

PAPER • OPEN ACCESS

A review on participation of cocoa smallholders in agricultural certification scheme

To cite this article: A L Rusli and F A Fatah 2022 *IOP Conf. Ser.: Earth Environ. Sci.* **1114** 012018

View the [article online](#) for updates and enhancements.

You may also like

- [Let the farmer decide: examining smallholder autonomy in large-scale land acquisitions with an agent-based model](#)
Tim G Williams, Daniel G Brown, Arun Agrawal et al.
- [Spatial patterns and drivers of smallholder oil palm expansion within peat swamp forests of Riau, Indonesia](#)
Jing Zhao, Janice Ser Huay Lee, Andrew J Elmore et al.
- [Palm oil's contribution to the United Nations sustainable development goals: outcomes of a review of socio-economic aspects](#)
Maria Vincenza Chiriaco, Matteo Bellotta, Jasmina Jusi et al.

A review on participation of cocoa smallholders in agricultural certification scheme

A L Rusli and F A Fatah*

Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA Cawangan Melaka Kampus Jasin, 77300 Merlimau, Melaka. Malaysia.

Corresponding author: fazleen5201@uitm.edu.my

Abstract. The ability of cocoa smallholders to comply with the agricultural certification scheme has led to the improvement of commodity profits in agriculture, especially cocoa crops. This study aims to determine the participation of cocoa smallholders in agricultural certification schemes. Cocoa production contributes to the national economy by generating exchange profits. Factors such as the age of smallholders, gender, training, farming experience, education, and attitude influence the smallholder's participation in the agricultural certification scheme. Educational status had a significant positive relationship with the certification scheme. Based on the review, the multinomial logistic regression model and other methods are used to analyse smallholders' participation in the certification. Therefore, the certification has some benefits for smallholders in terms of food safety standards. Consequently, it can improve the safety of the consumer, the livelihood of smallholders, and the quality of agricultural products. This capacity will locate the cocoa crops at the global demand linked together from top to down of the value chain process.

1. Introduction

Cocoa (*Theobroma cacao* L.) is a primary commodity crop in Malaysia, like oil palm, rubber, and paddy [1]. Cocoa belongs to the Malvaceae family. In the tropical world, cocoa is a significant crop where its bean is widely used in manufacturing chocolate and other product. Generally, commercial chocolate comes primarily from cocoa beans. The Malaysia Cocoa Board (MCB) under the Ministry of Plantation Industries and Commodities (MPIC) manages the cocoa industry in the country to improve its production throughout the year [2]. Cocoa production has been growing consistently over the last few decades because of its organised policy support, primarily through crop area expansion rather than yield improvements. According to the Food and Agriculture Organisation of the United Nations (FAOSTAT), Malaysia's cocoa crop was ranked 13th globally, producing 1,005 tonnes in 2019 [3]. However, the cocoa industry contributed RM 1.64 billion to Gross Domestic Profit (GDP) in 2020 [1]. Smallholders are essential in enhancing agricultural commodities such as cocoa and other crops. Cocoa crops in Malaysia can be divided into three areas namely: Peninsular Malaysia, Sarawak, and Sabah. The primary cocoa production in Peninsular Malaysia areas includes Sabak Bernam, Bagan Datoh, Kuala Selangor, Muar, Batu Pahat, and Temerloh. According to the data from Kementerian Perusahaan Perladangan dan Komoditi- Industri Koko in March 2021, cocoa's ranking was third in Malaysia in the Agri commodity sector. An estimated 227 tonnes of cocoa was produced, with 59 tonnes in Peninsular Malaysia increasing by 63.9%, 181 tonnes in Sabah increasing by 47.2%, and 34 tonnes in Sarawak decreasing by 27.7% [1].



This study reviews the participation of cocoa smallholders in agricultural certification schemes. Due to the vast diversity of the cocoa smallholder's agricultural certification scheme, the present study measures the factors and benefits of the smallholder's participation in the agricultural certification schemes [4]. Agricultural certification schemes clearly define the numerous production and marketing standards created from consultations with key stakeholders, authorised by recognised agencies, and homogenise crucial components of the production process and trade [5]. The overall aim of certification is to create high-quality safe food with a low environmental impact, which would enhance smallholders' income and welfare [6]. The available certification in Malaysia and other countries must align with the cocoa sector's requirements to support producer groups and smallholder cocoa producers. The certificates include Malaysia Good Agricultural Practice (MyGAP) and Malaysia Organic (MyOrganic), Rainforest Alliance.

The factors affecting cocoa certification among smallholders include receiving motivation and support [7], awareness of the certification [8], educational status of the smallholders in the cocoa sector [9], training and courses that will be received by the smallholder through the certification scheme [10]. In addition, smallholders' attitudes toward certification participation, and access to credit positively and significantly influenced certification decisions [9]. Therefore, the study would assist cocoa smallholders in making decisions and gaining more knowledge on the benefits of the agricultural certifications scheme to improve their production operations in the cocoa sector.

A study reported that the Government would also support smallholders in the cocoa sector to guarantee crop quality and productivity [12]. It also observed that Malaysian cocoa has been consistently recognised on a global scale. The MPIC Minister, YB Datuk Zuraida Kamaruddin highlighted that the country's cocoa sector is well-known and keeps improving throughout the year. As a result, Malaysian chocolate is also among the most affordable chocolates that allow small producers to compete with top items globally. Hence, the study aims to find out the factors and benefits of cocoa smallholders' participation in agricultural certification schemes to increase the productivity of the cocoa industry, particularly in terms of certification, production, imports, exports, and other factors that can increase its profitability. Then, when the full utilisation of the certification process would provide high-value chains to the smallholders in the cocoa industry. As a result of this certification scheme, the smallholders become aware of the significance of agricultural certification that will improve the human capital in the smallholders' region and provide a clear understanding of the market demand.

2. Method

2.1 Study selection

The scope of this review is based on the smallholders' factors and benefits in the participation of agricultural certification schemes in the cocoa industry, which can provide high-value chains for cocoa industry smallholders. From this review, the roles of upper capital may also assist to build up the local smallholders' organisations and groups by receiving input through the benefits programme.

The articles published were retrieved from Scopus, Web of Science, and Google Scholar using combinations of synonyms and keywords. These databases were chosen given that they contain a huge number of abstracts and peer-reviewed publications from worldwide publishers in various scientific fields. The articles included in this review were published from January 2000 to April 2022.

2.2 Search

In this part, the keywords for agricultural certification schemes included in this review are: agricultural and certification scheme [7, 10, 11, 13, 14, 15,16, 17, 18,19] or certified [20] or similar since it was used in the title. Then, the search term for smallholders was smallholders or farmers or producers [11, 14]. The literature search was performed using a specific search highlighting the title and concepts considered in this review such as factors [21] or influence [11,16] or effectiveness [18] or motivations [19] or preference [20] or adopting [10] or affecting [9]. The systematic literature search was carried out using keywords such as benefits or successful or impacts.

2.3 Screening

All studies found during the search process were checked against a set of clearly specified inclusion criteria. The current review focuses on two finding factors and benefits that differ in the data types. A multi-step screening procedure, starting with titles and abstracts and continuing to a partial text review and finally a full-text review. This screening procedure was employed in this review while ensuring progressively strict criteria at each level. In the full-text review, studies were double-coded separately, with any discrepancies mediated by the principal reviewer. The last check against methodological criteria was run, and a final judgement of study relevance was made at this stage.

2.4 Data extraction and analysis

All included studies were analysed. Bibliographic, project type, implementation, and methodological data were collected from the research. The models and methods used to evaluate the cocoa smallholders were factors in the participation of the agricultural certification scheme. The analysis section of each article including the tables of statistical outputs was observed for future study to determine the significance of the factors that influence the agricultural certification scheme participation on cocoa smallholders in Malaysia. Articles that met the review's criteria were discovered using a comprehensive search to define the factor information. To determine the factor and benefits, the factors were classified into diverse categories to gain a lot of study on the review. Also, The study has been revised widely by several researchers.

3. Result

The factors influencing the participation of the agricultural certification scheme for cocoa smallholders in Malaysia were significant as reported in other studies on food crops in the country. Table 1 depicts that the articles published in 2019 were higher than those published from 2000 to 2022. The recent increase in research output reflects the role of educational status in the agricultural certification scheme [22]. The articles were then divided into categories depending on the investigated crops and their study locations. The agricultural certification scheme has contributed to numerous studies on several crops such as oil palm, cocoa, coffee, tea, vegetables, agricultural products, French beans, oranges, and pineapple.

4. Discussions

4.1 Factors of the agricultural certification scheme participations among smallholders

Several studies have identified the key elements influencing smallholders' participation in agricultural certification schemes in developing countries. Resultantly, educational background, age, and economic factors such as access to credit, age, awareness and attitude of the smallholders are some of the reported influencing factors [23,24]. Hence, among the aforementioned factors, one study highlighted the educational background of the cocoa industry's smallholders as a significant factor as presented in Table 1 [25].

Table 1. Factors on smallholders' participation in agricultural certification scheme.

No	Author	Year	Source title	Country	Purpose of Study	Factor
1.	Hazem S. Kassem <i>et al</i> (2021)	2021	Factors influencing smallholder orange farmers for compliance with Global	Saudi Arabia	The study aims to determine the level of Global GAP compliance among orange producers and check for compliance-related obstacles.	Educational status, non-farm income, land size, age of smallholders, institutional support and, awareness influence the Global GAP compliance.

No	Author	Year	Source title	Country	Purpose of Study	Factor
2.	Mubarak Iddrisu <i>et. al</i> (2020)	2020	GAP standards Participation in UTZ-RA voluntary cocoa certification scheme and its impact on smallholder welfare: Evidence from Ghana	Ghana	The study examined the factors that influence UTZ-RA cocoa certification programme participation and its effects on the welfare of smallholder farmers.	Educational status, non-farm income, farming experience, and household size influence the UTZ-RA cocoa certification programme participation among smallholders.
3.	Ernawati Apriani <i>et. al</i> (2020)	2020	Non-state certification of smallholders for sustainable palm oil in Sumatra, Indonesia	Indonesia	To analyse the factor affecting smallholders' willingness to apply for the certification.	Educational status, non-farm income, farming experience, household size, land size, and smallholders' age affect the smallholder's certification participation.
4.	Soo-Fen Fam <i>et.al</i> (2019)	2019	Factor Influencing Malaysian Pineapple Smallholder's Intention to Adopt MyGAP and MPIB Roles to Inspire the Growers to Obtain MyGAP Certification	Malaysia	The study aims to determine the factors affecting producers' intentions to adopt MyGAP and MPIB roles, as well as to motivate pineapple growers to get their MyGAP certification.	Awareness, motivational factors, training, attitude, perceived barriers, and personal norms were the factor influencing the intention of smallholders to obtain the certification.
5.	George C. Schoneveld <i>et. al</i> (2019)	2019	Certification, good agricultural practice and smallholder heterogeneity : Differentiate the pathways for resolving compliance gaps in the Indonesian	Indonesia	Knowing the global sustainability agenda priorities, improving smallholder adherence to sustainability norms and sustainable agricultural practices.	Smallholder age, gender, access to credit, and extension agent are factors influencing the certification among smallholders in Indonesia.

No	Author	Year	Source title	Country	Purpose of Study	Factor
			oil palm sector			
6.	Pabitra Mishra <i>et. al</i> (2019)	2019	Factors Affecting the Adoption of Certification among the Orthodox Tea Growers in Nepal	Nepal	This study aims to identify the factors influencing the adoption of certified orthodox tea production in the Eastern Himalayan Corridor of Nepal.	Educational status, smallholder age, gender, access to credit, and training influence the adoption of certification among the smallholder growers.
7.	H. K Poudel <i>et.al</i> (2019)	2019	Factor Affecting Coffee Certification Among Rural Farm Households in Nepal	Nepal	This study conducts the value chain analysis of the smallholders in Nepal on the participation that affects the coffee certification in the rural farm.	The factors influencing coffee certification among rural farms in Nepal were educational status, smallholder age, gender, access to credit, and training.
8.	N. Kibet <i>et. al</i> (2018)	2018	Risk Attitude Effects on Global-GAP Certification Decisions by Smallholders French Bean Farmers in Kenya	Kenya	This study reveals the smallholders' perception of the benefits of coffee smallholders when they comply with the certification.	Educational status, farming experience, gender, access to credit, and training affect the smallholder decisions on the certification application.
9.	Norlizabeth Mohd Yusof <i>et.al</i> (2017)	2017	Fcators Influencing the Cocoa Smallholders Behavior Decision Making in Hilir Perak	Malaysia	This study assesses the factors influencing the cocoa smallholders' behaviour and decision-making in Hilir Perak on the certification scheme.	Training, attitude, perceived barriers, personal norms, and knowledge influence the cocoa smallholder behaviours decision making.
10.	Yeong Sheng Tey <i>et. al</i> (2015)	2015	A Means-End Chain Approach to Explaining the Adoption of Good Agricultural Practices Certification Schemes: The Case of	Malaysia	This study examines how personal values play a role in influencing decision-making to understand why GAP certification methods were adopted.	Educational status influences the approach of the GAP practices certification.

No	Author	Year	Source title	Country	Purpose of Study	Factor
11.	Brian Chiputwa <i>et. al</i> (2014)	2014	Malaysian Vegetable Farmers Food Standards, Certification, and Poverty among Coffee Farmers in Uganda	Uganda	This research is to analyse the impact of certification participation and the welfare effect on the prevalence and poverty among farmers.	Educational status, household size, farming experience, smallholders' age, and gender influence the involvement in certification.
12.	Oscar i. Ayuya <i>et.al</i> (2014)	2014	Effect of Certified Organic Production Systems on Poverty among Smallholder Farmers: Empirical Evidence from Kenya	Kenya	This study aims to determine the effect of certification participation on organic production poverty among farmers.	Household size, extension agents, motivational factors, and training influence certification participation among smallholders.
13.	Ryerd Ruben, Ricardo Fort (2011)	2011	The Impact of Fair Trade Certification for Coffee Farmers in Peru	Peru	This study aims to analyse the fair trade certification scheme's impact on coffee farmers in Peru.	Educational status, household size, and smallholders' age affects the participation of the smallholders in the certification scheme.

Sources: extracted from articles review

The support received by smallholders in the cocoa sector influenced their readiness to apply for cocoa certifications. The study revealed that the Malaysian Cocoa Board (MCB) motivates and supports cocoa smallholders, including planting supplies, raw materials, and the proper procedures and guidelines for managing the cocoa plantation area to increase smallholders' income during difficult times. A productive MCB staff, especially in the extension agent division, provides them with more information. These agents must complete their tasks to disseminate new technologies and inputs like fertiliser [7].

Certification awareness is a typical factor affecting cocoa certification among smallholders. Participating smallholders in certification programmes are overwhelmingly positive about the advantages of the programmes. They are interested in the economic values and the availability of services like loans and training. This review suggests that certified farmers' production is significantly higher. The influence of previously running programmes on the target demographic makes it difficult to distinguish between the impact of certification and farmer yield estimates. The participation of smallholders in the certification programme increased the awareness of environmental management, health and safety challenges, and the difficulties of advancing environmental practices [8].

Smallholders have more access to obtaining a certification because they have higher household literacy rates than illiterate households. This acceptance of the certification procedure is positively

associated with educational status. A 20% inclination exists for smallholders with at least a higher education and a university degree to adopt the certification. The primary factor may be that small investors who are educated are more likely to accept the certificate and its benefits and value-adding techniques [9].

The smallholders' involvement in the training and courses will still have an impact if they have or have not received certification on a national or worldwide level. Nevertheless, participating in such events boosts the producer's influence, provides them with new information and allows them to share ideas with other producers in the field [10, 26]. The information provided by the certification scheme encourages farmers, particularly in the cocoa sector. Hence, when farmers have more knowledge and awareness, they will be more eager to obtain certificates [13].

Based on the Theory of Planned Behaviours (TPB), the study revealed that attitudes could be one of the factors influencing smallholders when obtaining the certification [27]. Attitudes were observed to greatly influence the smallholders' willingness to obtain the certificate. Belief is the likelihood that a behaviour will lead to a particular consequence. Specifically, age in the agricultural certification scheme choice was consistent in a study conducted in Kenya, which revealed that smallholders' age influenced their decision to participate in the certification scheme [28]. This finding can be best explained based on the primary strategy of the agricultural certification scheme, which is to alleviate poverty and improve the standard of the smallholders, especially those belonging to the older age category [29].

However, access to credit positively and significantly influenced certification choices in the research field. Smallholders preferred to accept certification if local cooperatives, microfinance organisations, and banks were ready to offer loans [9]. Another study stated that the more the investment in a commodity for upgrading decisions, the more credit available [30].

A study reported that the theory of preferences is an essential component of individuals' decisions and behaviour in determining the quantification and identification of their preferences over a collection of options [31]. Previous research highlighted the importance to understand the smallholders' choices for the certification scheme. Enhancing the quality of the smallholders' production is vital to achieving their demands [32]. It is observed that the smallholder has little knowledge about the certification procedures. The smallholders only adhere to the information provided to them by professionals. The pre-attribute test's descriptions were so comprehensive for these reasons. Smallholders can only understand these attributes with their little knowledge until they are provided with various certification processes. According to the data, smallholders with less experience were more likely to be affected by institutional awareness, informational barriers, personal issues, and financial obstacles. The highly educated smallholders emphasised awareness and information when explaining their lack of compliance with the norms [33].

4.2 Benefits of the agricultural certification scheme participations among smallholders

This part explained the benefits of the smallholder's participation in the agricultural certification scheme, which complies with the management to improve the quality and production of the crop. Consequently, it can help in the exportation of crops locally and internationally. Smallholders' participation in agricultural certification scheme guidelines has been a successful strategy for easing the transition of goods and sustainable agricultural production in crops such as cocoa shown in Table 2 [16,34].

Table 2. Benefits of agricultural certification scheme.

Categories of benefits	Explanation
Successful strategy	• Transition to goods and sustainable agricultural • The price premium for sustainable output
Premium up the supply chain	• To demonstrated the anchor corporation's effective • To gain access to new market share

Categories of benefits	Explanation
Exogenous benefits	• Information and technology • Increased on-farm organisation • Get a lot of training in term of GAP
Have an economic performance	• Cost • Profits • Marketing channels • Margins
Extrinsic and intrinsic rewards	• Job satisfaction • Social fairness • Trade agreement • Fair prices • Fair wages • Reduced severity of poverty
Environmental and social conditions improvement	• Delivering good systems • Increase consumer awareness
Strengthen the welfare effect	• Raising demand for agricultural products • Quality of the products

Sources: extracted from articles review

The prospect of a price premium for the sustainable output was a selling factor utilised by the anchor company to persuade farmers to participate in certified practices among the smallholder alliances in the study sample [35]. The most widely acknowledged benefit of certification was that it demonstrated that the anchor corporation effectively distributed premiums up the supply chain to smallholders. The premium's proportional value was less, especially among medium and large-scale producers. Instead, the main reason for enrolling and staying in certification programmes was to gain access to new market shares [35].

According to other researchers, the benefits that bolster satisfaction with certification include access to information and technology, increase on-farm organisation, having a confirmed buyer and so on [36]. A study reported that the prices of certified crops are higher than those of uncertified crops. However, smallholders still receive extensive training from the other sides of the agricultural certification scheme, such as the organisations and groups of farmers, especially in terms of Good Agricultural Practices (GAP) [21]. The certification assists them to optimise their manufacturing processes, leading to increased productivity and improved quality of products [37]. Although it's implied that the certified crops might be sold alongside conventional, the study also reported that some common crops are making their way into the certified market. Another study reported that the certified crop has better economic performance than the conventional channels in terms of production costs, profits, marketing channels, and margins amongst others [38]. The study discovered significant differences between the channels, with certified channels, which are more effective than conventional channels because of their shorter length.

The extrinsic and intrinsic rewards received by employees can be affected by the certification scheme, which might affect job satisfaction. The certification focuses on social fairness, alternative trade agreements, fair prices for smallholders, and fair wages for hired employees [39, 40]. Firstly, according to Fairtrade, businesses must offer training as it assists smallholders to advance their knowledge and abilities. Secondly, the certification scheme prioritises smallholder empowerment and the bargaining process through stringent guidelines for collective agreements between the labour and the trader. The outcomes from these certifications can lead to high profits and revenues. Based on these economic implications, the certification has been associated with alleviated poverty frequency and severity in some situations [41].

Another study reported that certification will improve environmental and social conditions [42]. Hence, the certification scheme provides many advantages to the smallholders in developing countries with a good system. The popularity of agriculture food standards and market-based certifications has led to many sustainability standards during the past few decades [19]. This certification aims to increase consumer awareness of the harmful effects of global trade on producers so that they can effectively use their purchasing power to establish a single set of rules for trade partnerships based on communication and openness to promote changes to the current rules and procedures of global trade, promote social justice, environmental sound business practises, and economic security to protect human rights.

The smallholders' participation in the agricultural certification scheme will also assist strengthen the cocoa smallholders' welfare effect. The word welfare effect is frequently used to explain and support the intrinsic and extrinsic levels to qualify the benefits among folks globally [43]. A new era of development must be accomplished for the Sustainable Development Goals (SDGs) and the 2030 Agenda. Thus, smallholders are one of the tools that may guarantee productivity if effectively managed, raising both production and standard of living respectively [44]. The demand for high-quality agricultural products consistently exceeds supply because the agricultural sector is expanding globally [45,46]. To ensure that all of the products meet the consumers' needs in the global market, the welfare effect on cocoa smallholders must be regularly considered because of the rising demand for agricultural products, particularly in the cocoa sector. The considerable shift in agricultural development in developing nations demonstrates the variety of agricultural production [47]. Smallholders' participation in the agriculture of the cocoa sector on a small scale will give them new life and a brighter outlook, which is a fantastic approach to enhance their welfare across a variety of fronts [48,49]. Raising smallholder welfare, increasing agricultural inputs, and fostering long-term growth can significantly alleviate poverty [50]. Smallholders can reduce all the vulnerable hazards in their growing area by applying for certification, including reducing pests, illnesses, and price changes. The certification will provide the small farmers and the entire production with significant real profit support. It is, therefore, notable that the welfare effect on small-scale smallholders may give them a quality product and enable them to transform into large-scale smallholders [51].

5. Conclusion

This paper was reviewed to examine the factors and benefits of the agricultural certification scheme participation on cocoa smallholders in Malaysia. Based on the study, it was discovered that factors such as educational background, age of smallholders, certification training, access to credit, awareness, attitude to the smallholders, and others greatly influenced farmers' decisions in the certification scheme participation. The analysis also shows that many factors may influence smallholders' participation in certification schemes and these insights are essential for certification scheme designers, implementers, and other key stakeholders in the commodity sector. The study also acknowledges that although the cocoa certification program had a significant beneficial influence on enrolled smallholders' total household income, cocoa production in kg/ha, and income of cocoa, it has a negative impact on their level of food security. This demonstrates the necessity of better labour standards for creating high-quality employment in rural areas. Additionally, it is also important to facilitate the farmer's knowledge about the effects of adhering to an agricultural certification scheme. It can be accomplished by setting up forums like farmer-to-farmer platforms and farmer field education

Acknowledgement

The authors are grateful to the Graduate Excellence Programme (GrEP MARA) for the financial assistance as well as the author's family for consistently supporting the authors in the completion of the article.

References

- [1] *Kementerian Perusahaan Perladangan dan Komoditi - Industri Koko* 2021 Retrieved 19 October 2021 from Mpic.gov.my website: <https://www.mpic.gov.my/mpi/sidebar-industri->

kokoAnother reference

- [2] *Malaysian Cocoa Board Official Website* 2021 Retrieved 16 October 2021 from Koko.gov.my website: <https://www.koko.gov.my/lkm/loader.cfm?page=1>
- [3] Faostat 2021 Retrieved 17 October 2021 from Fao.org website: <https://www.fao.org/faostat/en/#data/QCL>
- [4] Cocoa. (2019). Retrieved October 31, 2021, from Fairtrade International website: <https://www.Fairtrade.net/product/cocoa/>
- [5] Loconto, A. 2013 *Agribusiness and Food Industries* 3 (Rome: FAO)
- [6] Kuit M and Waarts Y 2014 *Small-scale farmers, certification schemes and private standards: Is there a business case* (Wageningen: CTA)
- [7] Yusof N M, Syahlan S, Zulkefli F and Bakar M A 2017 *International Journal of Academic Research in Business and Social Sciences* 7
- [8] Hafid H, Neilson J, Mount T and McKenzie F 2013 *Pilot Survey Results 13 March 2013*
- [9] Poudel H K, Kattel R R, Poudel M R and Khanal S 2019 *International Journal of Applied Sciences and Biotechnology* 7 69–74
- [10] Silva E C, Castro Junior L G, Costa C H G and Andrade F T 2014 *Revista de Economia e Sociologia Rural* 52 437–48
- [11] Fam S F, Laham J, Sapak Z, Chuan Z L, Ahamat A, Zin W Z W and Suhartono 2019 *Humanities and Social Sciences Reviews* 7 315–21
- [12] Mail M 2021 Retrieved 28 December 2021 from Malaymail.com website: <https://www.malaymail.com/news/money/2021/12/12/malaysian-cocoa-industry-has-good-potential-to-penetrate-international-mark/2027872>
- [13] Aidoo R and Fromm I 2015 *Journal of Sustainable Development* 8 33–43
- [14] Bakker P 2014 12 June 125 Retrieved from <https://edepot.wur.nl/308496>
- [15] Ibnu M, Glasbergen P, Offermans A and Arifin B 2015 *Journal of Agricultural Science* 7 20–35
- [16] Kassem H S, Alotaibi B A, Aldosari F O, Herab A and Ghozy R 2021 *Saudi Journal of Biological Sciences* 28 1365–73
- [17] Mishra P, Kattel R R, Dhakal S C and Bhandari P L 2019 22 January 1–6
- [18] Oya C, Schaefer F and Skolidou D 2018 *World Development* 112 282–312
- [19] Pyk F and Hatab A A 2018 *Sustainability (Switzerland)* 10
- [20] Anh N H and Bokelmann W 2019 *Sustainability (Switzerland)* 11
- [21] Glasbergen P 2018 *Ecological Economics* 147 243–252
- [22] Iddrisu M, Aidoo R and Wongnaa A C 2020 *World Development Perspectives* 20 100244
- [23] Ajewole O C 2010 *African Journal of Agricultural Research* 5 2497–2503
- [24] Meemken E M, Veettil P C and Qaim M 2016 *Global Food Discussion Papers*
- [25] Kleemann L, Abdulai A and Buss M 2014 *World Development* 64 79–92
- [26] Monte E Z and Teixeira E C *Revista de Economia e Sociologia Rural Brasília* 44 201–207
- [27] Ajzen I 2011 *Social Psychology and Evaluation* 72-101
- [28] Muriithi B W, Mburu J and Ngigi M 2011 *Agribusiness* 27 193–204
- [29] Quartey C L N K, Osei Mensah J, Nimoh F, Adams F and Etuah S 2021 *Journal of Agribusiness in Developing and Emerging Economies*
- [30] Kattel R R 2009 Leibniz University Hannover Germany
- [31] Dyer J S and Jia J 2001 *Encyclopedia of Operations Research and Management Science* January
- [32] Birol E, Villalba E R and Smale M 2009 *Environment and Development Economics* 14 521–540
- [33] Ibnu M, Glasbergen P, Offermans A and Arifin B 2015 *Journal of Agricultural Science* 7 20–35
- [34] Nicetic O, van de Fliert E, Chien H, Mai V and Cuong L 2010 *European IFSA Symposium (Vienna)*
- [35] Furumo P R, Rueda X, Rodríguez J S and Parés Ramos I K 2020 *Journal of Cleaner Production* 245
- [36] Rueda X and Lambin E 2013 *Ecology Social* 18
- [37] Brandi C 2013 Retrieved from https://www.idos-research.de/uploads/media/Studies_74.pdf

- [38] Astuti E S, Offermans A and Glasbergen P 2015 *Journal of Economics and Sustainable Development* **6** 84–98
- [39] Krumbiegel K, Maertens M and Wollni M 2018 *World Development* **102** 195–212
- [40] Fairtrade International 2014 *Research in Business and Social Sciences* **7**
- [41] Chiputwa B, Spielman D J and Qaim M 2014 *World Development* **66** 400–412
- [42] Ochieng B O, Hughey K F D and Bigsby H 2013 *Journal of Cleaner Production* **39** 285–293
- [43] Definition of Welfare 2021 Retrieved 24 November 2021 from Federal Safety Net website: <http://federalsafetynet.com/welfare-definition.html>
- [44] FAO Statistics Division 2017 *Proposed International Definition of Small-Scale Food Producers* 3 March, 1–17
- [45] Quisumbing A R, Rubin D, Manfre C, Waithanji E, Van den Bold M, Olney D, Johnson N and Dick R M 2015 *Agriculture and human values* **32** 705–725
- [46] Barrett C B, Reardon T, Swinnen J and Zilberman D 2020 *Journal of Economic Literature*
- [47] Reardon T, Echeverria E, Berdegue J, Minten B, Liverpool-Tasie S, Tschirley D and Zilberman D 2019 *Agricultural Systems* **172** 47–59
- [48] Martey E, Etwire P M, Wiredu A N and Ahiabor B D K 2017 *Food Security* **9** 849–866
- [49] Herrmann R, Nkonya E and Faße A 2018 *Food Security: The Science Sociology and Economics of Food Production and Access to Food* **10** 827–839
- [50] Wu J, Guo S and Huang H 2018 *IEEE Communications Surveys and Tutorials* **20** 2389–2406
- [51] Amare M, Cissé D J, Jensen N D and Shiferaw B 2008 *A Panel Data Analysis* 1–28