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Do Sustainability Standards Provide Environmental, Social, and Economic Benefits for Independent Oil Palm Smallholders?

Apakah Standar Keberlanjutan Memberikan Manfaat Lingkungan, Sosial dan Ekonomi bagi Petani Kelapa Sawit Mandiri?

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ABSTRACT

There is much inconclusive and unclear literature on understanding the benefits of environmental, social, and economic for the sustainability standards compliance of smallholders. The study aims to build a simultaneous relationship of the sustainable standard in the context of Indonesian Sustainable Palm Oil toward the benefit of sustainable dimensions using the concept of sustainable development, incentive theory, and the concept of agricultural extension of 150 independent smallholders. The results prove that farmers' organization is the most significant, followed by management of environmental monitoring and sustainable business development. However, legal is insignificant because of thought of as a nice to have. There is limited involvement in practical communities' instruments so agricultural extension becomes an effort to reconstruct thoughts and actions to promote sustainability, especially social sustainability. Most indicators of sustainable standards toward the benefit of sustainable dimensions indicators are poor, except for fire prevention and control which had a moderately positive effect on the conservation of biodiversity. Thus, an integrated approach to area-based risks management, local institutions with religious and traditional leaders, Community-Based-Fire-Management, conservation area buffer zone, public-private partnerships, enabling conditions to access finance, and resource distribution with budgets and geographic proximity can be an effort to encourage compliance with sustainable standards.

Keywords: *Economic benefits, environmental benefits, independent oil palm smallholders, social benefits, sustainable oil palm standards*

ABSTRAK

Pemahaman atas manfaat standar keberlanjutan terhadap lingkungan, sosial, dan ekonomi bagi petani sawit swadaya dirasakan masih kurang jelas dalam kebanyakan literatur. Tujuan penelitian membangun hubungan simultan standar berkelanjutan menuju manfaat dimensi berkelanjutan dengan mengkolaborasikan standar Minyak Sawit Berkelanjutan Indonesia dengan konsep pembangunan berkelanjutan, teori insentif, dan konsep penyuluhan pertanian terhadap 150 petani sawit swadaya. Hasil penelitian membuktikan bahwa organisasi petani sawit swadaya adalah paling signifikan, diikuti oleh pengelolaan pemantauan lingkungan dan pengelolan usaha berkelanjutan. Namun, legalitas tidak signifikan karena bukan menjadi kebutuhan petani. Selain itu, keterlibatan instrumen komunitas masih terbatas sehingga konsep penyuluhan pertanian menjadi upaya merekonstruksi pemikiran dan tindakan untuk promosi keberlanjutan, khususnya keberlanjutan sosial. Sementara itu, sebagian besar indikator standar keberlanjutan terhadap manfaat indikator dimensi berkelanjutan adalah lemah, kecuali pencegahan dan pengendalian kebakaran yang memiliki efek cukup positif terhadap konservasi keanekaragaman hayati. Oleh sebab itu, pendekatan terpadu manajemen risiko berbasis kawasan, lembaga lokal dengan pemimpin agama dan adat, Manajemen Kebakaran Berbasis Masyarakat, zona penyangga kawasan konservasi, kemitraan publik-swasta, menciptakan kondisi yang memungkinkan untuk mengakses keuangan, dan sumberdaya distribusi anggaran dan kedekatan geografis dapat menjadi upaya mendorong kepatuhan terhadap standar keberkelanjutan yang ada.

Kata kunci: Manfaat ekonomi, manfaat lingkungan, manfaat sosial, petani sawit mandiri, standar kelapa sawit berkelanjutan

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INTRODUCTION

Independent smallholders are becoming increasingly dominant producers and critical players in the oil palm industry. In Indonesia, smallholders are estimated to manage 6.04 million hectares or 41 percent (Statista-Research-Department, 2021a) of 14.6 million hectares of total oil palm plantations (Statista-Research-Department, 2021b), and predicted to manage 60 percent of the total area of oil palm plantation by 2030 (Suhada et al., 2018a).

However, independent oil palm smallholders are vulnerable to exploitation (Jelsma et al., 2017). Independent oil palm smallholders have typical characteristics, such as uniform profiles and patterns structure (Didiet, 2021), poor financial circumstances (Jelsma et al., 2017), lower productivity (Daemeter Consulting, 2015), depending on powerful actors for information of good agricultural practice (INOBU, 2016; Bennett et al., 2019; Karji et al., 2020), and complicated traceability of supply chain (INOBU, 2016). In addition, they are identified as actors in the clearing of forests and peatlands that lead to substantial biodiversity loss, gas emissions, smoke, and hazards (Bakhtary et al., 2021).

This is exacerbated by weak governance and private sustainability efforts (Suhada et al., 2018). Independent smallholders are not linked to certain mills (Dharmawan et al., 2021), except those who are members of farmer groups. There is little training and supervision support from companies or the government (Apriani et al., 2020). Thus, independent smallholders have limited information on good agricultural practices that lead to low productivity and low concern with sustainability (Suhada et al., 2018b).

While the past decades emerged the necessity for sustainable oil palm production, sustainable development with resource allocation of farmers and support of governments and public-private partnerships will drive long-term value creation (Evans et al., 2017; Piñeiro et al., 2021). An integrated goal of environmental conservation, economic profitability, and social equity (Raharja et al., 2020, Uning et al., 2020) contribute to the transparency and credibility (Hidayat et al., 2018), ecosystem service mapping, and good management practices (Khatun et al., 2017).

Furthermore, much inconclusive and unclear literature in an understanding of adoption incentives lead to change in outcomes around sustainability efforts (Piñeiro et al., 2021). Sustainability efforts need to be inclusive (Brandi, 2020), action-oriented, collaborative, and adapt to different levels of development (Melo, 2018) to reduce inequality, strengthen economic governance (Mishra, 2020), and respond to market-driven (Molenaar et al., 2015), which include health concern, food security, social and environmental issues (Slamet et al., 2020), and economic impacts (Ceschin & Gaziulusoy, 2016).

Therefore, the paper tried to build a simultaneous relationship of the sustainable standard toward the benefit of sustainable dimensions by collaborating the Indonesian Sustainable Palm Oil standard (Kementan, 2020), the three dimensions of sustainable development (Seidler and Bawa, 2016), the concept of agricultural extension, and the incentive theory (Logan, 1968). The sustainable concept can be trusted to build certain behavior of independent smallholders in a global chain (Zeweld et al., 2017; Gardner et al., 2019; Liverpool-Tasie et al., 2020; Nashr et al., 2021), to encourage sustainable standard compliance (Khatun et al., 2017b; Nurliza et al., 2018; Voora et al., 2019; Apriani et al., 2020a). An effective sustainability visions are characterized by future orientation and the ability to inspire stakeholder satisfaction (Kantabutra, 2020).

In addition, we used concept of agricultural extension to reconstruct the human thinking and actions for a higher level of competence among the farmers and to promote and achieve social sustainability (Mehan, 2017; Mensah, 2019). The extension concept is used for transition to sustainable agriculture within sensitization and attitude in society because of a lot of differences in its effectiveness (Karim, 2018). Many extension activities do not promote sustainability (Rezaei-Moghaddam & Karami, 2008) and need indigenous knowledge (Senanayake, 2006). Besides, income per capita increases more rapidly but the employment in agriculture decreases (Felipe et al., 2014), age distribution changes among farmers (Guo et al., 2015), the demand for high value agricultural products increases (Samson et al., 2021), and there are issues of climate change, land degradation, deforestation, loss of biodiversity, natural habitat fragmentation, poverty and geographic isolation (Nurliza et al., 2022).

In the meantime, ISPO criteria have strong and clear requirements (Yaap & Paoli, 2014), in line with economic, social, and environmental dimensions. In addition, the criteria are under 12 of the 17 sustainable goals/SDGs (i.e. Compliance with laws and regulations, good plantation practices, management of environmental and natural resources) (Efeca, 2020). Then, incentive theory as one of the behavioral sciences provides competing options for effective interventions (Roy et al., 2021),

meaning it gives temporary compliance and alters the attitudes that underlie the behaviors (Underhill, 2019). The incentive theory is also used to create an enduring commitment (Arsalidou, 2016) since changes are essential aspects (Logan, 1968) that play an effective direct role in controlling an individual's responses (Anselme & Robinson, 2019), or receiving reward value for the performance (Lagarde & Blaauw, 2021).

Therefore, the hypotheses are proposed as follows:

H1: Legal significantly improves the benefit of sustainable dimensions (i.e. Environmental, social, and economic).

H2: Farmers' organizations significantly improve the benefits of sustainable dimensions (i.e. Environmental, social, and economic).

H3: Management & environmental monitoring and sustainable business development significantly improve the benefits of sustainable dimensions (i.e. Environmental, social, and economic).

METHOD

The research was conducted in three districts (Sambas, Kubu Raya, Landak are 82,620 Ha) in 2021 with an associative method. These are located in one of the provinces with the largest population of independent oil palm smallholders in Indonesia (Nurliza et al., 2018; Nurliza, 2020). Purposive sampling as a valid non-random method of 150 independent oil palm smallholders was used to provide reliable and robust data with questionnaires (Tongco, 2007; Ames et al., 2019).

The study used a collaborating paradigm of ISPO standard (Kementan, 2020) in three dimensions: sustainable development (Seidler and Bawa, 2016), theoretical basis of agricultural extension, and incentive theory (Logan, 1968). The sustainable concept is trusted to encourage sustainable standard compliance (Khatun et al., 2017b; Nurliza et al., 2018; Voora et al., 2019; Apriani et al., 2020a), while theoretical basis of agricultural extension is used to reconstruct the human thinking and actions at community for the sustainability promotion (Mensah, 2019), and to achieve social sustainability (Mehan, 2017).

Thus, the purposes of the research were systematically carried out through three steps. First, identifying the characteristics of independent oil palm smallholders (i.e. Age, education of household head, land tenure, family members, farm experiences, number of oil palm trees, age of the palm oil, and monthly yields) using descriptive quantitative for generalizability of results (Salkind, 2008). Second, identifying perceived sustainable standard and perceived benefits of social dimensions using 5-degree of a semantic differential scale (least = 1 and most = 5 at opposite buttons) to get orderings of the most in predetermined contexts (Takahashi et al., 2016; Rosenberg et al., 2018).

The perceived sustainable standard consists of legal, farmers' organization, management and environmental monitoring, and sustainable business development of oil palm production (Efeca, 2020; Kementan, 2020). Legal consists of land ownership and registration certificate of cultivation. Farmers' organizations consist of farmer groups and cooperatives, land disputes and compensation also other disputes, relevant information, land clearings, seed, cultivation on mineral soil, cultivation on peatland, and nurture. Management and environmental monitoring, and sustainable business development consist of permit of environmental, requirements and obligations, application notes, fire prevention and control, conservation of biodiversity. While perceived benefits of the sustainable dimension consist of environmental benefits, social benefits, and economic benefits, Environmental benefits consist of biodiversity conservation, environmental degradation, soil health, and water conservation. Social benefits consist of harmony of social life, needs' fulfillment, prosperity level, social interaction, and management ability. Economic benefits consist of an increase in FFB and capital access.

Third, building a simultaneous relationship of the sustainable standard (i.e. Legal, farmers' organization, management and environmental monitoring, and sustainable business development) (Kementan, 2020; Efeca, 2020) toward the benefit of sustainable dimensions (i.e. Environmental, social, and economic) (Seidler and Bawa, 2016) using Structural Equation Modelling/SEM (Narimawati & Sarwono, 2017) with Lisrel for an acceptable solution (Holbert & Stephenson, 2002; Karakaya-Ozyer & Aksu-Dunya, 2018). In SEM, we used a 5-degree semantic differential scale (least = 1 and most = 5 at opposite buttons) to get orderings of the most predetermined contexts (Takahashi et al., 2016; Rosenberg et al., 2018). Meanwhile, the relationship strength of the model is shown through the value of the correlation coefficient or effect size that varies between +1 and -1 (Cohen,

1988; Ratner, 2009). We checked the consistency of measurement using reliability/CR (CR≥0.7) and discriminant validity using variance extracted/VE (VE>0.50) (Sideridis et al., 2018). Then, respecification was conducted for model output that does not meet the requirements using the goodness of fit (Hooper et al., 2008).

RESULTS AND DISCUSSION

Characteristics of Independent Oil Palm Smallholders

The characteristics of independent oil palm smallholders consist of age, education of household head, family members, farm experiences, land tenure, number of oil palm trees, age of the palm oil, and yields as described in Figure 1.

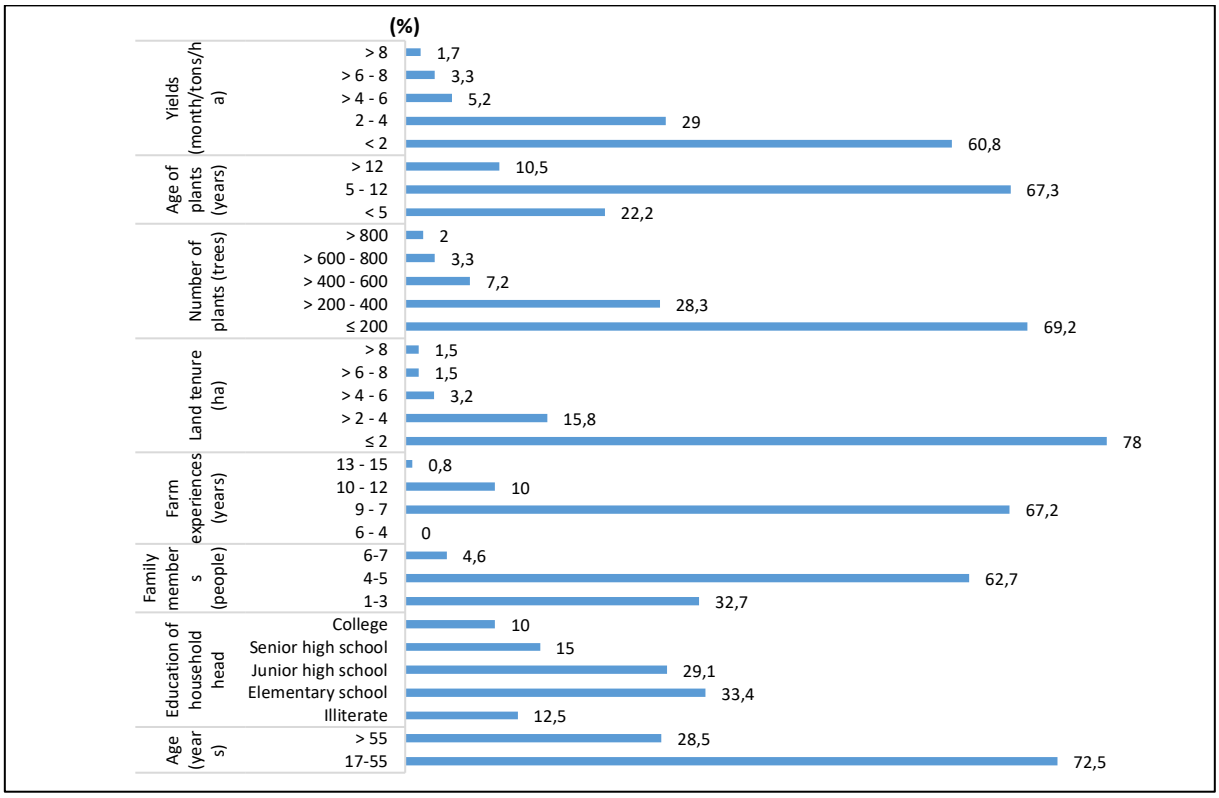


Figure 1. Characteristics of Independent Oil Palm Smallholder's Benefits

Source: Own Data, 2021

Figure 1 shows that most of the independent oil palm smallholders were 17-55 years old, the elementary school of education, 2-4 hectares of land tenure, 4-5 family members, 7-9 years of farm experience with less than 200 trees and 4-5 years of plant ages, while their yield was less than 2 months/tons/ha. Age and education influenced farmers to adopt technologies, risk management (Brown et al., 2019), and farm productivity (Paltasingh & Goyari, 2018). Land tenure affected property rights on agricultural productivity (Shimelles et al., 2009) and sustainable agricultural development (Akram et al., 2019). Family members gave incremental effects of family labor if only there was a family involvement (Kostov et al., 2018). Knowledge level affected the effectiveness of smallholders' activity (Jorgi et al., 2019), and farm experience impacted the perception orient of adaptation (Karki et al., 2020). However, the assessment of land use showed that oil palm was more profitable than paddy (Purba et al., 2020).

Perceived Sustainable Standard and Perceived Benefits of Sustainable Dimensions

The perceived sustainable standard consists of legal, farmers' organization, management and environmental monitoring, and sustainable business development of oil palm production, while

perceived benefits of the sustainable dimension consist of environmental benefits, social benefits, and economic benefits as described in Figure 2.

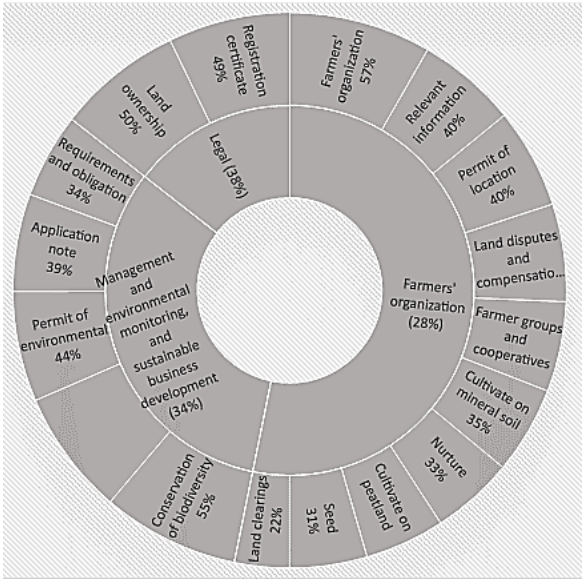


Figure 2. The Perceived Sustainable Standard
Source: Own Data, 2021

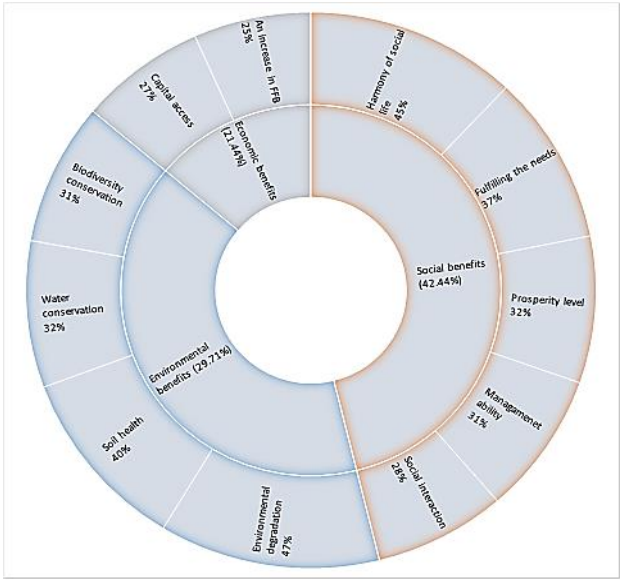


Figure 3. The perceived benefits of sustainable dimensions
Source: Own Data, 2021

Figure 2 shows that the most perceived independent oil palm smallholders are legal, followed by management and environmental monitoring, and sustainable business development of oil palm production, and farmers' organizations'. The most perceived legal is the land ownership, followed by registration certificate of cultivation. Legal is a norm of conduct for social change (Licht, 2008) and social inclusion (Medda-Windischer, 2002), and the land ownership generates changes in production systems, such as efficiency, environmental consequences, socio-economics' effect, and cultural conditions (Burja et al., 2020). The most perceived farmers' organizations are farmers' organizations', followed by permit of location, relevant information, land disputes and compensation also other disputes, farmer groups and cooperatives, cultivation on mineral soil, nurture, cultivation on peatland, seed, and land clearings. The most perceived management and environmental monitoring, and sustainable business development is conservation of biodiversity, followed by fire prevention and control, permit of environmental, application note, and requirements and obligation.

Figure 3 shows that the most perceived benefits of the sustainable dimensions are social, followed by environmental, and economic. The most perceived social benefit is the harmony of social life, followed by fulfilling the needs, prosperity level, management ability, and social interaction. The most perceived environmental benefit is environmental degradation, followed by soil health, water conservation, and biodiversity conservation. The most perceived environmental benefit is capital access followed by an increase in FFB.

Social benefit is important in inclusion and equality, equity and cohesion, resilience, culture (Andreoni & Miola, 2016; Huq & Stevenson, 2020), public involvement, risk of production (Eizenberg & Jabareen, 2017), and quality of oil palm production (Pacheco et al., 2017), although suffered from polarization (Mehdi & Siddiqui, 2020). A harmony in social life, however, provides an understanding of social stability and social interaction (Andreoni & Miola, 2016), and it leads to collective action for sustainable competitiveness (ILO, 2009).

The Sustainable Standard Toward the Benefit of Sustainable Dimensions

Table 1 described that the data is reliable (CR≥0.7) and valid (variance extracted/VE >0.50).

Table 1. Construct Reliability (CR) and Variance Extracted (VE)

Criteria	The benefit of sustainable dimensions	Legal	Management of environmental monitoring and sustainable business development	Farmers' organizations'
Std. loading factor of VE	1.14	0.49	1.12	0.65
Errors of VE	1.03	0.48	0.06	0.58
VE	0.41	0.48	0.85	0.45
Overall VE			> 0.50	
Std. loading factor of CR	1.98	1.03	1.15	1.05
Errors of CR	1.33	0.64	0.21	0.63
CR	0.54	0.65	0.79	0.58
Overall CR			≥ 0.70	

Note: Accepted if CR ≥ 0.7 and VE > 0.50; **Source:** Own Data, 2021

Meanwhile, the Goodness of Fit (GOF) test results are good fit in NCP, SNCP, RMSEA, ECVI, PGFI, and RMR, or model is suitable for problem analysis (Table 2).

Table 2. The Goodness of Fit

GOF Criteria	GOF Standard Value	Estimate	Conclusion
Chi-square (χ^2)	$\rho \geq 0.05$	0.06	good
$\chi^2/_{DF}$	$1.0 \geq x \leq 5.0$	2.152	good
NCP	Small value with narrow intervals	396.58 (321.98 ; 478.93)	good
SNCP (NCP/n)	Small value	2.643	good
RMSEA	≤ 0.08	0.088	good
ECVI	Small value and close to Saturated ECVI	M= 5.80; S= 5.45; I= 21.86	good
PGFI	0 - 1	0.63	good
RMR	≤ 0.05	0.045	good

Source: Own Data, 2021

The covariance matrix of latent variables (sustainable standards and the benefits of sustainable dimensions) is positive and asymptotically robust, meaning that independent data and dependent data tend to change simultaneously in the same direction. An increase in one value will increase in another value, but the magnitude of the covariance is not easy to interpret due to not being normalized, and it depends on the magnitudes of the variables (Figure 4 and Figure 5 in Appendix).

The finding of a simultaneous model of the sustainable standard toward the benefit of sustainable dimensions consist of the structural equation model and measurement equation model. In the structural model, each hypothesis of farmers' organizations' (H_2) and management of environmental monitoring and sustainable business development (H_3) are statistically significant to improve the benefit of sustainable dimensions (i.e. Environmental, social, and economic), but legal (H_1) is statistically insignificant (Table 3).

Table 3. The Structural Model

Hypothesis	Sustainable standard toward the benefit of sustainable dimensions (i.e., Environmental, social, and economic)	Coeff. estimate	Statistically results
H_1	Legal	0.016 (0.14) [0.15]	Insignificant
H_2	Management of environmental monitoring and sustainable business development	0.27 (0.18) [1.52]	**Significant**
H_3	Farmers' organizations'	**0.51** **(0.16)** **[3.22]**	**Significant**

Note: ( ) indicate standard error and [ ] indicate standard deviation. **Source**: Own Data, 2021

In SEM, an observed variable explained 54% of the total variation of the benefits of sustainable dimensions. The coefficient value represents the mean change in the response (i.e. Environmental, social, and economic) given by a one-unit change in the predictor (i.e. Legal, management of environmental monitoring and sustainable business development, and farmers' organization). Table 3 shows that the most significant coefficient value is farmers' organization, followed by management of environmental monitoring and sustainable business development. The mean change of the benefit of sustainable dimensions (i.e. Environmental, social, and economic) value increases by 0.51 for every unit change in the farmers' organization, while the mean of the benefit of sustainable dimensions (i.e. Environmental, social, and economic) value increases by 0.27 for every unit change in management of environmental monitoring and sustainable business development.

Farmer's organizations are an essential basis for agriculture in rural development (Bizikova et al., 2020). It is a vehicle to gain sustainable economic benefits (Tolno et al., 2015), such as agricultural inputs, credit, technical knowledge, and marketing (Pelimina & Justin, 2015; Kahan, 2016). Farmers' organization membership focus also influences their role in extension and advisory services (Bingen & Simpson, 2015), while legal is insignificant because of limited involvement in practical instruments of communities (Lee, 2018), and is commonly thought of as a nice to have rather than a need to have (Lassiter, 2020).

The unobserved variables/latent constructs (the benefits of sustainable dimensions and sustainable standards) are estimated through the observed variables/their indicators as described in Table 6. Table 6 shows that the most indicators of the benefits of sustainable dimensions are environmental degradation in environmental benefits, a harmony of social life in social benefits, and capital access in economic benefits. Environmental degradation is a driver and consequence of disasters since it grows interest in adaptation to climate change (UNISDR, 2008). Harmony of social life is relatively important for being truly social because lack of social harmony represents a key factor of instability (Faily, 2016). On the other hand, capital access in the economic space points a certain capital (Butkova, 2020).

While the most indicators of sustainable standards are conservation of biodiversity in management of environmental monitoring and sustainable business development, and relevant information in farmers' organizations', conservation of biodiversity is a critical targets issue (Addison et al., 2020), and relevant information is a key to assure and create supply chain components of oil palm production (Giagnocavo et al., 2017).

Furthermore, Figure 4 described the relationship strength of the benefit of sustainable dimensions indicator toward the sustainable standard.

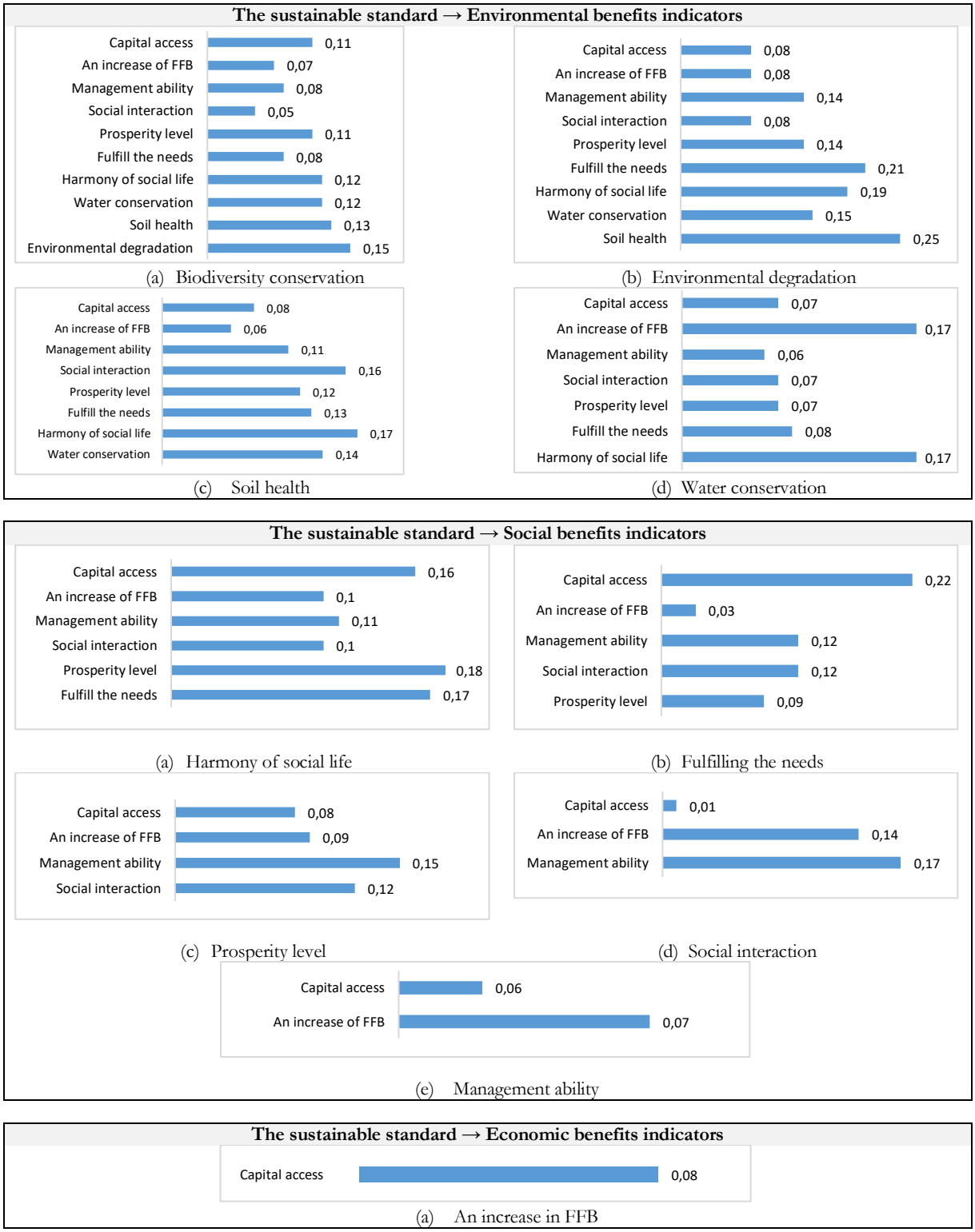


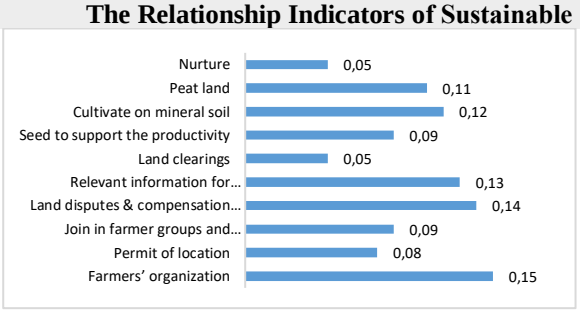
Figure 4. The Relationship Strength of The Benefit of Sustainable Dimensions Indicator Toward The Sustainable Standard
Source: Own Data, 2021

Figure 4 shows that all indicators of the sustainable standard toward the benefit of sustainable dimensions indicators are poor in relationships. Environmental benefits show that biodiversity conservation, environmental degradation, soil health, and water conservation of environmental benefits are poor in relationships. It is due to poor enforcement mechanisms and monitoring (Carlson

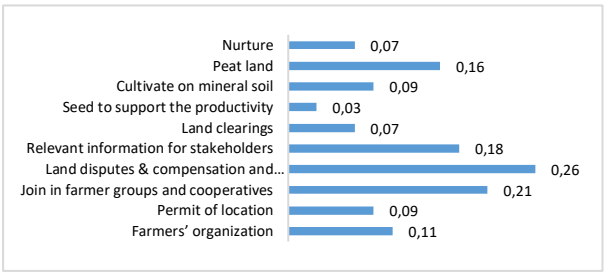
et al., 2018). Social benefits show that the harmony of social life, fulfilling the needs, prosperity level, social interaction, and management ability are poor in relationships though the most perceived benefits of the sustainable dimensions (Figure 3). This is due to the poor capacity building of the community (Pasaribu et al., 2020). Economic benefits show that an increase of FFB is poor in relationships. It is poor due to the high cost of the certification process (Levin, 2012). Thus, the government, smallholders, and private stakeholders need to be integrated and have the same goals. The government can use an integrated approach for area-based risk management to integrate collective action, risk assurance, and inclusive value chains (Bush et al., 2019).

Meanwhile, all indicators of the sustainable standard toward all indicators of the benefit of sustainable dimensions are poor in relationships as described in Figure 5.

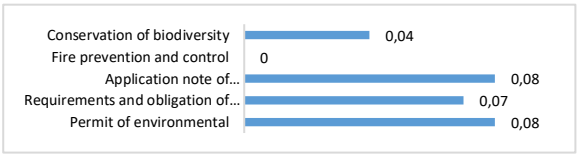
The Relationship Indicators of Sustainable Standard → Indicator of Environmental Benefits



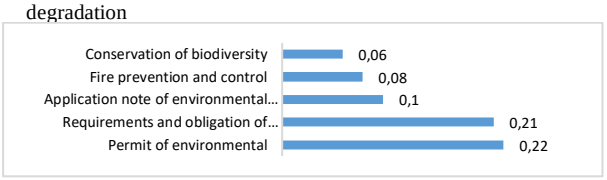
(a) Indicator of farmers' organizations' → Indicators of biodiversity conservation



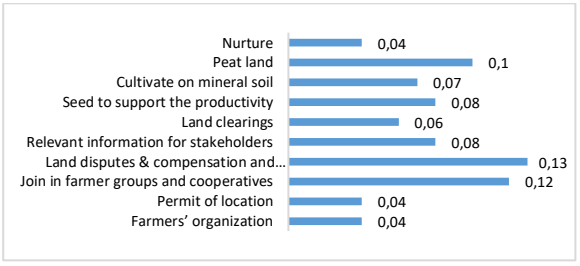
(b) Indicator of farmers' organizations' → Indicators of environmental degradation



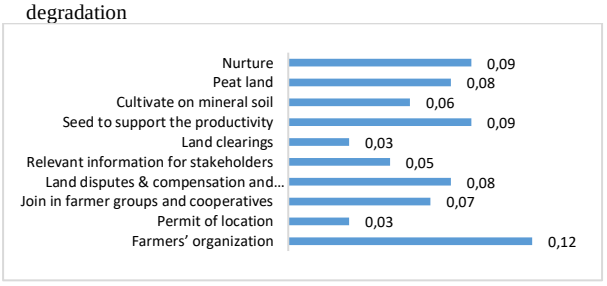
(c) Indicator of management of environmental monitoring and sustainable business development → Indicators of biodiversity conservation



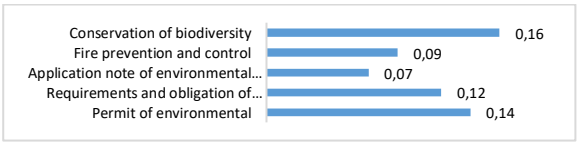
(d) Indicator of management of environmental monitoring and sustainable business development → Indicators of environmental degradation



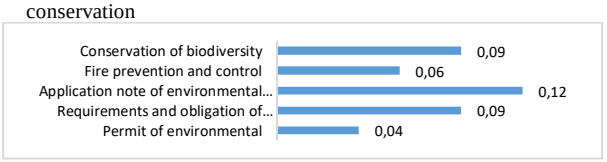
(e) Indicator of farmers' organizations' → Indicators of soil health



(f) Indicator of farmers' organizations' → Indicators of water conservation

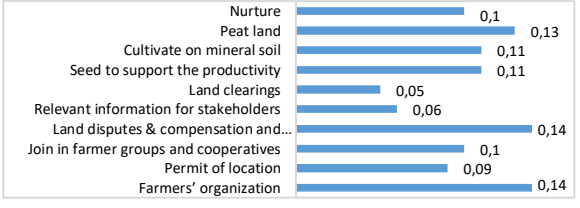


(g) Indicator of management of environmental monitoring and sustainable business development → Indicators of soil health

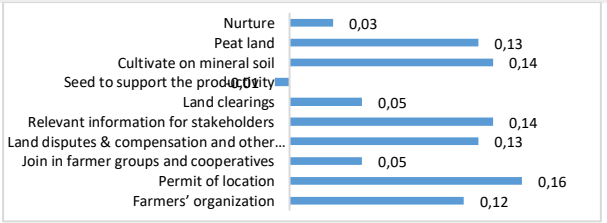


(h) Indicator of management of environmental monitoring and sustainable business development → Indicators of water conservation

The Relationship Indicators of Sustainable Standard → Indicator of Social Benefits



(a) Indicator of farmers' organizations' → Indicators of harmony of social life



(b) Indicator of farmers' organizations' → Indicators of fulfilling the needs

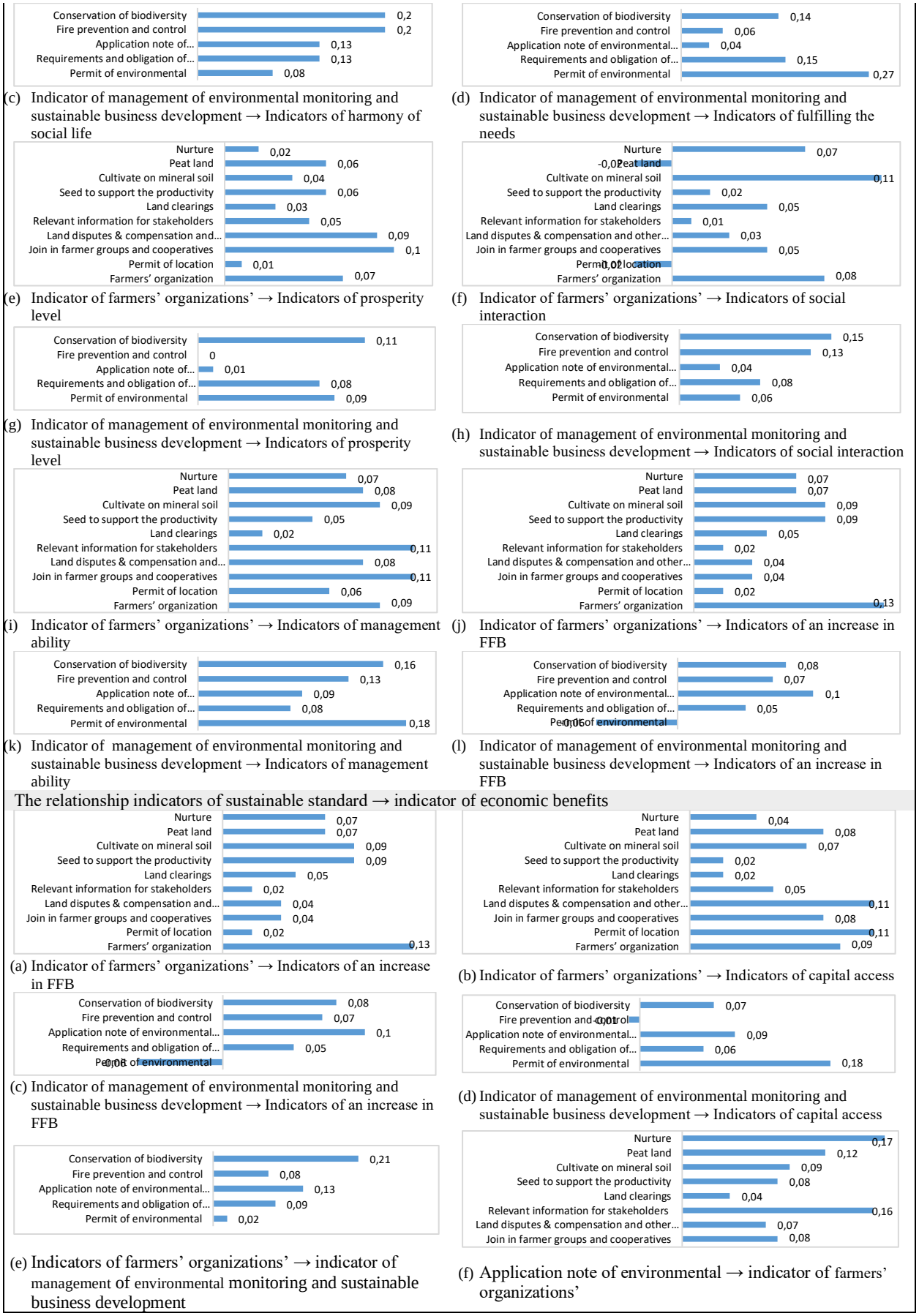


Figure 5. The Relationship Strength of The Indicator of Sustainable Standard Toward The Benefit of Sustainable Dimensions Indicators
Source: Own Data, 2021

Figure 5 shows that the relationship indicators of each environmental benefits, social benefits, and economic benefits toward indicators of the sustainable standard are poor in the relationship. The relationship indicators of environmental benefits toward indicators of the sustainable standard are poor due to different elements value concepts in a conservation area (Yaap & Paoli, 2014), while the relationship indicators of social benefits toward indicators of the sustainable standard are poor due to social conflicts, unresolved land disputes, gaps in the credibility of governance (Rival, 2018). The relationship indicators of economic benefits toward indicators of sustainable standards, due to unequal allocation and access to resources, have poor accountability (Rival, 2018), limited involvement in agricultural technology development and productive partnerships (AMAF, 2017), and ineffective risk management (Adnan et al., 2020).

However, fire prevention and control have a moderately positive effect on the conservation of biodiversity. It is due to climate changes and hydrology (Berry et al., 2018), direct risk on biodiversity, economic growth, and poverty reduction (Otero et al., 2020). In addition, these findings are in line with perceived independent oil palm smallholders and the most indicator of sustainable standards (Figure 2 and Table 4). Fire prevention and control, however, have a poor positive effect on farmers' organizations' because of the absence of community-based fire management (Svotwa et al., 2007).

Therefore, there are some efforts to encourage compliance with sustainable standards in facing the challenges. Community-Based Fire Management is a way for fire prevention and control (Goedde, 2016). Social conflicts and land disputes are resolved through local and traditional institutions with religious and traditional leaders (Afrizal & Berenschot, 2020). Conservation Area Buffer Zone is for ecological, social, and economic benefits (Nadhira & Basuni, 2021), and public-private partnerships for agricultural technology development (Mangeni, 2019). Access to financial institutions is resolved by creating conditions for independent smallholders from all branches of the financial industry (SIIA, 2018). Unequal allocation and access to resources are resolved by resource distribution with budgets and geographic proximity (Ledford & Lynch, 2019).

CONCLUSION

Most characteristics of the independent oil palm smallholders were 17-55 years old, of elementary school education, having 2-4 hectares of land tenure, consisting of 4-5 family members, having 7-9 years of farm experience with less than 200 trees and 4-5 years of plant ages, while their yield was less than 2 months/tons/ha. The most sustainable oil palm standards toward the benefits of sustainable dimensions are farmers' organization, followed by management of environmental monitoring and sustainable business development. The environmental degradation in environmental benefits, a harmony of social life in social benefits, and capital access in economic benefits are the most indicators of the benefits of sustainable dimensions. The most indicators of sustainable standards are biodiversity conservation in management of environmental monitoring and sustainable business development, and relevant information in farmers' organizations.

Furthermore, all indicators of the sustainable standard toward the benefit of sustainable dimensions indicators are poor in relationships. However, fire prevention and control have a moderately positive effect on the biodiversity conservation. Fire prevention and control have a moderately positive effect on the conservation of biodiversity that is in line with their perceived and the most indicator of sustainable standards. Fire prevention and control, however, have a poor positive effect on farmers' organizations because of the absence of community-based fire management.

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