy to empower farmers to carry out the replanting of their palm oil plantations ex-PIR-Trans, based on strengths, weaknesses, opportunities, and threats of the smallholders.

2. Methodology

This case study was located in Dharmasraya District, which purposively selected because it is the only palm oil plantation in West Sumatra that was developed with PIR-Trans scheme. This study used a qualitative method with a case study. The data used in this study are primary data and secondary data. Primary data is obtained from observations and interviews with respondent farmers (55 plasma farmers) and in-depth interview with key informants. The key informants are purposively chosen using the criteria of institutions or parties involved in the palm oil replanting program (*UPTD District Agriculture Office, KUD, Estate, Farmers Groups, Administration Village, Regional Government Unit*). The secondary data was in the form of reports or documents which was related to research problems and some relevant literatures. The data was analyzed by SWOT analysis using the strategic planning technique to identify strengths, weaknesses, opportunities, and threats of replanting. The internal and external factors were rated and weighted by experts in palm oil plantation and discipline. The scores were of 1-5 ranges. The final analysis is to generate the strategy to empower the palm oil plantation smallholders in Dharmasraya District at the *PIR-Trans* scheme.

3. Results and discussion

3.1. Internal farmers' characteristic

Farmer's character is individual, which is different from one person to another. Individual characteristics can be interpreted as individual conditions which can be seen from age, gender, marital status, and number of dependents and years of service. The internal characteristics of farmers in this study are (1) age, (2) level of education, (3) number of family dependents, (4) land area and (5) farming experience, and (6) motivation for implementing replanting.

Based on the internal factors of plasma farmers (Table 1), most of farmers (86%) are within productive age (30-60 years) and only a small percentage (14%) of old farmers. In terms of health and ability to work farmers with productive age have more ability to work and perform than those who are

not productive age. In the process of innovation adoption farmers who are in the productive age are more responsive than those who are older, because there has been a decline in physical condition, slow in the decision-making process and full consideration and prudence. Most farmers (83%) have motivation (medium and high) in replanting and a small percentage that have low motivation and are generally elderly (> 60 years).

In general, farmers have a low education level; more than 73% of farmers only completed their basic education and some have never received formal education, but most farmers can write, read and speak Indonesian Language. More than 20% of farmers with medium education and 3% are high.

Some farmers (56%) have a small number of family dependents in the category of having 2 persons. A small proportion of farmers who have family responsibilities are in many categories (> 5 persons). This shows that most farmers are not burdened by the number of dependents of their families but also do not have enough labor in the family for their palm oil plantation business.

The area of land owned by farmers varies, but most (78%) own land according to the quota given by the government, namely 2 ha for the plantation and 0.5 ha for the land for food crops. Besides that, there are also farmers who cultivate land outside the plasma plantation area. Some farmers (33%) are having experience of palm oil farming with more than 10 years.

In general, the motivation of farmers in implementing replanting are in the medium and high categories. Most farmers have a strong motivation to replanting because farmers realize the importance of replanting such as: do not want to lose their livelihoods and the existence of financial assistance (fund) from the government (53%). Some farmers still want to harvest non-productive plantation because they do not have plan on replanting (47%) and there is no demonstration plot in the Dharmasraya Regency.

Table 1. Internal factors

Factors	Rating	Weight	Weighted Score
A. Strength factors			
Farmers have certified land	4	0.08	0.32
Farmers land size are more than 2 hectares / families	3	0.05	0.14
Farmers are members of farmer groups	4	0.07	0.27
Farmers are member of KUD	3	0.07	0.22
Farmers have experience in palm oil plantations cultivation	3	0.07	0.22
The main source of farmers income is palm oil	4	0.07	0.27
A small percentage of farmers have insurance funds or reserves for replanting	2	0.04	0.08
The farmers have the desire to do replanting	3	0.05	0.14
The farmers will do replanting independently	2	0.04	0.08
B. Weakness factor			
Farmer education is low	2	0.04	0.08
The farmers do not understand replanting techniques	3	0.07	0.22
Farmers do not have job other than palm oil plantations	2	0.03	0.05
Farmers do not have experience in crop or horticulture cultivation	2	0.04	0.08
Land size is small	1	0.03	0.04
Farmers have unpaid bank credit charges	2	0.04	0.08
Most farmers do not have savings for replanting	2	0.04	0.08
Some farmers are afraid of losing their income if they do replant	3	0.05	0.14
Farmers are no longer active in farmer groups	3	0.06	0.18
Farmers are no longer active in KUD	3	0.07	0.22
Total	51	1.00	2.89

3.2. *Externals farmers' characteristic*

Palm oil replanting is an innovation for plasma farmers, because the development of smallholder plantations in the PIR model is carried out by company. Innovations can be disseminated to other farmers through fellow farmers with the role of early adopter information, and it has greatly helped the replanting activities.

The externals factors of the plasma farmers in this research are: 1). Availability level of production facilities, 2). Frequency of participation on extension activity, 3). Level of information access, 4). Impact of company, 5). The need of fund, and 6). Infrastructure. The external environment condition of the

plasma farmers affected to implement replanting palm oil plantation. Various obstacles faced by farmers make it difficult for farmers to manage their replanting plantations. Seeds of good quality and certified, fertilizer requirements in fertilization stage, extension, access of information will impact to the good plantation practice.

Based on Table 2, most of plasma farmers (>70%) argued that availability level of input production facilities and infrastructure plantation facilities in this area was low. In this research, the frequency of participating in the extension activities is in the low (86%) categories. Extension activities will be able to assist in the implementation of replanting of palm oil, if it starts with extension activities delivered by the *UPTD* (Village Technical Implementation Unit) and also the District or Provincial Plantation Service, but in recent years there has been no extension on replanting. The dissemination of innovation through demonstration plots has also not been conducted in Dharmasraya District. If a demonstration plot is held in the future, farmers who need information about replanting can get it from farmers who are demonstrating the plot and fellow farmers who are considered successful.

Table 2. External factors

Factors	Rating	Weight	Weighted Score
A. Opportunity Factors			
There are guidelines for palm oil replanting	3	0.08	0.24
There is a palm oil replanting fund from BPDPS	3	0.08	0.24
Partnership with Palm Oil Company	2	0.06	0.14
There is a Palm Oil Processing (Factory) around the plantation	3	0.08	0.24
There is a Special Team for replanting	4	0.10	0.35
There are regional government tools related to cooperatives	3	0.09	0.29
There existent of Research Institution and university	3	0.08	0.24
B. Threat factors			
KUD does not perform functions	3	0.08	0.24
The existence of collecting traders (middleman)	2	0.05	0.11
Inadequate infrastructure	3	0.09	0.29
Many farmers sell their plantation	2	0.05	0.11
Land use change	2	0.04	0.07
Replanting models have not been socialized	2	0.04	0.07
Counseling related to plantations no longer exists	3	0.08	0.24
Total	38	1.00	2.86

Some farmers are workers in replanting activities at company estate in PIR-Trans model. They can obtain knowledge about replanting. Some farmers also want to observe the process of replanting by plantation companies. Thus, the level of farmers' access to information on replanting activities in palm oil is in low/medium category, although most farmers do not participate in counseling, but farmers get information about replanting from fellow farmers.

The PIR model is a system of cooperation that should be mutually beneficial, complete and sustainable. Ideally for companies that used to be nucleus estates are responsible for guiding and also providing solutions in efforts to develop smallholder plantations. One of the responsibilities that must be carried out by the company is Corporate Social Responsibility (CSR). The nucleuses estate in the PIR-Trans model program should be facilitated by the government to partner again and provide information regarding replanting and management to farmers. According to key informants from company management, the company is willing to participate in plasma replanting but plasma farmers are more likely to be independently. This is in line with the perception of plasma farmers from the impact of company plantations, only a small percentage of those who rate high (10%), most rate moderate (56%) and some others rate low (34%). However, the desire to replant independently, is also the success of the PIR model of self-sufficient farmers. There are 76% of farmers stated that production facilities will not be easy to obtain, especially certified palm oil seedlings. Besides that, it is difficult to get subsidized fertilizers and farm medicines.

Most of plasma farmers (93%) required capital fund for replanting implementation. The government has provided an institution that manages replanting capital assistance for farmers, but the information is limited. Most of the farmers who aware of the assistance were motivated to do replanting, but the procedure for obtaining them was not understood by farmers. The condition of internal and external environment of the plasma farmers are used as basic to identify the strength, weakness, opportunity and threats to find the strategies of empowerment the smallholders (plasma farmers).

3.3. *Strategy to empower the plasma farmers*

Based on the internal and external characteristics of plasma farmers, and interviews with key informants, the result of IFE (Internal Factor Evaluation) is shown in Table 1 and EFE (External Factor Evaluation) is shown in Table 2.

From the result of IFE (Table 1), there are nine factors of internal factor that important to the strategy. The internal strategic factors are derived from the weighted score. If the score is higher than 0.16, it means the factors become the strategic factor. These factors are: Farmers have certified land, Farmers are members of farmer groups, Farmers are member of KUD, Farmers have experience in palm oil plantations cultivation, The main source of farmers income is palm oil, the farmers desire to do replanting, the farmers do not understand replanting techniques, some farmers are afraid of losing their income if they do replanting, farmers are no longer active in farmer groups, and farmers are no longer active in KUD.

The strategic external factors derived from the weighted score. The factors that have more than 0.22 score were considered as strategic factors. There are nine factors that important to became strategic factors which are: guidelines for palm oil replanting, partnership with palm oil company, palm oil replanting fund from BPDPS, special team for replanting, regional government tools related to cooperatives, research institution and university, KUD does not perform functions, inadequate infrastructure, and counselling related to plantations is no longer exists (Table 2).

From the internal and external strategic factors, we generate the strategy to empower the smallholder which are:

A. Preparation phase:

1. Empowering of the smallholders' institutions by revitalization of farmer groups and cooperatives.
2. Increasing of farmers' access to replanting fund from BPDPS and other government financial scheme.
3. Developing pilot project (field demonstration) of replanting and integrated farming or intercropping.
4. Determining a replanting model and constructing a procedural operating standard for the agreed replanting mode.

B. Implementation phase

1. Field assistance in implementation of replanting management plan and action plan for immature and mature period.
2. Accelerating coordination among Regional Team of replanting horizontally and vertically hierarchy.
3. Developing networking and partnership for implementation and marketing facilitated by regional team of replanting.

4. Conclusion

Empowerment of plasma farmers in replanting activities is to build palm oil in immature period, accordance with sustainable development standards (ISPO and/or RSPO). The regional government supports are needed by facilitating, supervising and accompanying the implementation. The farmers are given enlightenment and encouragement to realize the importance of planning and implementing the replanting. Replanting is the main activity that determines the success of sustainable palm oil plantation

by involving stakeholders (farmers, extension officer, estate plantation, NGOs and universities) to support the Indonesia's Sustainable Palm Oil policy. Strategy for palm oil replanting can be divided into 2 phases, namely preparation and implementation phase. Strategy formula in the preparation phase is classified into economic, technology and institutional aspects, and strategy formula in the implementation phase is classified into institutional economics and technology. Replanting have to be included in regional development program, through strengthening the farmer institutions (farmer group and cooperative), providing training, assisting technical implementation and management plan of replanting. Regional government needs to strengthen capacity building of the replanting regional team in order to implement strategies.

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