

# Cross-Sectional Study on Land and Seed of Oil Palm Smallholders in The Western Part of Aceh: Challenge for Sustainability Agenda

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**Abstract.** Palm oil sectors in Indonesia have to faced critiques due to its compliance towards sustainability agenda. As the main palm oil producing country, Indonesia may lose its competitiveness since the global consumers demand more environmentally products. The two issues in terms of traceability are land legal clarity and the source of seeds. This study aims to examine the current stage of land legal clarity and the adoption of certified seeds of oil palm smallholders. A cross sectional study has been done across four palm oil producing regions in the western part of Aceh Province-Indonesia. The results show a significant consideration for future improvement as most of the smallholders' land and oil palm seeds were lack of traceability. These findings imply that the government's intervention is very urgent to accelerate the transformation of smallholders' oil palm practices towards a global sustainability agenda.

## 1 Introduction

The growth of oil palm estates has sparked considerable interest among socioeconomic audiences both at the domestic and international levels. Palm oil is considered to have a negative influence, particularly on deforestation and the rights of individuals violations. CPO exporting destination countries, particularly the European Union, require Indonesia to adopt sustainable palm oil management.

To support sustainable palm oil in the international market, the government began to make Sustainable Palm Oil certification enforceable. Based on this, Indonesian palm oil is required to be able to meet certification standards either ISPO or RSPO which are designed to keep palm oil expansion away from deforestation and to preserve human rights and fair prices for smallholders [1].

The plantation sector in Aceh Province- Indonesia, especially oil palm estates, is one of the drivers of economic growth in the province and is expected to increase the income and welfare of farmers. The increase in oil palm area in the last five years amounted to 5.38% compared to 2017. This increase in area is due to high public interest because it is considered to have a promising market. The largest oil palm areas in Aceh are in the districts of East Aceh (23,479 ha), West Aceh (23,479 ha), and Aceh Tamiang (16,138 ha) [2]. The average area of oil palm in Aceh Province is 1.8 Ha [2]. This small landholding will affect the income and livelihood of farmers [3].

The palm oil commodity is considered profitable and easy to market, encouraging farmers to switch their existing commodities to palm oil. However, the expansion of smallholder oil palm plantations has constraints related to low quality and productivity [3]. This is due to the inefficient use of inputs such as the use of poor seedlings and the absence of proper plant care and maintenance in accordance with Good Agriculture Practice (GAP). In addition, environmental issues related to land clearing for oil palm plantations may still be carried out irresponsibly. These things are still not compatible with the sustainability agenda required by certification regimes.

The growing interest in planting oil palm was not accompanied by an increase in farmers' knowledge of sustainable oil palm cultivation. This is due to the lack of assistance and understanding of sustainable palm oil by farmers. Two issues that become the root of the main problems in the implementation of sustainable palm oil certification are the clarity of land status and seeds. This study aims to describe and analyze the existing conditions of land and oil palm seedlings in smallholder plantations in Aceh. This research contributes to the selection of appropriate strategies to accelerate the transition of traditional oil palm cultivation to a sustainable scheme for the welfare of farmers and to maintain environmental quality.

Either ISPO or RSPO is a challenge for palm oil sustainability schemes in Aceh. Business actors consider economic aspects more than social and environmental aspects. Compliance of independent

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smallholders with land status clarity remains a major obstacle. Accusations of land logging and deforestation are easily aimed at weakening the position of independent oil palm farmers. Land certificates, seeds, pesticide use, fertilization, and documentation are things that need to be supported in order to be included in the certification scheme [4]. Small-scale farmers also face the challenge of global market demand. In this case, the productivity and quality of smallholder production are sought to be stable and maximum to meet future demand [3]. One of the causes of low palm oil productivity is that the technology used is still very simple from nursery to harvesting. Therefore, it is necessary to identify the conditions of seedlings and land use related to the readiness of farmers to adopt sustainability certification.

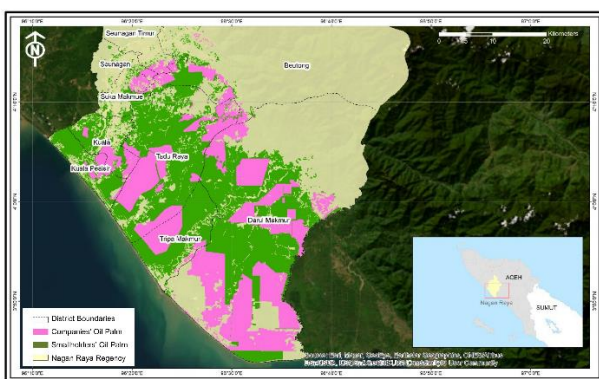
## 2 Method

This research was conducted in the four largest palm oil producing districts in Aceh Province, namely Aceh Barat Daya, Nagan Raya, Subulussalam, and Aceh Singkil. These four districts are also the districts with the largest oil palm in the Western part of Aceh. Purposive sampling was applied with a minimum number of 30 palm oil farmers in each regency. In this study, the total sample size is 172 respondents spread across the four districts with the following details:

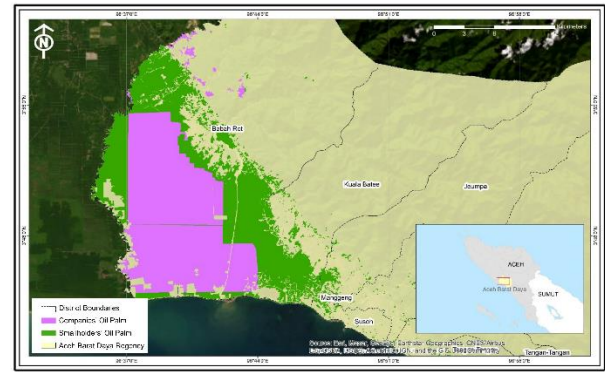
**Table 1.** Sampel Size.

Districts	Number of Farmers
Nagan Raya	41
Aceh Barat Daya	39
Subulussalam	34
Aceh Singkil	58
<b>Total</b>	<b>172</b>

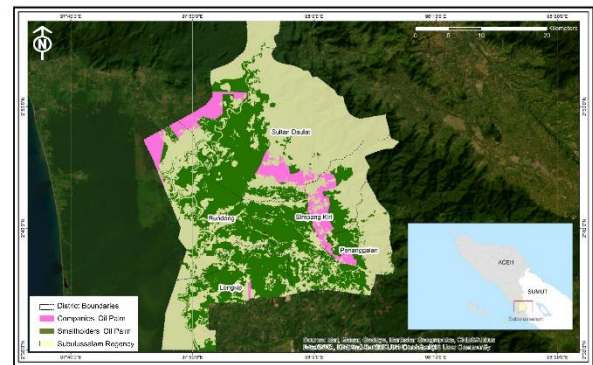
The research used structured questions/questionnaires and direct interviews with sample oil palm farmers. GPS tagging was also carried out to see the location points of respondents and farmers' oil palm plantations. The research location can be seen in the following figures



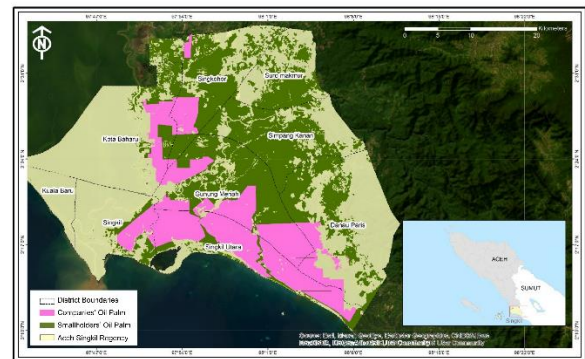
**Fig. 1.** Study Area in Nagan Raya



**Fig. 2.** Study Area in Aceh Barat Daya



**Fig. 3.** Study Area in Subulussalam



**Fig. 4.** Study Area in Aceh Singkil

According to the data, the majority of oil palm in Nagan Raya, Subulussalam, and Aceh Singkil is owned by smallholders. Meanwhile, estates in Aceh Barat Daya are dominated by private companies.

This research uses cross sectional studies to analyze data from a population at a single point in time. This method is useful for establishing preliminary evidence in planning a future advanced study. Descriptive cross-sectional studies simply characterize the condition of a specific population [5]. The descriptive data were analyzed by summarizing large amounts of information such as frequencies and percentages. The content of data is systematically analyzed, splitting it into meaningful pieces, and sorting those pieces in a way that allows the characteristics and meaning to be better understood [6].

### 3 Results and discussion

#### 3.1. Farmers' characteristics

The descriptive statistics of the respondents are illustrated in Table 2.

**Table 2.** Characteristics of the Respondents

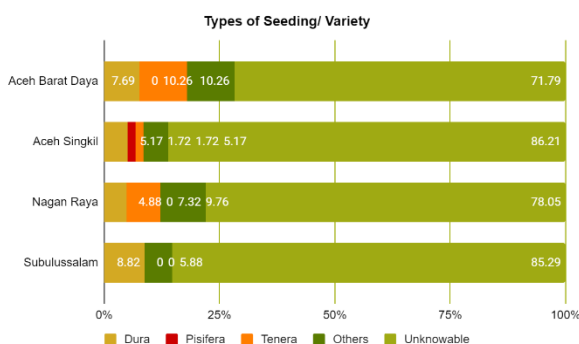
Districts	Gender (%)		Age	Experienc in Oil Palm
	Male	Female		
Aceh Barat Daya	100	0	47.59	11.36
Aceh Singkil	79.31	20.69	46.59	14.07
Nagan Raya	92.68	7.32	47.93	13.32
Subulussalam	88.24	11.76	45.32	14.94
<b>Total</b>	<b>88.95</b>	<b>11.05</b>	<b>46.88</b>	<b>13.45</b>

Most oil palm farmers are of productive age. At this age, farmers are still active in managing their oil palm estates both physically and mentally. Yet, there is a decreasing interest among young people to be involved in oil palm. Based on gender, oil palm farmers are dominated by males. Female oil palm farmers are normally inherited assets by their husbands and the management is handed over to other people. Women play a role in helping their husbands during the farming process such as fertilizing and harvesting. On average, farmers have been cultivating oil palms for 11-14 years, so they have sufficient experience in oil palm farming.

#### 3.2 Seeds

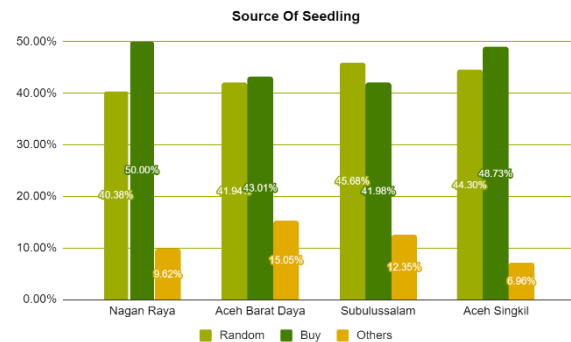
The use of good-quality seeds is very important for farmers' productivity and welfare [3]. However, based on the field survey data, it was found that farmers still have very little knowledge regarding quality seeds. Most farmers do not know the variety of seedlings used because many farmers still use random (*lelesan*) seedlings. Other farmers collected the fallen fruits from the company's plantation as seedlings.

The data in Figure 5 shows that 71 - 86% of farmers do not know for sure whether the varieties they use. A total of 4-8% of farmers use dura varieties while 5-10% use Tenera varieties. Only farmers in Aceh singkil use psifera. 5.17-10.26% of farmers use the *Marihat*, *Simalungun*, *Lonsum*, and *Socfindo* varieties.



**Fig. 5.** Types of Seedlings

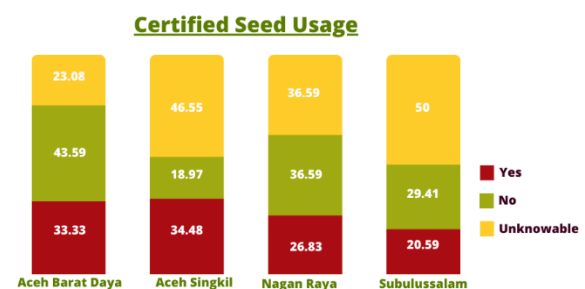
50% of farmers in Nagan Raya purchase their seed and Subulussalam farmers use the most random seeds among the four districts (45.68%). Asalan seedlings are seedlings that farmers make themselves and have no clear origin. A total of 6.96-15.05% of farmers received seeds from companies and assistance from the government. It is not uncommon for farmers to buy seeds at low prices but of poor quality. Sometimes the farmers collect hybrid seeds from the ground, and turn out to be unfruitful after four years because the seeds are sterile [7].



**Fig. 6.** Sources of Seedlings

The highest number of farmers using certified seeds was in Aceh Singkil District at 34.48% and Aceh Barat Daya at 33.33%. Farmers in Singkil and Aceh Barat Daya districts are starting to realize the importance of using certified seeds. Most farmers (23% - 50%) do not know whether the seeds they use are certified or not. This is due to a lack of understanding about certified seeds.

Farmers who use certified seed are mostly farmers who have large land areas and are aware of the importance of quality seedlings to produce high yields. The constraints in purchasing certified seed from PPKS felt by farmers are the long waiting period for orders. In addition, the number of seeds ordered must be in large quantities. The minimum seed order by farmers from PPKS Medan is 400 seeds and have to wait for several months. Therefore, an institution (local government) is needed that can provide seedlings according to the needs of farmers.



**Fig. 7.** Certified Seed Usage

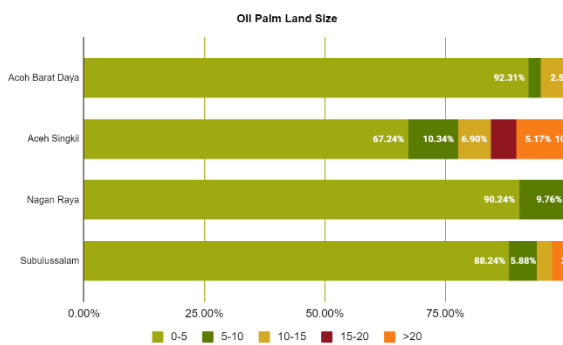
The percentage of farmers using certified seeds was highest in Aceh Singkil (34.48) and Aceh Barat Daya (33.33%) districts, and lowest in Subulussalam district (20.59). Many farmers do not know whether the seeds they use are certified or not. This is due to farmers' low knowledge of certified seeds. Farmers who use certified

seedlings are motivated to obtain good seedlings to obtain good Fresh Fruit Bunches (FFB) [8]. Some farmers who use certified seedlings are aware that non-certified seedlings will produce fruit with frequent and abundant growing seasons compared to certified ones.

Farmers' knowledge about certified seedlings will lead to positive perceptions. Farmers' motivation to use non-certified seedlings is due to their low price. Research conducted by [8] shows that price has a positive influence on farmers' decision to use certified seedlings. Information on the benefits of using certified seeds is more trusted by farmers if it comes from farmers and farmer groups that have used them. This is because farmers can obtain tangible evidence of the effect of using certified seeds on productivity. This is in accordance with [9] which states that the most effective information comes from personal sources. The standard of certified seedlings will be difficult for smallholders to meet shortly. It's because the age of the plants is currently at a productive age [10].

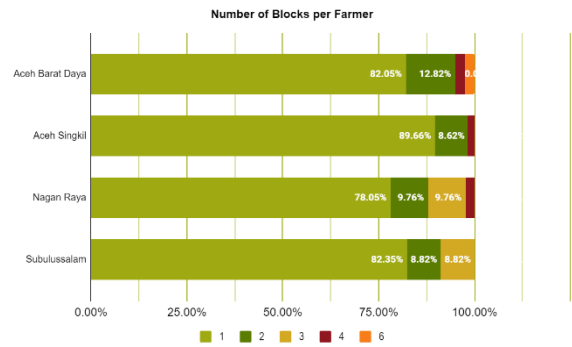
### 3.3 Land

The size of land owned by farmers varies between 0.5 to more than 20 Ha per farmer. On average, oil palm farmers in the four districts are entitled to less than 5 ha of land. Farmers with a land area of more than 20 ha are found in Aceh Singkil District at 5.17% and in Subulussalam at 2.94%. Oil palm farmers with access to capital can access more land while farmers with limited capital remain with limited land area and productivity [11].



**Fig. 8.** Oil Palm Land Size

The promising market has led palm oil farmers to increase their profits by expanding their plantations and accessing more land both within and outside the village and even in other districts. Some farmers have plots in two locations and even in six different locations.



**Fig. 9.** Number of Blocks per Farmer

Oil palm plantation development is only permitted on other use areas (APL) and conversion forests that are carried out in a planned and systematic manner [3]. Most of the land planted by oil palm farmers today was converted from forests and other crops such as rubber or paddy fields. The great prospect of oil palm has made farmers interested in cultivating this crop. 7-10% of the farmers changed their paddy crops to oil palm because irrigation water began to dry up. This happened because many farmers in the vicinity started planting oil palm, so the water supply began to be limited. In addition, the easier maintenance of oil palm plants compared to rice is also a factor in farmers converting to this crop. If this continues to happen, it will disrupt rice production. The government must implement policies so that the conversion from rice to palm oil can be controlled [12].

35-55% of the farmer convert their land from forest. In some cases, farmers convert production forests into oil palm plantations. Farmers do this because they do not know the status of the land beforehand. Spatial information is not accessible to farmers, so they do not know whether their farms are in accordance with the spatial plan [13]. Most smallholder oil palms were found in the production forest [14]. The percentage of production forest, limited production forest, and convertible production forest spatial patterns in the Existing Oil Palm Land can be seen in the table below.

**Table 3.** Production forest, limited production forest, and convertible production forest spatial patterns in the existing oil palm land

Districts	Pola Ruang		
	Production Forest (ha)	Limited Production Forest (ha)	Convertible Production Forest (ha)
Nagan Raya	152.64 (0.14%)	30.71 (0.03%)	-
Aceh Barat Daya	-	-	-
Subulussalam	29.34 (0.82%)	-	452.45 (1.10%)
Aceh Singkil	296,31 (0.40%)	-	-

Source: Satellite image interpretation data

Data in the Table was the overlay of spatial planning policy (RTRW) and the smallholder oil palm map. From the data, Subulussalam has the highest

percentage of oil palm land in production forest 0.82%, and conversion production forest 1.10% compared to the other three districts. Local community lands are often incorrectly categorized as part of the forest estate. Farmers whose land is located in an illegal area cannot obtain a cultivation registration letter. This will be an obstacle in the process of document legality [15].

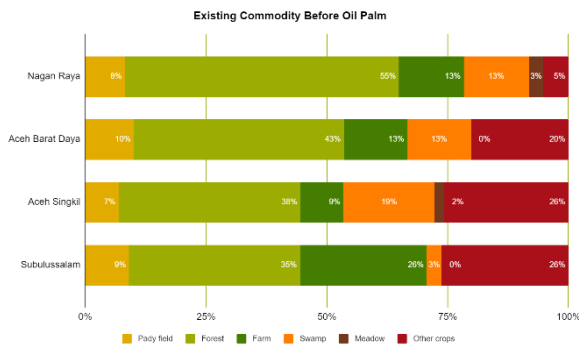


Fig. 10. Existing commodity before oil palm

Most of the land clearing for oil palm is done by manual logging (45-53%). Farmers use both non-family and family labor in the manual logging process. This land clearing normally takes longer periods due to limited resources and capital. 6-15% of farmers also still use burning when clearing land because it is cheaper and more effective [16], [17]. Land clearing by burning can be changed by using disincentives or coercion by the government [18]. Only 3-8% number of farmers use excavators in land clearing especially the one with sufficient capital and larger size of land.

Land clearing has not been implemented properly by farmers due to various factors, one of which is farmers' lack of awareness of the prohibition of burning, lack of information about land clearing regulations by the government, inadequate technology, and low economy [13], [19].

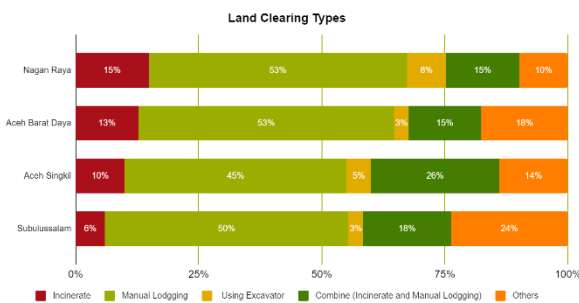


Fig. 11. Land Clearing Types

Conformity of land concessions with spatial plans will provide legal certainty in terms of ownership or control and management of areas used as plantation businesses [20][15]. Most farmers' land certificates are in the form of Certificates of Ownership (SHM) and SKT as well as other types of land certificates. SHM has the most benefits for the owner. SKT does not show strong ownership and is easy to cancel [21]. Farmers with the highest SHM ownership are in Nagan Raya

district at 56.10% while the lowest is Southwest Aceh at 38.46%. Enhancing smallholder farmers' land certificates will be effective through institutional approaches (farmer groups).

#### Type of Legal Certificate on Land

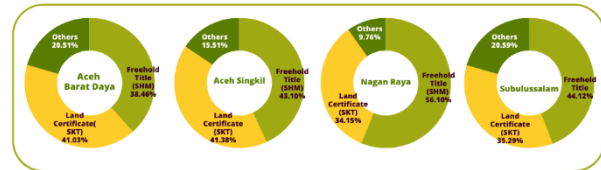


Fig. 12. Type of Legal Certificate on Land

Independent smallholders have limited formal recognition of land tenure through land certificates and the ownership of the land is not harmonized with official spatial plans. This is the most difficult to comply without support [15][22]. So it is necessary to provide assistance to farmers in order to overcome problems and land legality.

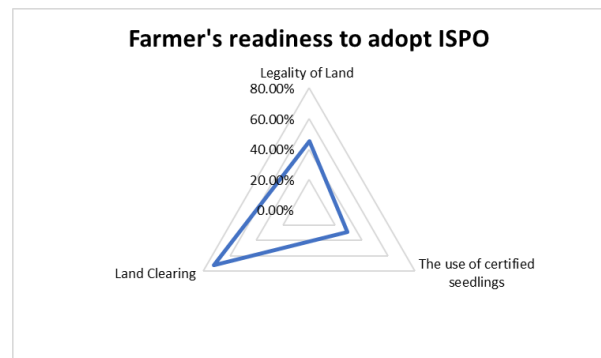


Fig. 13. Farmer's readiness to adopt ISPO

Fig. 13 shows the farmer's readiness to adopt ISPO based on land and seed criteria. The method of land clearing carried out by farmers is 72% compliant. Meanwhile, land legality is 45.35% and still needs to be improved through the Complete Systematic Land Registration (PTSL) program conducted by the land office in each district. The use of certified seeds is still very low at 28.81%. Therefore, there is a need for socialization to farmers regarding certified seeds. In addition, it is expected that through the People's Palm Oil Rejuvenation (PSR) program, the use of certified seeds will increase in the future.

The three indicators above are only a small part of the principles and criteria for sustainability certification. There are still many indicators that must receive attention so that the ISPO mandatory can be implemented in smallholders.

## 4 Conclusion and Recommendation

The number of farmers who use indigenous seeds in the four districts is still high. The highest number of farmers using certified seeds was in Aceh Singkil District, with 34.48%. When viewed from the land area, farmers in Aceh Singkil also have a larger land area. Farmers with access to capital can access land as well as quality

seeds. Farmers with capital and knowledge will purchase certified seeds to ensure high FFB yields.

For land legality, Nagan Raya has the largest number of famers with SHM ownership at 56.10% and the lowest is Aceh Barat Daya District at 38.46%. Therefore, the Land Office of each District needs to encourage the acceleration of land legality by involving farmer groups or working with plantation companies.

This study found that the clarity on land and seed still become the main problems in adopting sustainability schemes. One way to accelerate sustainable oil palm practices regarding land and seeds is to better understand the oil palm agroecosystem and test sustainability strategies. Land expansion and management can be achieved by encouraging the use of degraded and abandoned land for oil palm agriculture. To achieve sustainable land management methods, strong land-use planning and zoning restrictions should be implemented. Encouraging the use of high-yielding, disease-resistant oil palm seedlings that have been certified is another way to do this. Farmers should be given training and technical help in sustainable oil palm farming practices and financial incentives provision and support to farmers who adopt sustainable practices are important.

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