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Farmer Preferences for Coffee Certification: A Conjoint Analysis of the Indonesian Smallholders

Muhammad Ibnu[1], Pieter Glasbergen[1], Astrid Offermans[1] & Bustanul Arifin[2]

[1] International Centre for Integrated Assessment and Sustainable Development (ICIS), Maastricht University, Netherlands

[2] The Agribusiness Department of Agricultural Faculty, Lampung University, Indonesia

Correspondence: Pieter Glasbergen, International Centre for Integrated Assessment and Sustainable Development (ICIS), Maastricht University, Netherlands. Tel: 31-345-515-081. E-mail: pieter.glasbergen@maastrichtuniversity.nl

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Abstract

Most coffee certification schemes are developed by Northern-based businesses and NGOs to regulate the production of coffee in the South. It is questionable whether these Northern-driven standards correspond to the preferences of coffee farmers in the South. Understanding farmer preferences and taking them into account when developing or improving certification schemes is believed to lead to more internalized, and therefore more effective standards. However, there is a lack of information on farmer's preferences, both in the academic literature as well as with the certification programs themselves. Based on conjoint analysis and interviews, this paper investigates the preferences of coffee smallholder farmers in Indonesia. The smallholders surveyed include farmers registered with global certification schemes (i.e. Rainforest Alliance, Utz certified, and 4C), a local certification scheme (Inofice) and uncertified farmers. Results indicate that farmers in the different groups do not differ much in terms of their preferences. Moreover, although farmers value environmental conservation, their preferences regarding certification are mainly economically driven. This leads us to conclude that sustainability certification of coffee is only weakly institutionalized in the farmer's context.

Keywords: sustainability certification, coffee certification, smallholder preferences, Southern perspective, conjoint analysis, Indonesia

1. Introduction

Sustainability certification has been introduced as new governance model since the mid-1990s and regulates food production in Southern countries (Glasbergen, 2013). Global certification programmes address sustainability issues through using social, economic, and environmental indicators as the basis of their standards. Combined with certification rules and codes of conduct, these global sustainability standards function as 'non-state regulations' that govern food supply chains (Arifin, 2010; Auld, 2010). Regarding coffee certification there are numerous global certification schemes, including Rainforest alliance, UTZ certified, 4C, Organic, Fairtrade, and Smithsonian Bird Friendly. Next to these global, voluntary and private certification initiatives we can also distinguish local certification schemes (e.g. Inofice certification in Indonesia) and public certifications schemes (e.g. ISCoffee, which was initiated by the Indonesian Ministry of Agriculture in 2013). All these standards have in common that they attempt to cover the entire value chain from farmer to consumer (Giovannucci & Ponte, 2005) and that their impacts on farmer's livelihoods are heavily debated.

Many empirical studies have been conducted to analyse the impact of certification. Results however, often seem to be contradictory (Beuchelt & Zeller, 2011), misleading (Chiputwa, Spielman, & Qaim, 2015) and fluctuate between attributing positive effects to certification (see for example Barbosa de Lima et al., 2009; Becchetti & Costantino, 2008; Rueda & Lambin, 2013; Subervie & Vagneron, 2013), towards attributing insignificant benefits (Bacon, Ernesto-Méndez, Gómez, Stuart, & Flores, 2008; Bitzer, Francken, & Glasbergen, 2008; Holzapfel & Wollni, 2014; Jena et al., 2012; Méndez et al., 2010; Philpott, Bichier, Rice, & Greenberg, 2007; Valkila, 2009), and even attributing negative consequences on livelihoods due to certification (for example Beuchelt & Zeller, 2011; Getz & Shreck, 2006; Utting-Chamorro, 2005). Our literature review also shows that most empirical studies that evaluate the impact of the sustainability standards are conducted in Africa and in

Latin America (e.g. Arnould, Plastina, & Ball, 2009; Bacon et al., 2008; Bechetti & Costantino, 2008; Bitzer, Glasbergen, & Arts, 2013; Méndez et al., 2010; Philpott et al., 2007; Ruben & Zuniga, 2011; Ruben & Fort, 2012; Valkila, 2009). Papers about the impact of certification on Indonesian farmers are extremely rare although Indonesia is the third largest coffee exporter in the world (ICO, 2014), and even the second world's largest exporter of Robusta coffee (Wahyudi & Jati, 2012).

Notwithstanding this reputation as Robusta exporter, only 25% of the certified Indonesian coffee covers Robusta coffee. The majority (75%) of certified coffee is Arabica. Organic, as a global certification scheme, was among the first schemes in the Indonesian (Arabica) coffee sector; it has been implemented in Aceh in the 1990s (Arifin, 2008) and still covers the majority of certified, exported coffee from Indonesia (Wahyudi & Jati, 2012). Currently, many more global certification schemes certify coffee in Indonesia. Besides the global certification schemes, we can distinguish local schemes that are either initiated by the Indonesian government (ISCoffee) or initiated by other actors like farming agencies (Inofice). The Indonesian Standard Coffee certificate (ISCoffee) was initiated by the Indonesian Ministry of Agriculture and implemented by the government (Media Perkebunan, 2013, March 12). In the future, the government may require that Indonesian coffee producers are certified according to the national standard. According to Mawardi (2014), Neilson (2014), and Sughandi (2014) the formulation of ISCoffee was not only triggered by the existence of global certification schemes, but also by the increase in domestic coffee consumption and emerging export markets, particularly the markets in Africa and Asia. In 2013, 56% of the total Indonesian coffee export was targeted at these newly emerging markets and the Indonesian government wants to attach a "national identity" to the new coffee markets in the form of local (or national) certification (Sughandi, 2014). Other local certification schemes that were not initiated by the Indonesian government have been established in Indonesia as well. For example, the Inofice standard, managed by the Indonesian Organic Farming Infection and Certification Agency encompasses an organic certification scheme which refers to the National Standard of Indonesia or *Standar Nasional Indonesia* (SNI). It certifies plants and plant products (e.g. food, horticulture, crop and plantation), and livestock and livestock products (e.g. milk, egg, meat and honey) (Inofice, 2007).

The global coffee certification schemes that are present in Indonesia are developed by, and based on, the preferences of Northern consumers and implemented through multinational roasting companies and/or exporting firms (Neilson, 2008, 2014). According to Wahyudi and Jati (2012), the Indonesian farmers' participation in the global certifications is mainly the result of the buyers' requirements rather than the farmers' interest. Reliable data on the smallholder farmers' preferences for coffee certification programmes in Indonesia are currently not available. Several studies suggest that understanding farmer's preferences is vitally important to target a certification programme effectively (Birol, Villalba, & Smale, 2009), to design more acceptable programmes (Bekele, 2006), to choose the right strategies for improving farmers' productivity and income (Baidu-Forson, Waliyar, & Ntare, 1997), and to improve the pertinence of the programmes (Raghavarao, Wiley, & Chitturi, 2011). Certification schemes, however, pay little to no attention to the role of farmer preferences in the formulation and adoption stage of standards. Perhaps as a consequence, most of these programmes reach their intended goals only partially (see Adesina & Baidu-Forson, 1995; Bekele, 2006).

This paper is based on the premise that standard setting organizations, in order to be (more) acceptable to farmers, should consider farmer preferences. If certification schemes do not correspond to farmer's preferences, they may not be dedicated to comply with the certification principles, and some may even not be willing to participate. The objective of this paper is to contribute to our knowledge about smallholder preferences regarding coffee certification in Indonesia. The main research question is: What are Indonesian smallholders' preferences regarding coffee certification schemes, and what characteristics does the most preferred scheme - according to their opinion - contain? Field work was conducted in the province of Lampung, one of the major Robusta coffee producing regions in Indonesia (Wahyudi & Jati, 2012; Arifin, 2010).

This study contributes to previous studies in two ways. First, it examines the preferences for coffee certification from a southern producers' perspective, and from an Indonesian perspective in particular. The number of Indonesian smallholders are large (i.e., around 4 millions) (Wahyudi & Jati, 2012), and they can potentially make a significant contribution to sustainable coffee produced by southern countries. Second, the study includes and compares the preferences of smallholders participating in global certification schemes (Utz certified, Rainforest Alliance, and 4C), a local certification scheme (Inofice), and smallholders who do not participate in any certification programme. In the next sections we describe our methods (conjoint analysis and qualitative interviews) and provide an overview of our respondents. In section three and four we present our results and in section five our conclusions and reflection can be found.

2. Methods

The literature distinguishes several methods to operationalize and measure preferences. With the hedonic regression method the items being researched are decomposed into their essential characteristics to obtain estimates on the influence of each characteristic (Reis & Santos-Silva, 2006). Q-sort methodology focuses on understanding subjective phenomena and respondents arrange or sort a set of previously determined statements (Bracken & Fischel, 2006). The contingent-valuation or willingness-to-pay procedure, in its simplest form, determines the respondents' willingness to pay for hypothetical actions with specified characteristics (Carson & Flores, 2000; Bridges et al, 2007). For our study it is important that farmer's preferences can be related to (potential) characteristics of a (most preferred) certification scheme and that we can compare any differences in preferences between locally, globally and non-certified farmers. To that end, we decided to use conjoint analysis to evaluate farmer preferences regarding the most preferred certification scheme.

2.1 Conjoint Analysis

Conjoint analysis is a powerful and robust method for understanding farmer preferences (Arifin, Swallow, Suyanto, & Coe, 2009; Tano, Kamuanga, Faminow, & Swallow, 2003; Orme, 2010). It is a multivariate technique that is useful to examine trade-offs made by individual respondents when they are facing a range of options (Green, Wind, & Rao, 1999). Conjoint analysis encompasses several iterative steps of (re)defining and verifying so called attributes, interpretations (or attribute levels) and profiles. An attribute is a characteristic inherent to the variable that will be measured; in our case coffee certification schemes (see column 1 in Table 1). Attributes can be interpreted in different ways, depending on the farmer's preferences. These different interpretations are the attribute levels (see column 2-4 in Table 1). As recommended by Green et al. (1999) and Walley, Parsons, and Bland (1999) attributes and interpretations were selected by reading the codes of conduct containing core principles and guidelines of several coffee certification schemes (Fairtrade, Utz certified, Rainforest Alliance and 4C). Differences between existing schemes are expressed by differences between attribute levels (see Table 1). In addition, if existing schemes do not vary (enough) for specific attributes, the researcher has the freedom to add attribute levels (for example fairness as focus criteria). The different attribute levels can be combined in different ways into a certification scheme. These different combinations are profiles (see Appendix A). The attribute levels in Table 1 result in $2^7 \times 3^1 = 384$ possible profile combinations.

These profiles describe certification alternatives (or scenarios) (Green et al., 1999). According to Bakken and Frazier (2006), researchers recommend that the maximum number of profiles is 15 to 20 per respondent. If respondents must evaluate too many profiles, they tend to simplify their assessment process which distorts their true preferences (Green et al., 1999). In addition to the high cost of administering the survey, farmers' misperception and exhaustion can also be overwhelming, and the probabilities of farmers disregarding some attributes are high (Arifin et al., 2009). To this end, we had to reduce the possible profiles from 384 to a maximum of 20. SPSS contains a powerful procedure to select possible profiles randomly: the Generate Orthogonal Design Procedure, which offered 16 full profiles (see Appendix A). The profiles were written in Bahasa Indonesia, and pre-tested at the study sites. The pre-tests revealed that the smallholders have more difficulty in ordering choices (ranking) than rating. Rating (i.e. indicating the desirability of each profile separately) and ranking (i.e. ranking the different profiles from most- to least desirable) provide similar results in terms of preferences (Boyle, Holmes, Teisl, & Roe, 2001; Haefele & Loomis, 1999). However, based on confidence interval tests, rating provides more information and is relatively more efficient than ranking (Mackenzie, 1993). Rating of each profile is therefore used in the surveys with a scale of 1 to 5, in which 1 represents the least desirability and 5 the highest desirability. Rating based on full-profile conjoint analysis (i.e. full-profile plans by using orthogonal design) has the advantage that it utilizes *fractional factorial* designs that allows researchers to conduct statistical tests without evaluating all possible combinations of the attributes and the attributes levels (IBM Corp., 2010; Bakken & Frazier, 2006; Green et al., 1999). The results of our conjoint analysis are utility (part-worth) scores and percentages that indicate the relative importance of each attribute level (see Table 4). Similar to regression coefficients, the part-worth scores provide a quantitative degree of preferences for each attribute level, and the larger values correspond to the greater preferences. The relative importance of an attribute indicates how important the attribute is to the overall preference (IBM Corp., 2010). If all attributes would be considered equally important, they would all have a score of 100/8 attributes = 12.5%.

Important in conjoint analysis, and recommended by many (e.g. Arifin et al., 2009; Walley et al., 1999; Harrison, Ozayan, & Meyers, 1998) is pre-testing and verification of the attributes and attributes levels. To guarantee reliability and validity, it is important that the selected attributes and (variances in) attribute levels are understood by the farmers, cover the full range of farmer's preferences, and are easily digestible to rate. To this end, we went through four cycles of testing and verifying the attributes and attribute levels with farmers by conducting

interview and organizing focus group discussions with the farmers. These cycles ultimately resulted in the reduction of attributes from 16 to 8, and a reduction in attribute levels from 4 to 3. The initial list with attributes and attribute levels can be found in Appendix B. Reasons to reduce attribute levels include that the farmers perceived "biodiversity, soil fertility, agro-ecology" equal to "soil fertility, erosion resilience". Therefore, only "biodiversity, soil fertility, agro-ecology" is used as one of the attribute levels. Similarly, the farmers considered that the price premium levels "no, but market price" and "no, but negotiated between seller and buyer" are just the same. To the smallholders, both levels have the same meaning: "no price premium." Therefore, we only differentiate between the presence and absence of a price premium in our final list of attributes (see Table 1). The list does not cover social criteria (e.g. labor issues) because the farmers argued in the pre-tests that criteria related to forced labor, child labor and discrimination are irrelevant to their farming practices as they only own small plantations (1-2 hectares), which they can easily harvest and maintain on their own. Besides, they hardly hire labor, which makes minimum wages also irrelevant to the farmers. The pre-test thus already indicated that the most preferred certification scheme − in the eyes of the smallholder farmers − does not prioritize social issues.

Table 1. The final list of attributes and attribute levels of certification programmes

Attributes	Attribute Levels		
	1	2	3
Price Premium	Yes	No	
Certification target	Smallholder Farmer in farmer group or cooperative	Large estates	
Environmental Focus	Close to environmental conservation	Biodiversity, soil fertility, agro-ecology	Close to organic input
Marketing Schemes	Contract between producers and buyers	No contract	
Important goal	Fairness (through democracy, participation and transparency)	Sustainability (through good farm management)	
Credit option	Yes, Pre-finance	No pre-finance, only cash payment at transaction stage	
Price differential between certified and uncertified coffee (especially when local market prices increase)	Yes	No	
Price differential based on the sizes of coffee beans.	Yes	No	

After the conjoint analysis, we interviewed 15 farmers. The goal of these interviews was twofold: first to verify the results from the conjoint analysis and second to gain more information about the argumentation behind the preferences. The latter offered relevant results on why farmers have specific preferences and why some preferences differed for the different farmer groups.

2.2 Respondent Selection and Characteristics

Previous conjoint studies vary widely in terms of the number of respondents (sample sizes) used, although 120 seems to be a typical number (Walley et al., 1999; Weiner, 1994). Our research covers 210 respondents, yielding 16 (the number of full profiles, see Appendix A) × 210 = 3360 observations. By randomly surveying farmers from the different sub-districts and villages, we collected the data of 35 coffee farmers from each of the schemes and from uncertified producers. The sample size has met the minimum number of required respondents to ensure the study design orthogonal (each combination of attribute levels has the same theoretical chance to appear). According to Arifin et al. (2009), in order to be orthogonal the number of respondents must be proportional to the number of profiles. This means the minimum number of required respondents in our study equals the total amount of possible profiles (384) divided by the number of full profiles (16), which are 24. The research was conducted in the Tanggamus Regency and in the West Lampung Regency of Lampung Province, Indonesia from October 2013 until February 2014. They are known as coffee producing regions where the farmers mainly cultivate Robusta coffee. The farmers are certified with Rainforest Alliance, Utz certified, 4C, and Inofice. The Fairtrade standard and other certifications that mainly certify Arabica farmers are not present in these regions. Competition among the schemes in the regions is low; only one scheme is present in each village. Rainforest Alliance and 4C mainly certify the smallholders in Tanggamus, whereas the Utz standard certifies the farmers in

West Lampung. Inofice certification is only found in West Lampung with a limited number of farmer participants. On average, around 70 % of the farmers in the researched districts turned out to be uncertified. The details of the sample are shown in Table 2.

Table 2. Respondent types, location of interviews and the number of respondents

Respondent Groups	**Survey Location**			**Number of Respondents**
	Regency	**Sub District**	**Village**	
4C certified farmers	Tanggamus	Air Naningan	Way Harong	35
Rainforest certified farmers	Tanggamus	Pulau Panggung	Tanjung Rejo	20
	Tanggamus	Pulau Panggung	Way Ilahan	15
Utz certified farmers	West Lampung	Sumber Jaya	Tugusari	24
	West Lampung	Sumber Jaya	Kebun Tebu	11
Inofice certified farmers	West Lampung	Way Tenong	Gunung Terang	35
Uncertified farmers	Tanggamus	Pulau Panggung	Kemuning	35
	West Lampung	Sumberjaya	Sukapura	35
Total Respondents				210

According to Arifin et al. (2009) and Setiawan, Cinner, Sutton, and Mukminin (2012), respondent characteristics − such as age, years of education, migration, ethnicity, and household assets − have little effect on preferences and perceptions. Nonetheless, we performed a One-way Anova test to compare the demographic characteristics of our respondent groups which indicated that the respondents are similar in terms of education, years of working as coffee farmers, and landholding (Table 3). The test shows that the average of ages varies among respondent groups, but the Post Hoct test of One-way Anova suggests that only Rainforest Alliance respondents are significantly younger than uncertified farmers of Tanggamus region. The multiple comparisons of One-way Anova also indicate that the organic farmers overall have considerable higher yields per hectare compared to the other groups. However, there is no clear evidence supporting that global certifications have increased the productivities of the certified farmers. For example, in West Lampung, Utz certified respondents averagely produce lower outputs per hectare than the uncertified respondents. Similarly, in Tanggamus Regency, 4C farmers have lower average productivity than the uncertified respondents in the neighborhood areas. Therefore, we assume that differences in smallholder preferences, if any, are mainly influenced by the certification types and factors (e.g. attitude) other than the respondents' characteristics. The overall education level of the respondents was low with an average of 8.46 years of formal education (see Appendix C). In detail, more than 70 % of the respondents did not complete 10 years of education, and 26 % accomplished 12 years of formal schooling. The average productivity is 848.29 kilograms coffee per hectare but the number of coffee plants per hectare is unknown. The smallholders generally intersperse the coffee plants with other crops in the same parcel. Although they have been cultivating coffee for an average of 15 years, they are relatively new participants in the certification programmes, with on average only 2.3 years of participation.

Table 3. The results of means comparison with One-way Anova

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Age	Between Groups	1422.214	5	284.443	3.335	.006
	Within Groups	17401.714	204	85.303		
	Total	18823.929	209			
Education	Between Groups	31.886	5	6.377	.493	.781
	Within Groups	2636.229	204	12.923		
	Total	2668.114	209			
Time length of becoming coffee farmers	Between Groups	510.310	5	102.062	1.417	.220
	Within Groups	14698.171	204	72.050		
	Total	15208.481	209			
Land ownership	Between Groups	29.613	5	5.923	1.813	.112
	Within Groups	666.256	204	3.266		
	Total	695.868	209			
Productivity	Between Groups	8330687.490	5	1666137.498	22.278	.000
	Within Groups	15257049.354	204	74789.458		
	Total	23587736.844	209			

3. Farmer Preferences and the Ideal Certification Scheme

The results of the conjoint analysis are twofold. First, it indicates the strength of the preferences for each attribute, or in other words: it reveals which attributes are considered most important in coffee certification schemes (see the percentages for the *relative importance* in Table 4). Second, the analysis offers utility (part-worth) scores and standard errors for each attribute level. These part-worth scores provide a quantitative degree of preferences for each attribute level; the larger these values, the greater the preference for the specific attribute level (IBM Corp., 2010). These two results combined, indicate which attributes are considered important and how the most preferred interpretation of these attributes look according to the smallholder farmers. Table 4 indicates both results for the overall farmer's preferences, and the preferences of farmers certified under 4C, Rainforest, Utz certified, and Inofice as well as the uncertified producers.

3.1 Important Certification Attributes

Table 4 shows that the most important attribute in the overall farmer preferences is the "Price Premium" with a relative importance of 21.9 per cent. Also highly preferred is the attribute of "Environmental focus" (14.1%) and "Price differential between certified and uncertified coffee" (13.1%). The latter is particularly valued by Inofice and uncertified farmers, whereas the global certified farmers attach more value to "the Important goal" (fairness or sustainability) of the certification scheme. This means that price premium, environmental focus and price differentiation between certified and uncertified coffee beans are important certification attributes for most farmers and that a scheme's focus is particularly important for globally certified farmers. The attributes of "Certification Target" (12%), "Important goal" (11.6%) and "Price differential based on the coffee bean sizes" (10.3%) all have an overall relative importance between 10% and 13% and can be interpreted as relatively important attributes in coffee certification. A comment we have to make at this point is that "Important goal" is relatively unimportant for the Inofice farmers, while being important for the other farmer groups. At the bottom of the list we find the attributes of "Marketing schemes" (9.9%) and "Credit option" (7%), which can therefore be considered less important in farmer's preferences for coffee certification.

Table 4. Average part-worth (utility estimate) for key attributes of coffee certification programme and relative importance of each attribute

Attributes and Attribute levels	Global Certifications								Local Certification Inofice Certified (n=35)		Non Certified (n=70)	
	Overall (n=210)		4C Certified (n=35)		Rainforest Certified (n=35)		Utz Certified (n=35)					
	Utility Estimate	Std. Error	Utility Estimate	Std. Error	Utility Estimate	Std. Error	Utility Estimate	Std. Error	Utility Estimate	Std. Error	Utility Estimate	Std. Error
Price Premium												
Yes	+0.343	0.055	+0.314	0.071	+0.366	0.043	+0.320	0.082	+0.373	0.064	+0.341	0.056
No	-0.343	0.055	-0.314	0.071	-0.366	0.043	-0.320	0.082	-0.373	0.064	-0.341	0.056
Relative importance	21.908%		21.786%		22.253%		21.278%		19.627%		23.253%	
Certification Target												
Smallholder farmer in farmer group or cooperative	+0.171	0.055	+0.221	0.071	+0.180	0.043	+0.205	0.082	+0.123	0.064	+0.146	0.056
Large estates	-0.171	0.055	-0.221	0.071	-0.180	0.043	-0.205	0.082	-0.123	0.064	-0.146	0.056
Relative importance	11.999%		12.713%		11.927%		12.395%		11.670%		11.644%	
Environmental Focus												
Environmental conservation	+0.131	0.073	+0.181	0.094	+0.236	0.057	+0.231	0.109	+0.017	0.085	+0.060	0.075
Biodiversity, soil fertility, agro-ecology	-0.041	0.086	-0.076	0.110	-0.039	0.067	-0.058	0.128	-0.055	0.099	-0.008	0.087
Organic input	-0.090	0.086	-0.105	0.110	-0.196	0.067	-0.173	0.128	+0.038	0.099	-0.051	0.087
Relative importance	14.137%		13.857%		16.613%		16.154%		13.693%		12.252%	
Important goal												
Fairness	+0.097	0.055	+0.114	0.071	+0.141	0.043	+0.180	0.082	+0.052	0.064	+0.048	0.056
Sustainability	-0.097	0.055	-0.114	0.071	-0.141	0.043	-0.180	0.082	-0.052	0.064	-0.048	0.056
Relative importance	11.617%		12.058%		12.798%		14.145%		7.858%		11.423%	
Credit Option												
Yes, pre-finance	-0.061	0.055	-0.071	0.071	-0.095	0.043	-0.105	0.082	-0.016	0.064	-0.039	0.056
No, only cash payment at transaction stage	+0.061	0.055	+0.071	0.071	+0.095	0.043	+0.105	0.082	+0.016	0.064	+0.039	0.056
Relative importance	6.998%		7.231%		7.948%		7.376%		7.390%		6.021%	
Marketing schemes												
Contract between seller and buyer	-0.132	0.055	-0.179	0.071	-0.148	0.043	-0.159	0.082	-0.138	0.064	-0.084	0.056
No contract	+0.132	0.055	+0.179	0.071	+0.148	0.043	+0.159	0.082	+0.138	0.064	+0.084	0.056
Relative importance	9.961%		11.587%		10.563%		10.456%		9.072%		9.045%	
Price differential between certified and uncertified coffee (especially when local market price increase)												
Yes	+0.194	0.055	+0.143	0.071	+0.120	0.043	+0.145	0.082	+0.255	0.064	+0.252	0.056
No	-0.194	0.055	-0.143	0.071	-0.120	0.043	-0.145	0.082	-0.255	0.064	-0.252	0.056
Relative importance	13.108%		9.587%		7.626%		8.747%		20.440%		16.039%	
Price differential based on the sizes of coffee beans												
Yes	+0.157	0.055	+0.171	0.071	+0.152	0.043	+0.184	0.082	+0.123	0.064	+0.155	0.056
No	-0.157	0.055	-0.171	0.071	-0.152	0.043	-0.184	0.082	-0.123	0.064	-0.155	0.056
Relative importance	10.272%		11.015%		10.272%		9.450%		10.249%		10.323%	
Pearson's R	0.966	Sig.000	0.948	Sig.000	0.981	Sig .000	0.939	Sig.000	0.956	Sig.000	0.963	Sig.000
Kendall's tau	0.917	Sig.000	0.824	Sig.000	0.954	Sig .000	0.840	Sig.000	0.780	Sig.000	0.862	Sig.000

3.2 Most Preferred Certification Scheme Based on Preferences for Attribute Levels

In general, the different farmer groups are rather comparable in terms of their preferences. The presence of a price premium is the most preferred attribute level with a utility score of +0.343. Next, smallholders prefer environmental conservation, a price differential against uncertified coffee, farmer groups or cooperatives as target, emphasis on fairness, price differentials based on coffee bean sizes, no contract and no pre-finance (see Table 5). The preferences for the attribute levels are very comparable across the respondent groups, except for the environmental-focus attribute. While all farmers prefer the attribute level of environmental conservation, the smallholders certified under Inofice prefer organic input. Further, where the global certified farmers prefer fairness over a price differential based on certified and uncertified coffee, this is opposite for uncertified and Inofice farmers.

Table 5. Attribute level summary of the most preferred certification scheme

Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Rank 8
Price Premium	**Environmental Focus**	**Differential Price with Noncertified Farmers**	**Certification Target group**	**Important goal**	**Differential Price Based on Size**	**Marketing Schemes**	**Credit Option**
Yes	Conservation	Yes	Smallholder farmers in group or cooperative	Fairness	Yes	No contract	No credit

4. Assumptions Underlying Farmer's Preferences

Following the statistical results of the conjoint analysis, we conducted interviews to further explain the preferences. Related to the importance of the *presence of a price premium* we found that the poor farmers have a high expectation of the tangible economic benefits of the certification programmes through a price premium. They perceive the price premium as a reward for following, or complying to, the activities and practices as required by the scheme. The interviews reveal that it was not only the price premium as such that was highly preferred, but also a more direct relation between the farmers and certificate holders, to ultimately gain a stronger bargaining power and guaranteeing a (higher) price premium for the certified coffee beans. Currently, the global certified respondents hold no certificates themselves. Roasting companies and exporting firms (Nestle, NedCoffee, and Indo Cafco) hold the certificates because they pay the certification costs. The farmers have an indirect relationship with these certificate holders as they collectively or individually deliver their harvests to KUBEs (Kelompok Usaha Bersama). KUBEs are joint business groups consisting of different producer groups that partner with a specific certificate holder and transport the coffee beans to the roasting companies or exporters after cleaning and drying the coffee beans. This procedure results in lower prices for the farmers as around 30% of the premium prices goes to the KUBEs. Every transaction with exporters or roasters has to be conducted through KUBEs, although they also have relatively little bargaining power against the big buyers. Within the Inofice scheme, certificates are held by joint farmer groups called "Gabungan Kelompok Tani Hulu Hilir" often shortened as Gapoktan Hulu Hilir to whom the Inofice farmers directly sell their coffee beans, without the intervention of a KUBE. The uncertified smallholders commonly sell their coffee beans to local traders and local roasters with lesser requirements.

Farmers highly value the *environmental focus* of a certification scheme, in particular the focus on conservation. This can partly be explained by their understanding of conservation, namely beyond the coverage of forests, soil and biodiversity protection, and partly by their feeling of being connected to nature. Regarding the former, farmers value the preservation of historical heritage such as the Inscription of Batu Bedil and the Megalithic Site of Batu Gajah, and consider this to be part of the attribute of environmental conservation. Regarding the latter, the interviews reveal that farmers feel strongly connected to nature. They realize that for their coffee farming practices, and therefore also their income, they depend on the state of the environment. Particularly the older farmers compare the current environmental state with the state of years ago and express their concerns about decreasing bird populations and the poor water quality. The farmers believe that planting coffee in protected forests must either be banned or controlled, for example, by the Decree of the Minister of Forestry (No. 31/Kpts-II/2001). This decree provides opportunities for farmers to manage and to use state-forest lands, with the proviso that they must conserve the area. However, our interviews also reveal that, although the environmental focus is deemed important, the farmers would not choose a different certification scheme only because the environmental criteria are more rigorous.

Inofice certified and uncertified respondents indicate a high preference for *price differentials between certified*

and uncertified coffee. Their underlying reasons are nevertheless different. On the one hand, the uncertified smallholders value their freedom to sell coffee to any buyer offering a high price or quick cash. Besides, if they manage to produce good quality coffee they can also sell to the KUBEs and cashing a higher price. According to them, coffee quality should be more important than the question whether the coffee is certified or not. On the other hand, the Inofice organic producers feel that they are participating in a certification programme which uses strict environmental criteria. The certification programme should therefore give a significant price differential for their "exclusive" coffee beans. The surveys reveal that the Inofice farmers obtain 3,000 rupiah (around €0.19) per kilogram more than the prevailing local market price for uncertified coffee. This desire for gaining a financial reward for more exclusive coffee could also be recognized among the global certified farmers (although they only receive a financial reward of 200-300 rupiah per kilogram of coffee).

Related to the certification target group, the respondents prefer the attribute level of smallholder farmers in a *farmer group or cooperative* rather than large estates. Our interviews reveal that farmers see the roles of their farmer groups as positive as they are believed to play vital roles in improving bargaining positions, solving problems, and managing and educating their members. The groups also organize the coffee growers to work together to build terraces, terrace drains, and ridges in each member's plantation. In addition, individual members are able to contribute cash to the groups' financial deposits, which can be used to jointly (and therefore more cheaply) buy fertilizers, tools, and seeds. These activities have produced strong social relations between the individual farmers and their groups. These relations are valued as being important by the farmers. According to the smallholders, they rarely encounter such emotional connections in relation to the large estate plantations, which usually employ many labour workers. The possibility to develop and maintain strong personal relationships explains the farmers' preference for farmers groups over large estates. A desire to act independently was not expressed during the pre-tests or the interviews. Most coffee farmers are smallholders owning limited land and capital. Joining a producer group is a need for almost every farmer rather than an obligation. Independent coffee smallholders are therefore very rare, except for those farmers whose livelihoods do not mainly depend on coffee.

Next to personal relationships, *fairness* is an important issue for most respondents; especially for the global certified farmers. This can again be related to their indirect relationship with the certificate holders (roasters and exporters). Farmers lack understanding on how prices are formulated by the certificate holders and - more importantly - have the feeling that they may not receive the prices they have the right to. The lack of negotiation opportunities contributed to lower trust and a feeling of unfairness. Furthermore, the smallholders perceive a lack of transparency about the advantages and content of the certification programmes and the initiators behind these programmes, which generates doubts about the fairness of these programs as well. Lastly, as being one of the most important actors within the certification scheme the farmers consider it unfair that things are simply decided upon for them.

The preference to *differentiate prices based on the coffee bean sizes* results from the practice that coffee roasters almost always separate the coffee beans in accordance to their size, to produce high-quality coffee products. If the beans are mixed, the smaller beans are scorched before the larger beans, which influences the coffee quality. The National Standard of Indonesia, the authority being in charge of regulating coffee quality, requires coffee beans to be graded and priced according to their size (BSN, 2014). Most farmers hope that grading requirements based on the bean sizes can also be applied under (global) certification schemes. The poor farmers call the grading exercise "ekah", which literally means "differentiating to increase income".

The preference for *not having any formal contract* with buyers is rooted in a desire to be able to adapt to opportunities to sell coffee for higher prices elsewhere or to maintain social relationships. For this attribute level again, we see that emotional *attitude* and social relations are important explanatory aspects behind the farmer's preferences. For example, while the coffee producers usually sell their coffee beans via their KUBEs to the exporting firms under a particular certification, they also continue to sell their coffee to local traders to maintain social relationships with these traders. In the neighbourhoods, the smallholders and the local traders usually have a close relationship, comparable to family-ties or friendship. Finally, farmers indicate that they are not familiar with formal agreements and compliance, which keeps them rather reserved to opt for such a contract.

Unfamiliarity and a lack of understanding also play an important role in farmer's cautiousness about *credit*, especially credit or pre-finance offered through formal procedures. They perceive that such credits require collateral and formal requirements that are difficult to follow. The poor farmers usually rely on informal sources of financial aid, such as friends and extended families. Given uncertainty regarding the timing, and quantity of coffee bean harvests, farmers refer to pre-finance as a "debt risk" that could result in an unintended contract with the creditor (see previous point).

5. Conclusion

Most global coffee certification schemes are developed by Northern-based businesses and NGOs and regulate production in the South. Production requirements can often be traced back to the demands of global buyers that do not necessarily coincide with the demands and preferences of smallholder producers in the South. Understanding farmer preferences makes it however easier to take these preferences into account when (re)developing a certification scheme. This is believed to contribute to standards that are more acceptable to farmers and encompass better applicable strategies for improving farmers' productivity and income. Insight into motivations behind preferences contributes to knowledge about the current context and conditions smallholders have to cope with. This also implies that changes in context or structure may have implications for farmer's preferences. Therefore, the results of this study should not be treated as steady and unchangeable.

This study examined the preferences for coffee certification from a Southern producer's perspective by using the technique of conjoint analysis. The analysis reveals that our sample of Indonesian coffee farmers prefer a certification scheme that offers a price premium, focuses on environmental conservation, offers price differentials between certified and uncertified coffee, targets farmers in a group or cooperative, values fairness, offers a price differential based on the size of the coffee beans, and offers no formal contracts or credit options.

We learn that certification, which is meant to be a tool to promote sustainability and preferred by consumers in the North because of *environmental* and *social* conditions of production, becomes, when applied in the field and accepted by the farmers, an *economic* tool. This does not mean that the Indonesian coffee farmers do not value the environmental and social aspects of their production, but their preferences regarding the *certification schemes* are primarily economically driven. This observation is sustained by the fact that we hardly found differences in the preferences of globally certified farmers, locally certified farmers and uncertified farmers; they all prefer certification schemes that can promise tangible economic benefits. This implies that certification is only weakly institutionalized among farmers. Farmers display opportunistic behavior and may abandon one certification scheme to participate in another when the second one, or an alternative system, promises higher financial incentives. The current system that can be characterized by an overproduction of certified coffee (supplies outweigh demands), leads to a situation wherein certified coffee is sold in the conventional market. Premium prices can thus no longer be guaranteed, which may lead farmers to decide to leave the certification scheme. This trend may be further exacerbated by new emerging markets (including the domestic Indonesian market) that do not require coffee to be certified. From a liberal-market point of view this may not be problematic, but it shows again that the current certification systems are weakly institutionalized in farmer's practices.

We also found that farmer's knowledge about the certification schemes is low. Knowledge does generally only cover the recommended activities (like harvesting ripe cherries) and unacceptable practices that should be prevented within their own scheme (like the use of banned pesticides). This may explain why the description of attributes (also in the pre-tests) kept a rather general character. Farmers are simply not aware of differences between the certification schemes and can therefore not think of attribute levels that go beyond their own scheme.

This research offers new and interesting insights for science, practice and certification issuers, but only covered Robusta coffee farmers in two areas in Indonesia. Further research including Arabica farmers in different parts of the Archipelago will be necessary to further test the findings. In that research the conjoint analysis, although a robust method could be improved. Conjoint analysis limits the number of attributes and attributes levels that can be included in an analysis. Social attributes were purposely excluded from our attribute list as they were considered irrelevant by the farmers in the pre-tests. However, it may be interesting to further investigate farmer's ideas and preferences for price premium *alternatives*. Repeating this study with the incorporation of different certification attributes related to tangible economic aspects, but also aspects related to farmer's preferences regarding organizational capacity or skills (e.g. what is their need regarding skill development) may offer interesting, additional insights.

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Appendix

Appendix A. Display of full profiles (orthogonal design)

Card ID	Price Premium	Certification Target	Environmental Focus	Important goal	Credit Option	Marketing Schemes	Differential Price Based on Size Coffee Bean size	Differential Price with Noncertified Farmers	Rating (1-5)
1	Yes	Smallholder farmers in group or cooperative	Conservation	Fairness	Pre-finance	Contract between seller and buyer	Yes	Yes	
2	No	Large Estates	Biodiversity, soil fertility, agro-ecology	Sustainability	Pre-finance	No Contract	Yes	Yes	
3	Yes	Smallholder farmers in group or cooperative	Conservation	Fairness	Pre-finance	No Contract	No	No	
4	No	Large Estates	Conservation	Fairness	No Credit	Contract between seller and buyer	No	Yes	
5	No	Smallholder farmers in group or cooperative	Conservation	Sustainability	No Credit	Contract between seller and buyer	No	Yes	
6	Yes	Smallholder farmers in group or cooperative	Organic	Sustainability	No Credit	Contract between seller and buyer	Yes	No	
7	Yes	Large Estates	Conservation	Sustainability	Pre-finance	No Contract	No	No	
8	No	Large Estates	Conservation	Fairness	No Credit	No Contract	Yes	No	
9	No	Smallholder farmers in group or cooperative	Conservation	Sustainability	No Credit	No Contract	Yes	No	
10	Yes	Smallholder farmers in group or cooperative	Biodiversity, soil fertility, agro-ecology	Sustainability	No Credit	No Contract	No	Yes	
11	No	Large Estates	Organic	Sustainability	Pre-finance	Contract between seller and buyer	No	No	
12	Yes	Large Estates	Conservation	Sustainability	Pre-finance	Contract between seller and buyer	Yes	Yes	
13	No	Smallholder farmers in group or cooperative	Organic	Fairness	Pre-finance	No Contract	Yes	Yes	
14	No	Smallholder farmers in group or cooperative	Biodiversity, soil fertility, agro-ecology	Fairness	Pre-finance	Contract between seller and buyer	No	No	
15	Yes	Large Estates	Biodiversity, soil fertility, agro-ecology	Fairness	No Credit	Contract between seller and buyer	Yes	No	
16	Yes	Large Estates	Organic	Fairness	No Credit	No Contract	No	Yes	

Appendix B. Preliminary list of attributes and levels of certification programmes

Attributes	Attribute Levels			
	1	2	3	4
Certification Target	All Producers	High quality coffee grower only	Smallholder Farmer in groups or cooperatives	Large estates
Community outreach	Premium use for community programmes	Linkages with input suppliers and labourer	Project in coffee communities	
Credit	Pre-finance	Through (Local) banks	Farmer Loan Fund	
Environmental Focus	Close to environmental conservation	Biodiversity, soil fertility, agro-ecology	Close to organic input	Soil fertility, erosion resilience
Inspection Frequency and accreditation	Annually	At least annual	Every 3 years	
Key aspects	Labor, livelihood and participation	Sustainable resource management practice	Production and quality management	
Labor input	Higher	Moderate		
Main Focus	Fairness	Sustainability	Responsible sourcing	
Market Focus	All Market	Mainstream	Niche, Specialty	
Marketing schemes	Contract between producers and buyers	No contract		
Price Differential to Farmers	Negotiated between seller and buyer	Set by the programme	Set by market	
Price Premium	Yes (minimum floor price/ market price +price premium)	No, but market price (Farmers earn more through gains in efficiency, improved quality and controlling farm costs).	No, but negotiated between seller and buyer	
Scope of Programme	All aspects: Social, Economic, and Environmental	Only two aspects (e.g. social-economic)	Only one aspect (e.g. economic)	
Standards	Minimum and progress standard	Minimum compliance standard	Scorecard with indicators	
Supply chain coverage	Supply chain record	Chain of custody requirements	Supply chain traceability	
Technical Assistance (TA) and Capacity building	Local Farmers' organization	TA through sustainable agricultural network	Good agricultural practice (GAP)	

Sources: Certification codes of conducts including Fair Trade, Utz, Rainforest Alliance and 4C Schemes.

Appendix C. The descriptive statistic of respondents to the conjoint survey

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Age	Uncertified Lambar	35	39.86	7.923	1.339	37.14	42.58	25	52
	ORGANIC	35	40.06	7.554	1.277	37.46	42.65	25	55
	UTZ	35	42.11	9.216	1.558	38.95	45.28	23	60
	Uncertified Tanggamus	35	45.51	11.559	1.954	41.54	49.48	21	75
	4C	35	45.17	10.942	1.850	41.41	48.93	25	69
	RFA	35	38.86	7.329	1.239	36.34	41.37	21	50
	Total	210	41.93	9.490	.655	40.64	43.22	21	75
Education	Uncertified Lambar	35	8.89	6.850	1.158	6.53	11.24	5	46
	ORGANIC	35	8.29	2.573	.435	7.40	9.17	6	16
	UTZ	35	8.43	2.305	.390	7.64	9.22	6	12
	Uncertified Tanggamus	35	7.74	2.616	.442	6.84	8.64	5	16
	4C	35	8.51	2.853	.482	7.53	9.49	6	16
	RFA	35	8.89	1.922	.325	8.23	9.55	6	12
	Total	210	8.46	3.573	.247	7.97	8.94	5	46
Farming experiences	Uncertified Lambar	35	13.1429	8.10643	1.37024	10.3582	15.9275	2.00	35.00
	ORGANIC	35	17.2286	7.29257	1.23267	14.7235	19.7337	5.00	36.00
	UTZ	35	16.5429	9.03048	1.52643	13.4408	19.6449	1.00	40.00
	Uncertified Tanggamus	35	13.8000	9.18375	1.55234	10.6453	16.9547	.00	40.00
	4C	35	14.4857	10.20199	1.72445	10.9812	17.9902	2.00	48.00
	RFA	35	13.4571	6.59029	1.11396	11.1933	15.7210	1.00	30.00
	Total	210	14.7762	8.53041	.58865	13.6157	15.9367	.00	48.00
Landholding	Uncertified Lambar	35	2.0286	4.05104	.68475	.6370	3.4202	.50	25.00
	ORGANIC	35	1.6000	.98182	.16596	1.2627	1.9373	.75	5.00
	UTZ	35	1.1914	.68829	.11634	.9550	1.4279	.20	3.00
	Uncertified Tanggamus	35	.8286	.66358	.11217	.6006	1.0565	.25	3.00
	4C	35	1.3657	.51831	.08761	1.1877	1.5438	.50	2.30
	RFA	35	1.6214	1.01889	.17222	1.2714	1.9714	.50	5.00
	Total	210	1.4393	1.82470	.12592	1.1911	1.6875	.20	25.00
Productivity	Uncertified Lambar	35	925.0000	77.64929	13.12513	898.3265	951.6735	750.00	1000.00
	ORGANIC	35	1221.1903	463.37835	78.32524	1062.0143	1380.3663	750.00	3000.00
	UTZ	35	806.1909	221.18529	37.38714	730.2111	882.1707	400.00	1500.00
	Uncertified Tanggamus	35	704.0714	219.88907	37.16804	628.5369	779.6060	400.00	1200.00
	4C	35	582.7640	194.24646	32.83364	516.0380	649.4900	266.67	1000.00
	RFA	35	850.5714	304.92953	51.54250	745.8245	955.3184	400.00	1600.00
	Total	210	848.2980	335.94640	23.18250	802.5965	893.9995	266.67	3000.00
Years of participation in certification programs	Uncertified Lambar	35	.00	.000	.000	.00	.00	0	0
	ORGANIC	35	4.00	.767	.130	3.74	4.26	2	5
	UTZ	35	3.60	1.557	.263	3.07	4.13	1	6
	Uncertified Tanggamus	35	.00	.000	.000	.00	.00	0	0
	4C	35	1.91	.373	.063	1.79	2.04	1	3
	RFA	35	4.29	.926	.156	3.97	4.60	2	5
	Total	210	2.30	1.969	.136	2.03	2.57	0	6