Towards a sustainable banana supply chain in Colombia

Rainforest Alliance Certification and economic, social and environment conditions on small-scale banana plantations in Magdalena, Colombia

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Preface

In recent years, public interest in the effects of sustainability certification is rising. Several studies have been published about sustainability certification in the coffee, tea, cocoa or banana sectors, showing the relationship between certification and socio-economic and environmental outcomes. These studies primarily focus on farm level changes in productivity and input use, adjustments in cultivation practices, worker conditions, and ultimately on improvements in household welfare. In addition, studies documented implications of certification for landscape level outcomes, including preservation of biodiversity and reduction of deforestation.

Rainforest Alliance – UTZ (RA) is one of the largest sustainability certification organisations worldwide. The RA Theory of Change postulates that compliance to social and environmental standards, combined with training and technical assistance, leads to better livelihoods for farmers and workers. The sustainable crop production scope within the 2017 Rainforest Alliance Sustainable Agriculture Standard includes 4 principles: (1) effective planning and management system, (2) biodiversity conservation, (3) natural resource conservation, and (4) improved livelihoods and human wellbeing. Each of these principles includes a number of RA critical criteria, to which certified plantations need to comply. These include, for example, protection of forests and other natural ecosystems, a guarantee of at least minimum wages with progression toward living wages, protection of worker rights, and improved worker health and safety.

This study was conducted by Wageningen Economic Research at the request of Rainforest Alliance – UTZ. We assess the relationship between recent RA certification and socio-economic and environmental outcomes on small-scale banana plantations in Magdalena region, Colombia. This region is one of the major banana-producing regions in Colombia, with potential for further growth. We collected data on a large number of socio-economic and environment and agrochemicals indicators among plantation administrators and workers on recently certified and non-certified plantations. Accordingly, a large number of RA criteria, as defined in the 2017 Rainforest Alliance Sustainable Agriculture Standard are evaluated.

This study is based on cross-sectional data, comparing recently certified and non-certified farms at only one point in time. Follow-up studies among the same sample of banana farms will therefore provide a more thorough insight in the direction of causality between certification status and outcome indicators.

Wageningen, March 2019

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Summary

Motivation

Bananas are the most exported fresh fruit in the world, but its production is accompanied by environmental and socio-economic challenges.

Wage workers on plantations and in processing facilities of tropical crops are among the most vulnerable people in the global commodity trade. Voluntary sustainability standards and certification, however, can contribute to the adoption of improved practices, potentially leading to improved labour conditions and reduced pressure on the environment.

Studies examining the impact of certification on banana and fruit plantations are scarce. This study contributes to filling that gap.

The Rainforest Alliance (RA), which manages and oversees a global certification standard for sustainable agriculture, along with other stakeholders, seeks to better understand the full impact of its certification on working conditions, environmental conditions, resource use efficiency, and plantation productivity in its system. The objective of this study is to provide insight into the differences between socio-economic and environment and agrochemicals indicators on RA certified and non-certified small-scale banana plantations in the Magdalena region in Colombia.

The study area, the Magdalena region in Colombia, is an important banana production region, with a combination of RA-certified and non-certified plantations.

Bananas are the third most important export crop in Colombia, and a large share of these bananas is certified. Magdalena is an important banana-producing region in Colombia, especially focusing on high-quality export market. Magdalena region contains a diversity of certified and non-certified plantations. In January 2018, there was a total of 84 RA-certified plantations comprising a total production area of 7,134.61 hectares, corresponding to 47% of the banana sector of Magdalena and La Guajira.

Research setup and methodology

This report presents the results from research among 202 workers on 13 newly certified and 16 non-certified banana plantations in the Magdalena region of Colombia.

In the preparatory stage of the project, stakeholders in the banana sector of Magdalena were contacted. Following this, 13 plantations were selected by availability from all newly RA-certified plantations in the Magdalena region. Larger plantations and plantations certified for more than 3 years did not participate. 16 non-certified plantations were selected from the same sub-region of Magdalena using a snowball (non-probabilistic) technique. Data was then collected on various plantation-level variables through observation and administration interviews. Workers within the plantations were then randomly selected, stratified by contract type (temporary / permanent). Worker data was collected through interviews. Data were collected between March and May 2018 in Spanish, by a team of eight experienced, local enumerators guided by a team leader.

Data are analysed using statistical t-tests and regression analyses.[1] In regression, the relationship between certification status and outcome indicators is analysed for all workers together, as well as in interaction with the contract type of workers (permanent/temporary). The selected non-certified plantations are comparable to newly-certified plantations in most respects, but they differ in terms of size and trader-affiliation. Hence, eventual differences between certified and non-certified plantations are potentially not attributable to certification alone, but also to plantation size and affiliation.

[1] Full regression results are provided in Appendix 4.

Socio-economic indicators

Socio-economic indicators included in this study include wages, working hours, monetary and in-kind benefits, productivity, and the functioning of the grievance system. Socio-economic data were collected via administration and worker interviews.

Results from analysis of administration data show that hourly wages are significantly higher on certified than on non-certified plantations. However, wages reported by workers on certified and non-certified plantations are not significantly different.

According to plantation administrators, the average hourly wage on newly certified plantations is 4,287 pesos and 3,632 pesos on non-certified plantations. However, although wages reported by workers are comparable to wages reported by farm administrators, according to workers, wages do not signicantly differ between certified and non-certified plantations. Instead, contract status is significantly correlated with wages. Workers with permanent contracts earn higher wages than workers with temporary contracts.

Workers with permanent contracts spend more time on the jobs than workers with temporary contracts.

Workers on certified plantations report they spend more time on their jobs on the plantation than do workers on non-certified plantations, which is related to contract status rather than certification: permanent workers report they work 40 hours per week, whereas temporary workers report they work for only 27 hours per week. Both administrators and workers at certified and non-certified plantations state that working hours did not change in 2017.

Assuming full time jobs, monthly wages at newly certified plantations are significantly higher than wages at non-certified plantations, but the difference in wages is also related to contract status.

Monthly wages are calculated assuming that workers work 26 days per month. Both according to administrators and workers, workers at certified plantations earn higher monthly wages than workers at non-certified plantations: 870,262 vs 797,667 COP per month as reported by administration, and 816,421 vs 755,760 COP per month as reported by workers. These wages compare to 781,000 COP as the monthly minimum wage in Colombia (264 USD). However, higher wages cannot be attributed to certification status alone, but also to contract type. Workers with a permanent contract earn higher monthly wages. Monthly wage for a 26 day working week is higher or at least close to the official minimum wage. Overall, wages stayed more or less the same at certified and non-certified farms in the past two years.

Certification contributes to additional monetary benefits for plantation workers, but no statistically significant relation with in-kind benefits could be found.

Workers on newly certified plantations more often have access to monetary benefits than do workers on non-certified plantations, and differences are statistically significant. This relationship is most pronounced for workers with a permanent contract. Monetary benefits include 13_{th} month benefits, paid holidays, leave, and schooling, family, and housing subsidies. These findings are reported by plantation administration and corroborated by workers. Some but not all of these benefits are required by Colombian law. There are limited differences for in-kind benefits between certified and non-certified plantations. In-kind benefits include meals, transportation, health benefits, education, and child care. However, workers with a permanent contract receive more in-kind benefits than temporary workers. Many in-kind benefits were reported by plantation administration but not corroborated by workers.

Certification is related to a safer grievance claim system.

Workers at certified plantations more often perceive the grievance claim system as safe. The same is true for workers with a permanent contract. Results indicate that the benefit of certification in relationship to a safe grievance system is equally large compared to the benefit of having a permanent contract.

Environment and agrochemicals indicators

Environment and agrochemicals indicators in this study include aerial fumigation practices, restrictions and protection measures for workers and neighbours, existence of natural vegetation zones, integrated pest control, and plantation mapping. Environmental data were collected via administration and worker interviews.

Overall, pest management and aerial fumigation practices are similar at certified and non-certified plantations, but some management practices are better organised at certified plantations than at non-certified ones.

All newly certified plantations carry out aerial fumigation and rely on a service provider to do so. 64% of non-certified plantations also rely on such service providers, and an additional 14% carry out aerial fumigation using their own equipment. Plantation managers at certified plantations also have more knowledge about restrictions related to aerial fumigation. At certified plantations, neighbours are notified about pest control through meetings and loudspeaker warnings more often than at non-certified plantations.

Workers and managers at newly certified plantations know more about restricted entry interval policies. Record keeping of applications of pest control and pest incidences is done by the majority of both newly and non-certified plantations.

The use of protective equipment is similar at certified and non-certified plantations, but Restricted Entry Interval after pesticide application is slightly longer at certified plantations.

Protective equipment usage is similar across all plantations, except for the usage of helmets which is more common by workers at newly certified plantations. Furthermore, regression analyses shows that time interval for entry after pesticide application (restricted time interval) is longer at newly-certified plantations. Administrators at newly-certified plantations also more often mention an increase in REI in the last two years compared to administrators at non-certified plantations.

The presence of different types of natural vegetation zones is similar at certified and non-certified plantations, and similar integrated pest control methods are applied.

Both newly certified and non-certified farms were likely to contain conservation areas. Newly certified farms were more likely to have buffer zones on river banks than non-certified farms (92% vs 44%), but this result is not significant in regression analysis. The extent of the buffer zones were extremely variable across all plantations. Regarding integrated pest control, similar methods are applied at both newly and non-certified (manually by machete or scythe and by chemicals).

Production and yields

Newly certified plantations had higher banana yields than did non-certified plantations, but it is not clear how much can be attributed to RA certification status.

Results from worker and administrative survey show that banana yields at newly-certified plantations are higher than at non-certified plantations. Workers and plantation administrators at newly certified plantations also more often perceive that production increased in the last two years than workers and administrators on non-certified plantations. Most likely, higher yields are not the results of certification status alone, as more productive farms are probably more motivated to apply for certification. Note that higher production may go together with higher production costs. Indeed, managers at newly certified plantations have more often perceived an increase in pest management costs over the past two years.

Notes on methodology

Potential selection bias in this study is quite high. Therefore, results cannot be attributed directly to certification status. Box S.1 outlines the four main reasons for potential selection bias.

Box S.1 Risk of selection bias

1. Only a small number of banana plantations were interested in participating in the study. This implies some selection effect, as likely only the more motivated or open planation administrators decided to participate in the study.
2. Only newly certified plantations participated in this study; longer-term certified plantations did not. Most newly-certified farms received certification in 2017. Hence, not all certification-related changes may have fully evolved yet, some change may need more time.
3. All newly certified plantations are affiliated to the same trading company. This means that it is impossible to distinguish between changes caused by trader-specific policies and certification status. Plantation size has been accounted for in all statistical regression analyses.
4. Participating plantations are smaller than the average RA-certified plantations in Magdalena region. Hence, the sample is not representative for all RA certificated plantations in the region, but offers an overview of what occurs at the smallest plantations.

Conclusions

The main conclusions of this study are the following:

- Daily and monthly wages at RA certified plantations are slightly higher than wages at non-certified plantations. However, this difference cannot be attributed to certification alone, but is related to contract status too.
- RA certification is related to more monetary benefits for permanent plantation workers. Certification could thus (indirectly) contribute to higher wages.
- Certification is related to a safer grievance claim system.
- Certification is related to more safety precautions and active communication regarding pest management.

Recommendations

Based on the results of this study, the following policy and research oriented policy recommendations are presented:

Policy recommendations

- Together with supply chain actors, Rainforest Alliance should look into incentives to increase wages, since wages are close to the minimum wage, and deemed insufficient to cover daily needs.
- Supply chain actors in collaboration with Rainforest Alliance should look for incentives to further strengthen the position of temporary workers on certified plantations;
- Rainforest Alliance could together with actors in the banana supply chain address understanding of and access to in-kind benefits;
- Rainforest Alliance could look into possibilities for feasible alternative pest control methods, as replacement for aerial fumigation.

Research recommendations

- To better understand causal relationships between certification on social, environmental, and production indicators in the banana sector, further research is needed.
- For a future impact study, the sample of certified and non-certified plantations should be increased, and the sample should be more balanced in terms of trader affiliation and size;
- To improve assessment of wages, it is recommended to select a larger sample of workers, stratified on job type. This will allow the assessment of how job types interact with contract status and salaries, and will be conducive in making more precise estimates of monthly salaries;
- Implement a second wave of data collection to trace changes over time, and to confirm causal relationships between RA certification and outcome indicators.

1

Introduction

1. Introduction

Bananas are the most exported fresh fruit in the world, but banana production also comes with environmental and socio-economic challenges.

For many Latin American and Caribbean countries, bananas constitute a large percentage of exports, and are therefore vital to their economies. Many households depend on income derived from banana production and bananas are also an important source of nutrition and food security for many. However, due to the enormous scale on which bananas are produced, the impact on the environment (soil, water, air, animals, humans, biodiversity) is great. Pests and disease management methods with significant environmental and human health impacts are widely used (FAO, 2017). Production costs of bananas are rising, whereas downward pressure on retail prices persists. This puts pressure on workers' wages and smallholders' income (FAO, 2018a).

Wage workers on plantations and in facilities producing and processing tropical crops are vulnerable.

According to the Food and Agriculture Organisation of the United Nations (FAO), wageworkers make up 40% of the total agricultural work force and are often part of the poorest of the poor (Hurst 2005; Mueller & Chan, 2015). Wage workers also vulnerable because of agrochemical usage which comes with environmental and human health risks (FAO, 2017). And although wage work at plantations provide an important source of income for rural communities, many wage workers also suffer hunger (ILO, 2017). In addition, casual or temporary workers are often excluded from social services (ILO, 2017). The challenges in the banana sector, combined with the vulnerability of the wageworkers provide an opportunity for sustainability standards such as Rainforest Alliance to address key sustainability issues in the banana sector.

Certification and standards can contribute to the adoption of improved practices.

A recent systematic review on voluntary sustainability standards shows that standards can lead to improved environmental and socio-economic practices (Petrokofsky and Jennings, 2018). However, rigorous evidence on impact of certification on plantation level is scarce (see Ruben, 2017). There are few empirical studies that address impact of sustainability certification in tropical commodities at the level of hired plantation workers (e.g., Ostertag 2014; Krumbiegel et al. 2018).

Rainforest Alliance and stakeholders seek to better understand the full impact of its training and certification programme on working conditions, environmental conditions, resource use efficiency, and farm productivity.

The RA theory of change (ToC) postulates that compliance to social and environmental standards, combined with training and technical assistance, leads to better livelihoods for farmers and workers. This includes, among other things, protection of forests and other natural ecosystems, a guarantee of at least minimum wages with progression toward living wages, protection of worker rights, and improved worker health and safety.

This study investigates plantation-level impact of Rainforest Alliance sustainability certification on banana plantations in the Magdalena region in Colombia.

Changes in adoption rates for various social and environmental good practices in the banana sector have been evaluated in the 2015 and 2018 Rainforest Alliance Impacts Report (Rainforest Alliance, 2016; 2018). The current study complements these evaluations with an in-depth analysis of plantation-level practices. The objective of this study is to provide insight into the potential impact of RA certification on socio-economic as well as environmental and agrochemicals indicators on small-scale banana plantations in Magdalena.

The central research question this study aims to answer is: *Do certified and non-certified plantations differ from each other in terms of social and environmental characteristics, and can potential differences be attributed to RA certification, or other factors?*

Bananas are the third most important export crop in Colombia, and a large share of these bananas is certified.

Bananas have an export value of over 700 million USD in 2013, constituting 11% of total global banana exports (FAO, 2018a). There are several sustainability certification standards active in the banana industry, such as Global Gap, organic, Fairtrade and Rainforest Alliance. Colombia is one of the four biggest exporters of organic bananas (FAO, 2018b) and the second biggest producer of Fairtrade bananas (van Rijn et al, 2016). As of late 2017, 22.1% of all bananas certified by Rainforest Alliance is produced in Colombia (Rainforest Alliance, 2018).

Magdalena is a major banana-producing region in Colombia, focusing on the high-quality export market.

The Magdalena department is located on the northern coast of Colombia, with extensive lowlands suitable for banana cultivation (average precipitation between 1,000 and 1,500 mm[2]. Banana production levels have varied slightly over recent decades due to regional climatic and economic variability, but have been cultivated in Magdalena for over a hundred years. According to the third national agriculture census in 2014, there were 781 production entities in Magdalena, together cultivating 27% of the total area used for banana production in Colombia (DANE, 2015). Furthermore, 42,000 people work directly or indirectly in the banana sector (around 7.5% of the total work force in the region), showing the importance of banana production for the economy of the Magdalena region (Semana, 2017).

Magdalena boasts both certified and non-certified plantations, and there is potential for further expansion of certification.

The Magdalena region boasts a diversity of certified and non-certified plantations. In January 2018, there was a total of 84 RA-certified plantations in Magdalena and neighbouring La Guajira, comprising a total production area of 7,134.61 hectares. This corresponds to approximately 47% of the total banana sector of Magdalena and La Guajira. According to figures from the Magdalena and La Guajiro banana growers association (Asbama), the region produces organic bananas on 2720 hectares, which constitutes almost 20% of the total hectares used for banana production. While some RA-certified banana plantations in Magdalena are also organic, the ones included in this study are not. Bananas in the region are shipped through the port of Santa Marta, which specialises in shipping refrigerated cargo, and through the port of Barranquilla (Semana, 2017). The combination of RA-certified and non-certified banana producers makes this region an interesting area for this study.[3]

Certified plantations in this study are certified to the Rainforest Alliance Sustainable Agriculture Standard (2017). The standard addresses four main outcome areas:

1. Effective planning and management system
2. Biodiversity conservation
3. Natural resource conservation
4. Improved livelihoods and human wellbeing

Under each outcome area, a set of “critical criteria” is formulated to which plantations must comply as a prerequisite to certification. After being certified, plantations enter RA’s continuous improvement system. This is a six-year period during which plantations progress in terms of sustainability over time, moving from ‘good’ (level C) to ‘best’ (level A).[4]

This report presents the results from the socio-economic survey of 202 workers on 13 newly certified and 16 non-certified banana plantations in the Magdalena region. Socio-economic and environmental data were collected between March and May 2018. In addition, at each plantation, a plantation level survey was conducted with plantation administrators.

The report is structured as follows. Chapter 2 explains the methodology and research design of the study, as well as general characteristics of the plantations in the sample. Chapter 3 presents the relationship between certification and socio-economic indicators and chapter 4 presents the relationship between certification and environment and agrochemicals indicators. Finally, Chapter 5 concludes and provides recommendations.

[2] Source: http://atlas.ideam.gov.co/visorAtlasClimatologico.html

[3] Although the main banana producing region of Colombia is in Uraba, this research study focuses on Magdalena because in Uraba, the vast majority of banana plantations is already Rainforest Alliance (RA) certified.

[4] See www.rainforest-alliance.org/business/sas/wp-content/uploads/2017/11/03_rainforest-alliance-sustainable-agriculture-standard_en.pdf

2

Methods and data

2. Methods and data

Preparatory phase

Key stakeholders in the Colombian banana sector were contacted in the preparatory phase of the project.

The research project consisted of a long preparatory phase, starting in May 2017. During this period, the main stakeholders in the Colombian banana sector were contacted by the authors of the study (WUR research team), together with Rainforest Alliance. These stakeholders included Colombian banana producer associations (Augura, Asbama), and banana trading companies (Banasan, Tecbaco, Banarica, Uniban, and Daboon group).

Small, newly certified plantations and independent non-certified plantations were willing to be part of the study. Larger plantations and plantations certified for more than 3 years were also contacted, but could not participate.

The newly certified plantations in the sample are independently owned but all affiliated to the same trading company, one of the major ones in Colombia, which started the process of RA certification in Magdalena in 2017. The plantations affiliated to this trading company operate average production plantations[5] in Magdalena (to be discussed later in study limitations). Long-time certified plantations (including larger plantations) were contacted but were not able to participate. Non-certified plantations had an identified area of 25 hectares each, relatively small compared to RA-certified plantations. These non-certified plantations were selected through snowball sampling (see following section).

Figure 2.1 Study area

Adapted from Shadowxfox, licensed under CC BY-SA 3.0.

[5] Banana farms in this region vary from less than 5 ha to several hundred hectares and, in this study, banana farm size varied from 1 to 38 hectares. For simplicity, however, these farms are all referred to as plantations.

Sample selection

The plantations were selected in Magdalena region, located in northern Colombia.

Data were collected in two administrative zones in Magdalena: Zona Banarera and the neighbouring Cienaga district. Both zones are located in the north of Magdalena. A total of 29 plantations were selected for the study (see Figure 2.1). These included 13 newly certified plantations, affiliated to the same trading company, and 16 non-certified plantations.

The sample of plantations and workers was determined in a two-stage procedure. In the first step, plantations were selected.

Plantations participating in the study were contacted by the research team with no involvement from Rainforest Alliance. Newly certified plantations were selected randomly from the list shared by the trading company. If plantation administrators chose not to participate, the plantation was replaced by another plantation from the list. Non-certified plantations were selected using snowball sampling technique. Snowball sampling uses the network of respondents that are already part of the study. The research team asked plantation managers of newly certified plantations that they interviewed whether they knew of similar non-certified plantations in the same area, and approached these for the study. This approach of course involves the risk of selection bias (only the most open and motivated plantation managers agree to participate). The potential impact of selection bias is reflected on in greater detail in the last part of this chapter.

In the second step of the selection procedure, workers were selected.

The sample of workers was stratified by job type. On plantations with fewer than 15 wageworkers, 5 workers were selected. On plantations with more than 15 wageworkers, 10 workers were selected. Wageworkers were selected randomly split out for the main job types: field workers, packers, and office workers – of which at least one temporary worker (regardless of his or her function). This resulted in a sample of 202 workers – an average of 7 workers per plantation.

At each plantation, an administration level survey was conducted with one or more plantation administrators, and a worker level survey was conducted with the selected plantation workers.

Data were collected by a team of experienced, local enumerators, guided by a team leader. The team was trained and supervised by two local field coordinators. The team leader was responsible for establishing contacts with plantation owners. The study was introduced as “an evaluation of the banana sector” conducted by Wageningen University and Research, without explicit mention of RA certification. Interviewees were also informed that all data would be anonymized. The team leader conducted administrative surveys with one or more plantation administrators. Enumerators conducted worker interviews with plantation workers. Interviews lasted about one hour and were conducted in Spanish (see Appendix 4 for the worker survey tool and Appendix 5 for the administrative survey tool).

Data analysis method

Data were analysed using T-tests and regression analyses.

Data were analysed similarly for worker level variables (n=202) and plantation level variables (n=29). T-tests compare key characteristics between newly RA certified and non-certified plantations. Regression analyses (ordinary least squares, OLS) were also conducted using a list of plantation-level and worker-level control variables. Control variables filter out some of the confounding effects from other characteristics that may influence the outcome variables, including worker characteristics such as age, experience, and gender, plantation size (hectares) and number of workers. Summary statistics of all indicators used are reported in Appendix 2. Full regression results are reported in Appendix 3. Statistical significance of statistical tests is reported using the p-value. All worker-level regression analyses use plantation-level clustered standard errors.

The relationship between certification status and outcome indicators is analysed for all workers together, as well as in interaction with the contract type contract workers have.

In Colombia, workers with permanent contracts have a very different position compared to workers with temporary contracts. They have more job security and access to monetary and in-kind benefits by law. For this reason, effect of certification is also analysed independently, and in relation with the type of contract workers have.

Plantation characteristics

Certified and non-certified plantations are comparable in many respects but differ in terms of size.

Certified and non-certified plantations are compared in terms of a number of key characteristics. Table 2.1 presents results for worker level and plantation level characteristics. The last two columns in the table report statistical significance levels, evaluated using T-test and ordinary least squares regression (OLS). Results show that certified and non-certified plantations are not different in terms of most characteristics. However, certified plantations are larger than non-certified plantations (also see Figure 2.2 and 2.3).

Table 2.1 Key plantation characteristics

	Not certified	Newly certified	T-test	Regression
Worker level data				
Proportion of workers with permanent contract	0.327	0.439	ns	ns
Female workers (proportion)	0.279	0.204	ns	*
Average age of workers (years)	36,077	37,959	ns	*
Education level (on scale 1-5)	2,553	2,469	ns	ns
Experience workers (months)	176,490	146,776	ns	ns
Plantation level data				
Area cultivated with bananas (hectares)	5,546	24,683	***	***
Total plantation area used for banana cultivation (proportion)	0.903	0.974	ns	ns
Total number of workers	11,750	24,769	***	ns

Note: ns indicates no significance; * indicates significance at the 10% level; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

Figure 2.2 Number of workers per plantation (administrative survey, n=29) *Error bars indicate 95% confidence intervals*

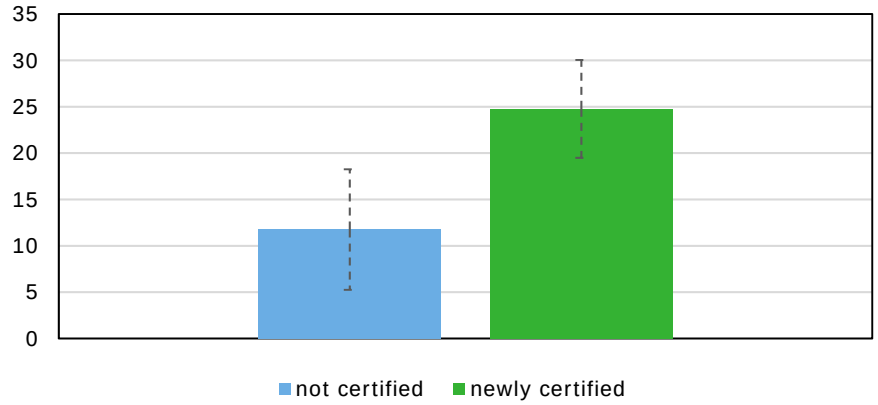
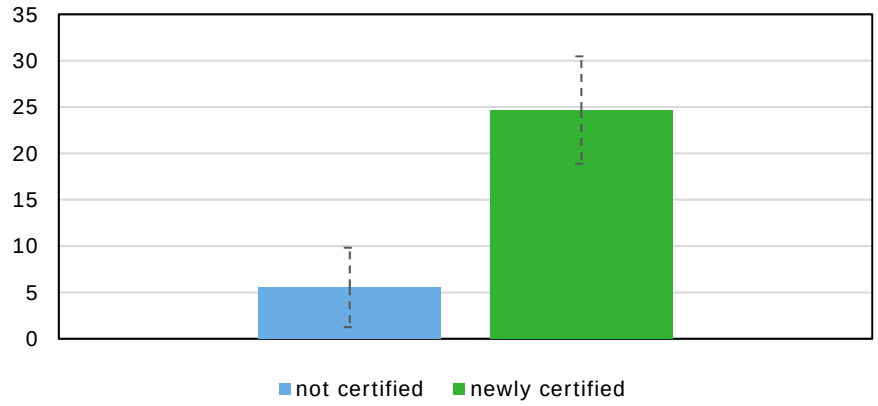


Figure 2.3 Area in hectares dedicated to banana cultivation (administration survey, n=29) *Error bars indicate 95% confidence intervals*



3

Socio-economic indicators

3. Socio-economic indicators

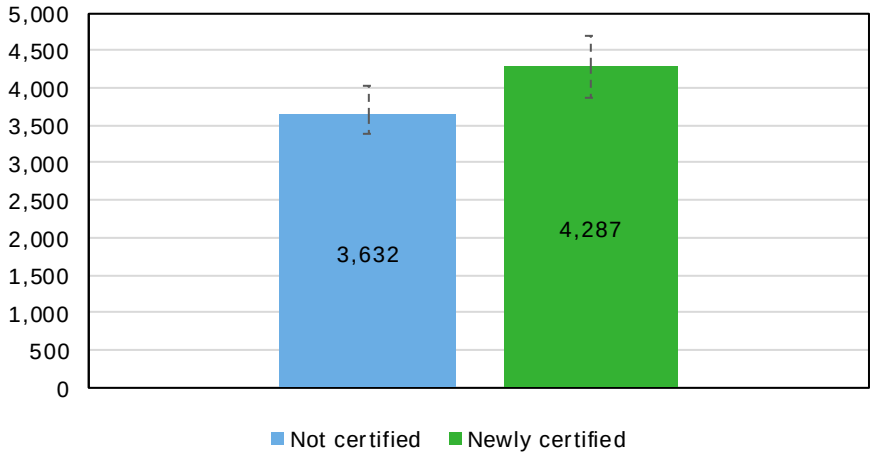
Socio-economic indicators presented in this section relate to Rainforest Alliance Sustainable Agriculture Standard, Principle 4: improved livelihoods and human wellbeing. This section of the standard states that "all humans have equal worth and should be treated well. By following the criteria in this principle, the standard strives for protection of human and labour rights for farmworkers and their families." Criteria include payment of minimum wage, no avoidance of benefits, living wage plans or support access to health care and basic education, access to grievance mechanisms, freedom of association, and occupational health and safety.

Hourly wages

Plantation level data show average wages at certified plantations are higher than wages at non-certified plantations.

Wages were calculated using the reported number of hours and weeks per job.[6] Average hourly wage, based on the plantation administrative survey, is significantly higher on newly certified plantations than at non-certified plantations (difference is significant at the 1% level) (see Figure 3.1). The average hourly wage on newly certified plantations is 4,287 Colombian pesos (COP)—equivalent to 1.45 USD per hour, and on non-certified plantations the average hourly wage is 3,632 COP (or 1.23 USD per hour).[7] Plantation administrators were also asked for the *lowest* wages paid. These do not differ between certified and non-certified plantations.

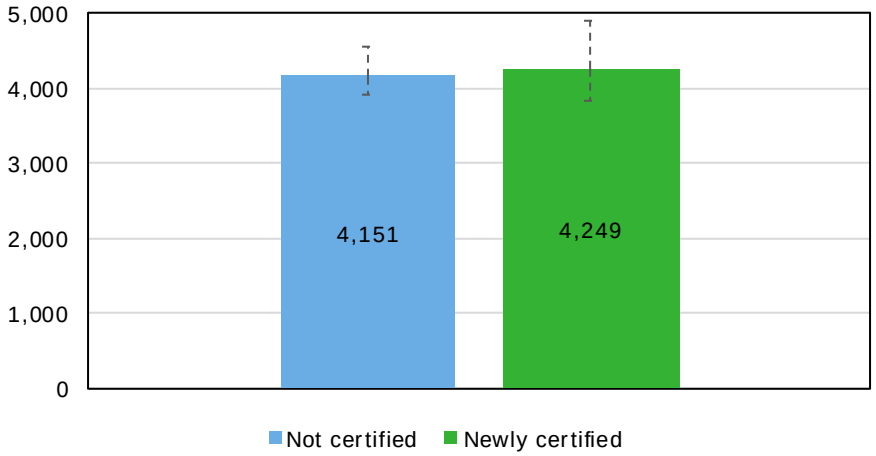
Figure 3.1 Average hourly wage in Colombian pesos (administrative survey, n=29) *Error bars indicate 95% confidence interval*



[6] See Appendix 1 for an elaborate description of how administration reported, and worker reported wages were calculated.

[7] 1,000 COP is equivalent to 0.338 USD (XE currency converter, accessed on 23 August 2018).

Figure 3.2 Average hourly wage workers in Colombian pesos (worker survey, n=199) *Error bars indicate 95% confidence interval*



Wages reported by farm administrators are comparable to wages reported by workers, but they do not differ between certified and non-certified plantations.

To compare workers' hourly wages with the wages as reported in the administration data, hourly wages reported for high and low season are averaged. The average hourly wage is 4,249 COP and 4,151 COP for workers at newly certified and non-certified plantations (see Figure 3.2), or 4,199 COP for the whole sample (n=199). The difference between certified and non-certified plantations is not statistically significant, and neither is the difference in hourly wage in high versus low season (in the instances, workers reported wages for both seasons).[8] Average hourly wage according to workers is 4,396 COP (1.49 USD) at newly certified plantations, and 4,311 COP (1.46 USD) at non-certified plantations in the high season, and 4,094 vs. 4,045 COP in the low season. The magnitude of the wages reported by workers is close to the wages as reported by administrators (difference is not statistically different).

Workers with permanent contracts earn higher wages than workers with temporary contracts.

Since workers with permanent contracts have a different status than workers with a temporary contract, we also relate working hours and wages to contract status. As noted in the descriptive statistics, permanent worker contracts are more common on newly certified plantations (44% vs 33%), but the difference is not statistically significant.

Reported hourly wages should be taken with some caution as many workers are temporary workers who rotate between plantations. This makes it difficult to capture the average amount of hours worked for a specific task or plantation over a certain period. Worker level data show that contract status matters for wages. Table 3.1 shows that both in the high and low season, workers with permanent contracts earn about 700 COP per hour more than workers with temporary contracts. Differences in both high and low season are statistically significant at 1% level.

The difference in wages between permanent and temporary workers are slightly larger at newly certified plantations compared to non-certified plantations. However, differences are small and not statistically significant in a regression analysis.

Table 3.1 Hourly wages for permanent and temporal workers

Hourly wage	Temporary contract	Permanent contract	T-test diff.	Regression
Throughout the year				
All workers	3945	4610	***	ns
	(n=123)	(n=76)		
Newly certified	3940	4637	***	
subsample	(n=54)	(n=43)		
Non-certified	3948	4575	**	
subsample	(n=69)	(n=33)		

Note: ns indicates no significance; * indicates significance at the 10% level; ** indicates significance at the 5% level; *** indicates significance at the 1% level. Regression analysis only for full sample of 'all workers', not for newly certified / non-certified subgroups.

[8] The distinction between high season and low season refers more to peaks of production, than to actual seasons. Because banana production varies throughout the year, wages can vary throughout the year. For this reason, in the worker survey, questions were posed separately for a high and low season. In reality, banana production is not seasonal, but peaks of production can be related to rain. This meant most workers could not identify a high and low season and their answers were related more to peaks of production. This explains why workers sometimes gave only one answer and why more workers reported their wages for the low season (76% versus 61% for the high season).

Working hours

Workers on certified plantations report they spend more working hours on their jobs on the plantation than do workers on non-certified plantations.

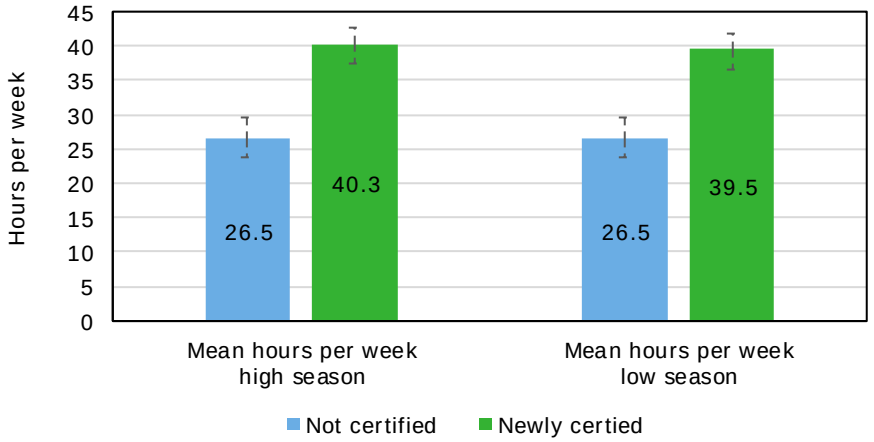
Workers reported time spent on the different jobs they have on the plantation, so hours were summed to reach the average total working hours (see methodology Appendix 1 for more detail). Figure 3.3 shows that workers on non-certified and newly certified plantations spent 26.5 and 40.3 hours per week on all jobs combined. Working hours in the high and low season are similar. Note that these figures include temporary workers as well. In contrast to workers with permanent contracts, workers with temporary contracts are often hired for a single job. They move from one plantation to the next, and may thus spend only a few days at a single plantation. On a weekly basis, permanent workers spent 10 hours more on their main job and 14 hours more on all jobs combined than temporary workers did.

Results from regression analysis show the difference in working hours on certified and non-certified plantations indeed is related to whether a worker has a permanent contract (significant at the 1% level). This suggests that more work hours on newly certified farms may be due to higher likelihood of workers holding a permanent contract. Sex is also loosely related: female workers work fewer hours than male workers (significant at the 5% level in the high season, and at the 10% level in the low season).

Both administrators and workers state that working hours did not change in 2017. Eighty-five per cent of newly certified plantation administrators stated that working hours did not change in 2017, just as non-certified plantation administrators.

Figure 3.3 Average hours per week all jobs (worker survey, n=201)

Error bars indicate 95% confidence interval



Monthly wage

Monthly wages are calculated assuming that workers work 26 days per month.

Workers reported the wages they earn either by day, week, or month. To make monthly wages better comparable across permanent and temporal workers (who often do not work full time on a single plantation), daily and weekly wages were converted to monthly wages assuming full-time work weeks of 6 days (26 days per month).[9] That is, these monthly wage calculations do not depend on hours reported in the preceding section. Therefore, in reality, monthly wages are lower for workers who work less than 26 days per month.

Both according to administrators and workers, workers at certified plantations earn higher monthly wages than workers at non-certified plantations. However, higher wages cannot be attributed to certification status alone, but also to contract type.

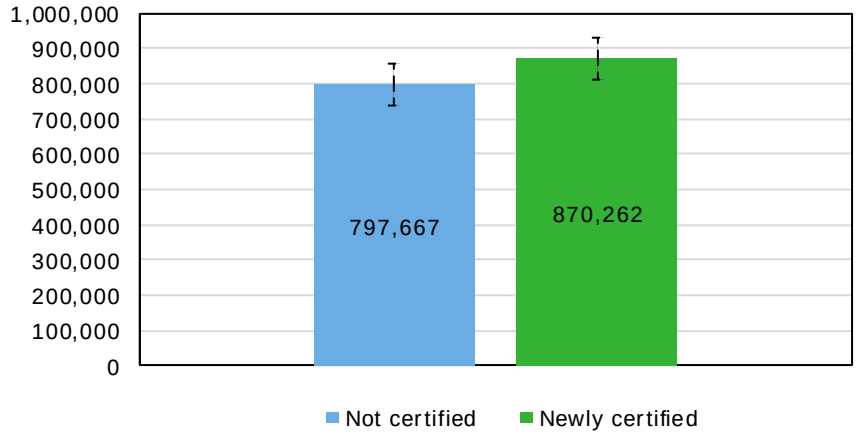
Based on data from the administrative survey, average monthly wage is 870,262 COP (302.40 USD) for workers on newly certified plantation versus 797,667 COP (294.15 USD) for workers on non-certified plantation (see Figure 3.4). This difference is statistically significant in a T-test at the 10% level, and also significantly related to certification status in a regression analysis (significant at the 5% level).

The figures are corroborated by data from the worker survey. According to workers themselves, average monthly wage throughout the year is 816,421 COP (275.95 USD) for workers on newly certified plantations versus 755,760 COP (255.45 USD) for workers on non-certified plantations (see Figure 3.5). Workers on certified plantations earn slightly higher average monthly wages than workers on non-certified plantations (according to T-test, the difference is statistically significant at the 5% level in the high season, and at the 10% level in the low season). However, differences are not statistically significant in regression analysis controlling for other variables. This indicates that the wage difference cannot be attributed to certification status alone; contract status matters too. Especially in the low season permanent workers receive a higher monthly wage than do temporary workers, since permanent workers receive a higher hourly wage (significant at the 10% level).

Monthly wage for a 26 day working week is higher than the official minimum wage.

The results from administration and worker surveys confirm that monthly wages are thus higher (in the high season) or at least close (in the low season) to the official minimum wage of 781,242 COP per month.

Figure 3.4 Monthly wage workers in Colombian pesos (admin survey, n=29)
Error bars indicate 95% confidence interval



[9] See Appendix 1 for detailed explanation on calculation of wages.

Figure 3.5 Average monthly wage workers in Colombian pesos (worker survey) *Error bars indicate 95% confidence interval*

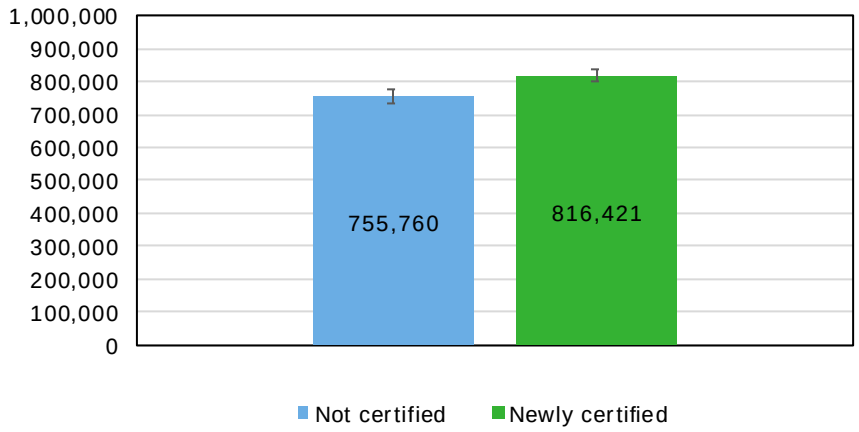
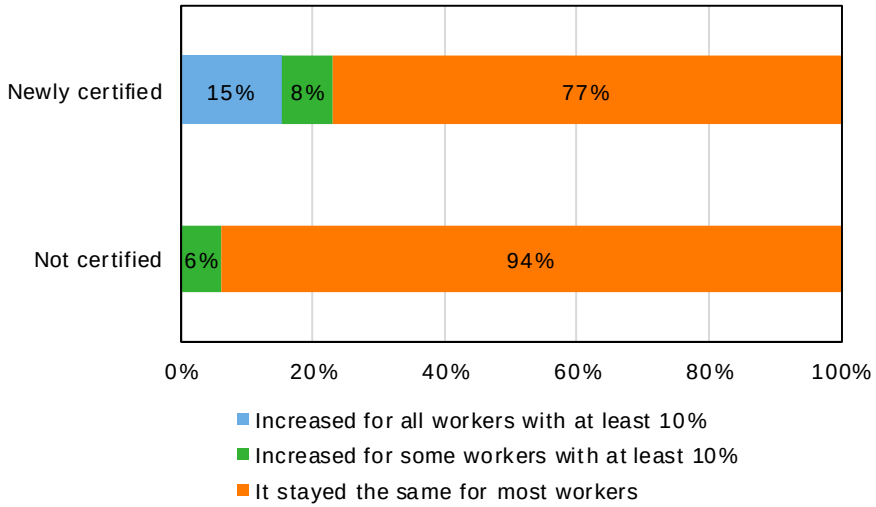


Figure 3.6 Frequency of changes in salaries (administration survey, n=29)



Change in wages

Overall, wages stayed more or less the same at certified and non-certified farms in the past two years.

23% of administrators of newly certified plantations reported that wages increased in 2017, whereas they stayed more or less the same on non-certified plantations (see Figure 3.6). However, these differences cannot be attributed to RA certification, and results are not statistically significant in a regression analysis. This is consistent with results from the worker survey. Workers on newly certified plantations more often mention they receive higher wages for the same hours than workers on non-certified plantations (57% versus 38%), whereas workers on non-certified plantations more often indicated to receive the same wage for the same hours (20% versus 38%). Note that workers are more likely than administration to report salary increases, but this may be related to a yearly inflation correction, which administration would not perceive as a significant increase.

Reported wages are similar to the national minimum wages, but are deemed insufficient to cover all daily needs by more than half of all workers.

The minimum hourly wage in Colombia is 3,255 COP, based on a daily wage of 26,041 COP and monthly of 781,242 COP.[10] The reported hourly wages for permanent workers are well above this figure, while wages for temporary workers are around the minimum wage. Nevertheless, 60% of workers on newly certified plantations and 52% on non-certified plantations deemed their wage insufficient for their daily needs. 53% of permanent workers stated their wage is not sufficient to cover daily needs.

[10] Note that Colombia does not have a minimum hourly wage, but a minimum monthly wage. In 2018, this amounts to 781,242 COP per month. This excludes transport allowance (88,211 COP per month). Here, the minimum monthly wage is converted to an hourly wage by assuming a 40-hour work week (Ministerio del Trabajo, 2017).

Monetary and in-kind benefits

Workers on newly certified plantations—especially those with permanent contracts—are more likely to receive different types of monetary benefits than workers on non-certified plantations.

According to plantation administrators, both permanent and temporary workers on newly certified plantations are more likely to receive various monetary benefits than workers on non-certified plantations. Table 3.2 shows an overview of all monetary benefits, and the answers of both plantation management and workers, for permanent and temporary workers separately. Administrators on all newly certified plantations state that all of their permanent workers receive a 13th month wage, paid leave and holidays (compared to about 30% of non-certified plantations). Workers with temporary contracts are also more likely to receive benefits on newly-certified plantations than on non-certified plantations.

Like administrators, workers on newly certified plantations also reported receiving more monetary benefits on average than workers on non-certified plantations. Monetary benefits mentioned by workers include subsidies for schooling, family and housing, as well as a 13th month and paid leave and holidays. Regression results show that certification does increase the access of monetary benefits for permanent workers, more significantly so than for temporary workers.

According to plantation administrators, workers on newly certified plantations more often receive different types of in-kind benefits, but results are not always corroborated by workers.

Workers on certified plantations also report receiving slightly more in-kind benefits (such as meals, schooling, and transportation), but this difference is not statistically significant in regression analysis: the result disappears when controlling for worker and plantation-specific characteristics. Table 3.3 shows that, overall, both plantation administrators and workers at newly certified plantations report receiving more in-kind benefits compared to administrators and workers on non-certified plantations, including transportation to plantations, basic schooling, some health benefits, interest-free loans and advanced payment of salaries. Workers with permanent contracts more often report receiving in-kind benefits than temporary workers.

Regardless of the discrepancy in reporting between administrators and workers, overall results show that workers at newly certified farms are more likely to receive monetary benefits and in-kind transportation benefits. However, as noted above, administration at newly certified plantations claim high rates of in-kind benefits, which are not confirmed by workers.

Most workers (more than 90%), in both newly certified and non-certified plantations, reported they did not observe any changes in the in-kind benefits they had access to in 2017.

There are three possible reasons for differences in reporting on benefits between administrators and workers.

The differences in reporting may be due to a combination of three reasons: (1) lack of knowledge among workers (also due to the presence of temporary workers, who may be less well informed than permanent ones). It is likely that plantation administrators are better informed than workers; (2) to the possibility that workers reported on actually used benefits, rather than having access to benefits, and (3) to an incentive to over-report on benefits among administrators, especially if they know these benefits should exist as part of the certification.

Table 3.2 Farmers receiving monetary benefits, according to administrative survey and worker survey

	Administrative survey				Worker survey			
	Permanent workers		Temporary workers		Permanent workers		Temporary workers	
	not certified	*newly certified*	*not certified*	*newly certified*	*not certified*	*newly certified*	*not certified*	*newly certified*
13th month wage	31%	100%	19%	77%	56%	70%	1%	16%
Paid holidays	31%	100%	0%	23%	29%	74%	0%	24%
Sick leave	25%	100%	6%	69%	41%	79%	0%	20%
Maternity leave	13%	46%	0%	8%	3%	12%	0%	4%
Schooling subsidy	19%	69%	6%	15%	3%	30%	0%	13%
Family subsidy	25%	85%	0%	15%	6%	37%	0%	4%
Housing subsidy	19%	62%	0%	8%	0%	2%	0%	0%
Other	0%	0%	0%	0%	0%	6%	0%	0%
N (# observations)	*16*	*13*	*16*	*13*	*34*	*43*	*70*	*55*

Table 3.3 Farmers receiving in-kind benefits, according to administrative survey and worker survey

	Administrative survey				Worker survey			
	Permanent workers		Temporary workers		Permanent workers		Temporary workers	
	not certified	*newly certified*	*not certified*	*newly certified*	*not certified*	*newly certified*	*not certified*	*newly certified*
Complete breakfast	63%	85%	31%	62%	50%	35%	34%	24%
Complete breakfast for family	31%	15%	6%	0%	15%	0%	1%	0%
Other meals	19%	0%	6%	0%	29%	0%	14%	7%
Other meals for family	6%	8%	0%	8%	6%	2%	0%	0%
Transport between plantation and villages	31%	85%	6%	77%	32%	70%	0%	13%
Other types of transport	0%	0%	0%	8%	6%	2%	0%	0%
In-kind health benefits	13%	62%	0%	23%	21%	28%	0%	4%
Basic schooling	13%	62%	6%	8%	3%	16%	0%	4%
Professional education	6%	8%	0%	0%	0%	0%	0%	0%
Child care	6%	8%	0%	0%	0%	0%	0%	0%
Funeral assistance	6%	62%	0%	8%	0%	5%	0%	2%
Interest-free loans	25%	77%	0%	23%	9%	21%	0%	9%
Advance payments	13%	54%	6%	0%	3%	16%	0%	4%
N (# observations)	*16*	*13*	*16*	*13*	*34*	*43*	*70*	*55*

Box 3.1 Definition grievance mechanism

Grievance mechanisms are formal processes that can be used by workers to file claims about certain situations, business processes or events that they feel negatively affected by. These could for example include claims of instances of discrimination, abuse or unfair treatment.

Certification is related to a stronger sense of protection in the grievance claim system for workers.

According to plantation administrators, in 2017, workers on certified plantations filed on average two more grievance claims than workers on non-certified plantations. This difference, however, is not statistically significant in a regression analysis. Newly certified plantations more often reported they document and record grievance claims (69% compared to 38% on non-certified); they also review grievance claims more often (100% reviewed once a month or once every three months compared to non-certified plantations where 50% are reviewed once a month or once every three months and the rest are reviewed less often. Yet, these differences are not found to be significant after statistical testing.

Worker level data show that on newly certified plantations, 44% of workers feel protected in the grievance process, versus 32% of workers at non-certified plantations. Regression results indicate that it is likely that RA certification indeed contributed to the sense of protection. The same is true for permanent workers at both certified and non-certified plantations.

Workers' perceptions regarding rights to organise is similar between workers on newly-certified and non-certified plantations, but workers organisations are not present among plantations in the study region

Most workers described their rights to organise as "partially free" or "restricted", and half said they were "partially informed" about their rights to organise. Results were similar between newly certified and non-certified plantations. Furthermore, on newly certified plantations, 76% of workers stated that workers who organise are treated "equally", compared to 49% of workers on non-certified plantations who stated this. However, regression results and T-tests indicated no statistically significant differences in these figures for newly and non-certified plantations. Finally, workers on newly certified plantations more often reported high "respect" from administration in terms of payment and benefits (46% on newly certified vs 35% on non-certified), but the difference is not significant.

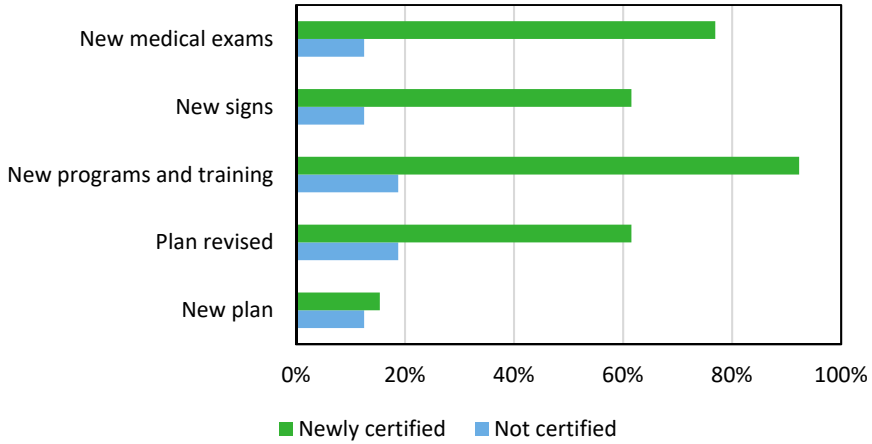
In some banana growing regions in Colombia, including Uraba, workers unions are common. In Uraba, almost all banana workers, no matter the plantation they are affiliated with, belong to a workers union. In Magdalena, the workers union is not very strong: only one of the workers in the sample reported being a member of a workers organisation.

Newly certified plantations more often have a professional for occupational health (OH) practices, but there is no statistically significant difference between newly certified and non-certified plantations in how OH is practiced.

The administrative survey included questions on OH practices. Plantation managers reported whether OH is practiced at the plantation and described the profile of the officer/coordinator of OH. All newly certified plantations have an OH professional versus 19% of non-certified plantations. The profile of these OH professionals is described as having had education, experience and extensive training in OH and sanitation. OH practices are of the following: identify risks, security trainings, security signs, and medical exams. At newly certified plantations, managers more often mentioned these practices, but the difference with non-certified plantations is not statistically significant.

Furthermore, managers were asked whether any changes in OH occurred in the last two years. The frequencies of answers are provided in Figure 3.7. Managers at newly certified plantations more often report changes. In particular, new programmes and training is reported by 92% of newly certified plantations while only 19% of non-certified ones reported this change. A T-test suggests certified plantations more often have made this change in OH (significant at the 1% level). The differences, however, are not significant in a regression analysis.

Figure 3.7 Percentage of managers reporting changes in occupational health practices in the last two years (administration survey, n=29)



4

Environment and Agrochemicals

4. Environment and Agrochemicals

Indicators in this section refer to certain additional elements of Principle 4 (Improved livelihoods and worker wellbeing), Principle 3 (Natural resources conservation), and Principle 2 (Biodiversity conservation), of the RA standard. Objectives and outcomes here include safe use of agrochemicals and sustainable farming practices, which include criteria on restrictions on aerial fumigation, use of protective equipment, and various other safety measures. Indicators related to these topics are presented first. Then, related to biodiversity conservation and protection of natural ecosystems, criteria include protection and management of buffer zones and natural ecosystems.

Pest control application and restrictions

All newly certified plantations carry out aerial fumigation and rely on a service provider to do so. Administrators on newly certified plantations report more instances of areas where fumigation is restricted, but most differences are not statistically significant.

All newly certified plantations perform aerial fumigation (for pest and disease control), versus 79% of non-certified plantations. The newly certified plantations all contract an expert or an external service provider to conduct spraying. Most non-certified plantations also contract a service provider for aerial fumigation, and the remaining 21% conduct pest control on-site manually.

Plantation managers reported where aerial fumigation is restricted on their plantation. Sixty-nine per cent of managers at non-certified plantations described restricting aerial fumigation around communities, compared to 44% of newly certified plantations, 85% around all houses and towns compared to 69%, and about 62% of both types of plantations reported around public roads (see Table 4.1). In these cases, differences were not statistically significant. 69% of managers at non-certified plantations reported 'Around aquatic ecosystems' versus 38% of managers at newly certified plantations. This difference is significant in t-test, but no longer statistically significant when several main characteristics of plantations and workers are considered in regression analysis.

Table 4.1 Areas where aerial fumigation is restricted

	Communities	All houses and towns	Public roads	Around aquatic ecosystems	Other
Newly certified (N=13)	69%	85%	62%	69%	8%
Not certified (N=16)	44%	69%	63%	38%	0%
T-test	ns	ns	ns	*	ns
Regression	ns	ns	ns	ns	ns

Note: ns indicates no significance; * indicates significance at the 10% level; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

Agrochemical safety: Personal protective equipment and Restricted Entry Intervals

Protective equipment usage is similar across all plantations, with the exception of workers at newly certified plantations being more likely to wear a helmet and all of their personal protective equipment (PPE).

89% of workers use personal protective equipment (PPE) as a measure related to the application of agrochemicals. This is similar at newly certified and non-certified plantations. Furthermore, workers reported whether they used masks, helmets, boots and/or gloves. Workers at newly certified plantations wear a helmet (47% versus 17% at non-certified plantations, significant at the 5% level) significantly more often. There are no further differences in usage of PPE. Overall, 77% of workers use a mask, 91% gloves and 48% use boots. However, workers at newly certified plantations are more likely to wear *all* of their equipment when they use it (16% versus 6%).

Workers were also asked *how often* they wear PPE when applying agrochemicals, and if they wear all equipment. Results show that workers at newly certified plantations do not use PPE more often than workers at non-certified plantations.

One consideration with the above results is that workers on newly certified and non-certified plantations perform different job tasks, and workers on newly certified farms might be more specialized, since these plantations are larger and hold more workers (25 vs 12 per plantation). Hence, it is possible that workers on newly certified plantations are more likely to be plant workers and therefore not need as much PPE, whereas workers on non-certified plantations are more likely to have various tasks, including activities with agrochemicals, and therefore use PPE. However, this observation cannot be confirmed due to the fact that few workers reported the content of their jobs in a consistent manner.

Workers in certified and non-certified both report a Restricted Entry Interval of 3.5 hours, but regression results show that the time interval is slightly longer at newly-certified plantations.

Workers and plantation management were asked about the knowledge of Restricted Entry Interval policies (REI). REI is the time immediately after a pesticide application when entry into the treated area is restricted, to protect workers after pesticide application. The actual time interval mentioned by both workers and managers is about 3.5 hours. There is no significant difference between newly certified and non-certified plantations on the estimated interval based on simple T-test results. However, regression analysis shows that time intervals are longer at newly-certified plantations.[11] Administrators at newly-certified plantations also more often mention an increase in RIE in the last two years compared to administrators at non-certified plantations (77 vs. 55%) (Figure 4.2).

At certified plantations, the policy of notifying staff and neighbours about pest control is organised more actively than at non-certified plantations.

Plantation managers were asked about the policy of notifying neighbours about pest control. Thirty-eight per cent of administrators at certified plantations indicate that they organise regular, scheduled meetings to inform people about upcoming pest control, whereas this method is not mentioned at non-certified plantations. 85% of newly certified plantations describe making other announcements to neighbours, compared to 18% on non-certified.

In addition, announcements during meetings to staff and plantation workers are more common at certified plantations (see Figure 4.1). At non-certified plantations, communication about pest control is mostly done using labels or signs to notify neighbours about the upcoming fumigation. Regression results indicate these differences are indeed related to certification status.

Figure 4.1 Frequency of ways of notifying neighbours about pest control, multiple responses possible (administrative survey, n=29)

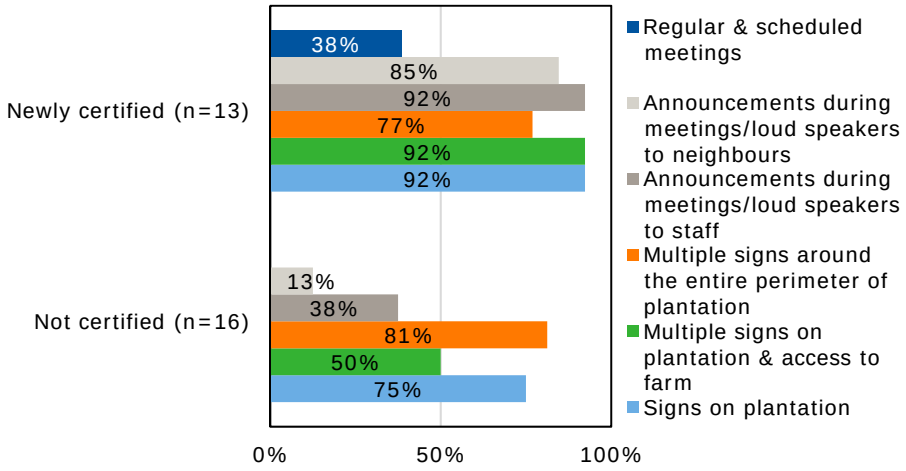
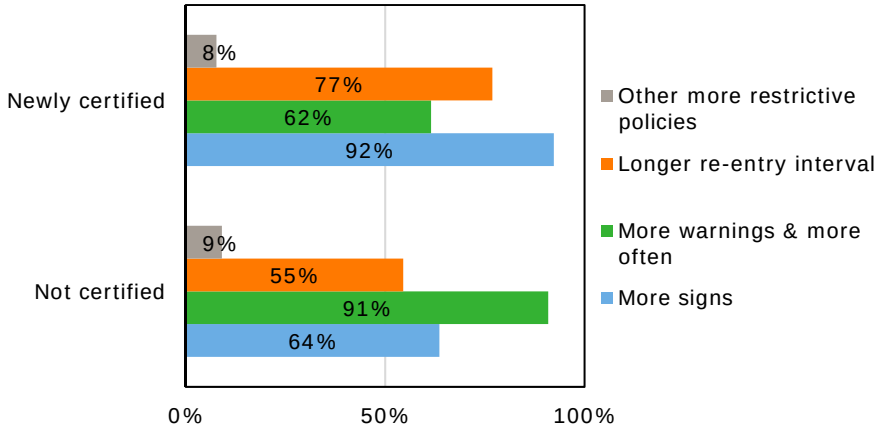


Figure 4.2 shows that administrators at newly-certified plantations also more often mention an increase in number of warning signs used in the last two years compared to administrators at non-certified plantations (92 vs. 64%).

[11] A significant regression result while the difference in a simple T-test is not significant, can be caused by low statistical power of the T-test compared to regression analysis with control variables—in combination with the small sample size. The significant result in the regression could also be due to spurious effects. Therefore, the result should be interpreted with some caution.

Figure 4.2 Changes noticed in REI in last two years (administrative survey, n=24)



Record keeping of applications of pest control and pest incidences is done by the majority of both newly and non-certified plantations.

Around 80% of plantations keep records of the number of applications of pest control and around 75% of all plantations record pest incidences. There are no statistical differences between newly certified and non-certified plantations.

Natural vegetation zones, integrated pest control methods and mapping

Existence of natural vegetation zones is similar at all plantations. Ground cover is also reported at 100%, on both certified and non-certified plantations.

Natural vegetation zones constitute conservation areas, fallow areas, buffer zones on the river banks and other buffer zones of natural vegetation. Existence of natural vegetation zones is similar for newly certified and non-certified plantations. Newly certified plantation managers mention considerably smaller buffer zones at river banks (but this result does not hold in regression analysis when controlling for worker and plantation characteristics).

Ground cover was reported as 100% of the production area on all plantations, with more than one species, by both newly certified and non-certified plantation managers.

This study did not include trends over time in the extent of natural vegetation zones. Without knowing these trends, it is not possible to estimate the effects of certification on natural vegetation zones.

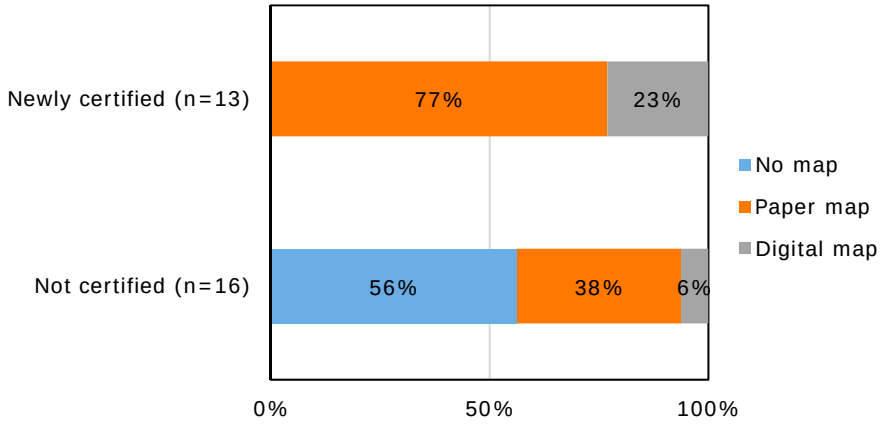
At both newly and non-certified plantations, integrated pest control is largely done manually by machete or scythe and by chemicals.

The majority of managers at both newly certified and non-certified plantations indicated they used biological methods (85 and 64%), manual methods (85 and 100%), and any other methods (62 and 50%). Among 'other methods', less than 10% of both newly and non-certified plantations mention the usage of traps. Manual methods both for insect pests and weeds are the usage of a scythe and/or machete as mentioned by all non-certified plantations and by 77% of newly certified plantations.

Contrary to non-certified plantations, all newly certified plantations are mapped.

44% of non-certified plantations are mapped, versus 100% of newly certified ones, but this difference is not statistically significant in regression analysis. Plantations with maps confirm the map became more detailed in the last two years. Newly certified plantations have a digital map more often (see Figure 4.3).

Figure 4.3 Frequency of plantations with plantation map (administrative survey, n=29)



5

Production & yields

5. Production & yields

Improved worker conditions and farm practices, stimulated by certification, may in the longer run also contribute to higher yields (e.g., see Rainforest Alliance, 2015). This study does not allow to measure the impact of RA certification on yields, due to the short period plantations in the sample have been certified. However, data on banana yields, production costs, and perceived changes in production volume were collected among plantation administrators as well as perceived changes in pest management costs. These are reported below.

Banana yields at newly-certified plantations are higher than at non-certified plantations.

Accounting for the land size dedicated to banana production, yields (production of boxes per week per hectare) have been calculated. Regression results show that certification status is correlated with yields: they are higher at newly certified plantations than at non-certified ones (see Table 5.1).

Table 5.1 Production variables at newly certified and non-certified plantations (administrative survey, n=29)

	Yield (boxes per week per ha)	% production with export quality	Costs of production per crate
Newly certified	43 (1)	100 (0)	19,000 (1,000)
N	13	13	2
Non-certified	39 (2)	97 (3)	14,364 (742)
N	16	16	11
T-test	**	ns	**
Regression	*	ns	ns

Note: Values are mean, with standard deviation in parentheses, followed by n. ns indicates no significance; * indicates significance at the 10% level; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

Both workers and plantation administrators at newly certified plantations more often perceive that production increased in the last two years than workers and administrators on non-certified plantations.

When asked about their perception on changes in production in the last two years, 30% of newly certified plantation administrators report that production has increased, while no increase is reported by managers on non-certified plantations (see Figure 5.1). Similar results are found based on the worker survey. Regression results indicate these worker and plantation level differences are indeed related to certification status of the plantations.

Most likely, higher yields are not the results of certification status alone.

It is not likely that higher yields are (solely) a result of certification, given the short period plantations in the sample have been certified. The result may rather indicate reverse causality. In other words, more productive plantation owners may be more motivated to apply for certification, than less productive ones. The yield increase may also be related to technical assistance and training received from the trader in recent years.

Figure 5.1 Change in banana production over past two years (administrative survey, n=29)

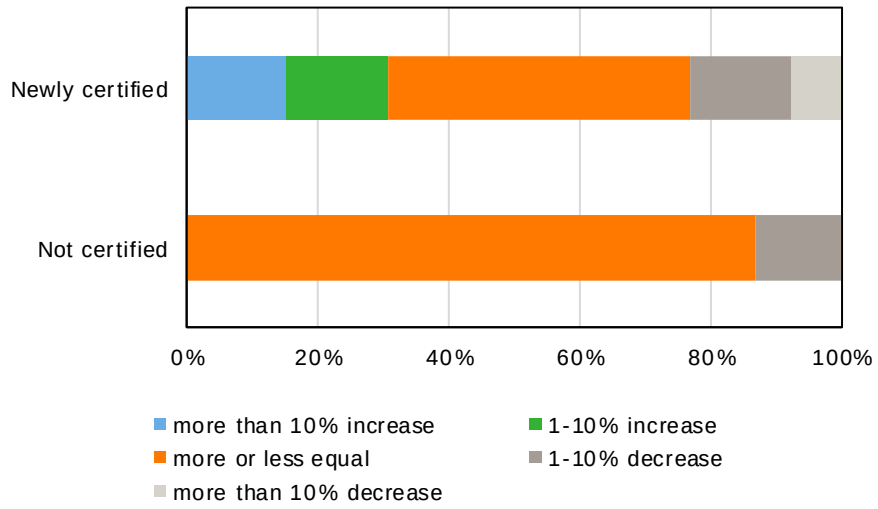
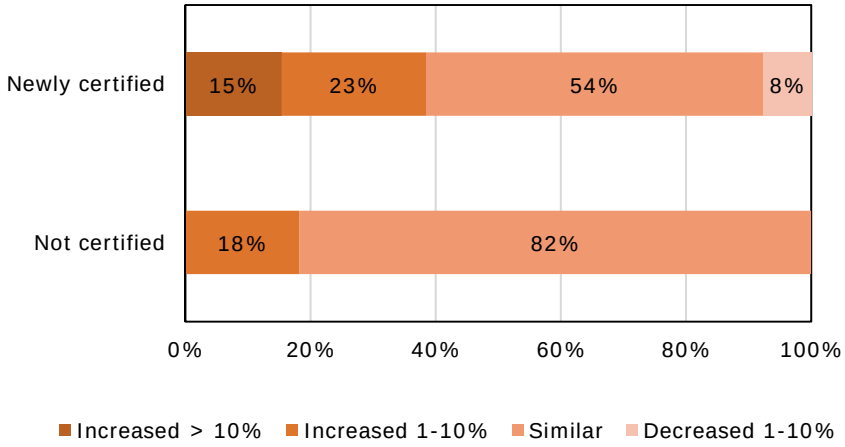


Figure 5.2 Frequency of plantation managers which reported change in pest management costs for past two years (administrative survey, n=29)



Higher production may go together with higher costs of production. Indeed, managers at newly certified plantations more often perceive an increase in pest management costs during the past two years.

At newly certified plantations, 38% of administrators report an increase in pest management costs in the past 2 years, compared to 18% of administrators at non-certified plantations (see Figure 5.2). This is, however, not attributable to certification status. Possibly, as yields at certificated plantations increased, it is not surprising that pest management costs increased as well—possibly due to technical assistance or training provided by the trader.

Risks of selection effects and related potential bias

6. Risks of selection effects and related potential bias

Potential selection bias in this study is quite high. Therefore, results cannot be attributed directly to certification status. Readers should be aware of four study limitations with regards to selection effects and other potential forms of bias, which are helpful for interpreting the outcomes of this study.

1. Only a small number of banana plantations were interested in participating in the study.

In the preparatory phase of this research project, it became apparent that key stakeholder in the banana value chain, including producer organisations, traders' organisations, and traders themselves, were unwilling to become part of the study. Their cooperation was needed for random sample selection. However, none of these organisations – save one – were willing to share lists of affiliated plantations.

Without formal support from traders' organisations, it was not easy to find plantation owners willing to be part of the study. As a result, it is possible that the plantation owners that participated in the study were more open than those who did not participate. The sample of plantations in this study is thus not fully representative for all small plantations in Magdalena.

2. Only newly certified plantations participated in this study; longer-term certified plantations did not participate.

The research team received a list with newly-certified plantations from one of the traders. Hence, only newly-certified plantations are part of this study. The implication is that the effects of certification may not yet be fully visible yet; some changes need some time. On the other hand, as plantations are in the middle of a transformation process, plantation owners, and perhaps even workers, may be additionally aware of the implications of certification. This awareness may fade somewhat over time. Hence, effects of certification may be subject to change over time. It is possible that yields will increase over time, whereas awareness of worker rights and safety regulations may be at its peak at the moment.

3. All newly certified plantations are affiliated to the same trading company, and are larger than non-certified plantations.

The selected non-certified plantations are comparable to newly-certified plantations in most respects, but they differ in terms of size and affiliation. Newly certified and non-certified plantations are comparable in terms of geographic location, contract types, level of education of workers, months of worker experience, and the proportion of total land used for banana cultivation. However, non-certified plantations are smaller than the sample of newly certified plantations (see Table 2.1, Figure 2.1 and Figure 2.2). The average number of workers on certified plantations is 25, compared to 12 on non-certified plantations. This is also reflected in the area dedicated to banana production: 25 hectares on average on newly certified plantations; compared to 5.5 hectares on non-certified ones.

In addition, all newly certified plantations are affiliated with the single trader that did share a list of affiliated plantations. This trader is one of the main players in the Colombian banana market, and started the process of certification in Magdalena region only recently—in 2017. The trader affiliation is fully correlated to certification status. Trader affiliation potentially affects yields through technical assistance and training to the plantations, which then makes it difficult to isolate the effects of certification.

4. Participating plantations are smaller than the average Rainforest Alliance certified plantations in Magdalena region.

Finally, the newly certified plantations are all relatively small compared to other RA-certified banana plantations in Magdalena. The plantations affiliated to this trading company operate an average area of 25 hectares each. In comparison, the average banana production area for RA certified plantations in the Magdalena region is about 80 hectares.

Hence, the results from this study may not be representative for RA certification in Colombia, or even in the Magdalena region. It is possible that

effects of RA certification would be different on larger plantations, due to scale effects. The direction of these possible differences could be positive or negative. However, the results of this study are indicative for the impact of Rainforest Alliance certification on small plantations.

In all analyses, plantation size is included as control variable, which filters out some, but not all of the correlation between plantation size and outcome indicators.

7

Conclusions and recommendations

7. Conclusions and recommendations

The aim of this study was to assess the effect of Rainforest Alliance certification on socio-economic and environment and agrochemicals indicators on small-scale banana plantations in Colombia. To this end, this study compared newly certified RA plantations with non-certified plantations in Magdalena, Colombia, in terms of selected socio-economic and environment and agrochemicals indicators. Data were collected through structured interviews with 29 plantation administrators and 202 workers. Based on the analysis of the plantation and worker level survey data, and taking into account the methodological considerations, a number of conclusions can be drawn, followed by a set of policy and research recommendations.

Conclusions

Socio-economic indicators

Assuming full time jobs, monthly wages at newly certified plantations are slightly higher than wages at non-certified plantations, but the difference in wages cannot be attributed to certification status alone.

Monthly wages were calculated assuming that workers work 26 days per month. Both according to administrators and workers, workers at certified plantations earn higher monthly wages than workers at non-certified plantations. However, higher wages cannot be attributed to certification status alone, but also to contract status. Workers with a permanent contract earn slightly higher hourly and thus monthly wages than workers with temporary contracts. Note that, in reality, temporary workers even earn lower wages, as they work fewer hours than permanent workers. Overall, wages stayed more or less the same at certified and non-certified farms in the past two years.

Monthly wages were calculated assuming full-time work, but workers at certified plantations reported significantly more working hours per week than workers at non-certified plantations. Regression analysis showed that this difference is due to contract status of workers, rather than to certification status of the plantation. Data indicate that newly-certified plantations employ a larger fraction of permanent workers than non-certified plantations (44 versus 33%). However, this difference is not statistically significant. Nevertheless, these results indicate that certification status may relate to higher wages through the provision of permanent contracts. Wages reported by administrators and workers are similar, and confirm that wages are well above or at least close to the official minimum wage in Colombia.

RA certification is related to more monetary benefits and in-kind transportation benefits (but not to other in-kind benefits), mostly so for permanent plantation workers.

Contract type matters for monetary and in-kind benefits: permanent workers have access to more monetary and in-kind benefits than temporary ones. However, certification strengthens the access of permanent workers to monetary benefits, such as 13th month wage, and paid leave and holidays, and in-kind benefit of transportation. Hence, even though it cannot be confirmed that hourly wages are higher on certified than on non-certified plantations, total monthly wages, including benefits, are likely to be different—especially for permanent workers. For example, inclusion of a 13th month wage would account for a 10% higher yearly wage.

It is possible that part of this difference is due to plantation size differences. Plantation owners of the smallest plantation may not be able to provide these benefits to their few workers. However, it is likely that at least part of the difference can be attributed to RA certification, as these benefits are part of the RA standard.

RA certification is related to a more developed grievance systems, and workers at certified plantations feel safer in the grievance claim system, when they make use of it.

Administrators at newly certified plantations describe more documentation and more frequent review of grievance claims. Workers at certified plantations also report they feel safer in the grievance claim system than workers at non-

certified plantations. It is likely that this is related to RA certification, as the grievance system is explicitly part of the RA standard.

Environment and agrochemicals indicators

RA certification is related to more actively organised pest control notification.

The study shows that there are no large differences in pest management practices at newly certified and non-certified plantations. Aerial fumigation is widespread on both types of plantations. This is in line with findings from a recent study by Bellamy et al. (2016) among RA-certified plantations in Costa Rica, which reports little difference in the application of pesticides between Rainforest Alliance certified banana plantations and non-certified plantations in Costa Rica. Note that it is not fully clear to what extent trading companies are involved in plantation management decisions including pest control, and whether the management of small plantations can decide about aerial fumigation. However, administrators at certified plantations in Magdalena are more active in communicating warnings to plantation workers and neighbours than managers at non-certified plantations. It is likely that this result is attributable to RA certification, as safety regulations are at the core of the RA standard. Record keeping of applications of pest control and pest incidences is done by the majority of both newly and non-certified plantations.

Results cannot confirm that RA certification is related to more frequent use of protective equipment, but RA certification is related to slightly longer Restricted Entry Interval after pesticide application.

Results show that protective equipment usage is similar across all plantations, with the exception workers at newly certified plantations are more likely to wear a helmet and to wear all of their equipment. Workers at newly certified plantations do not use PPE more often than workers at non-certified plantations. However, use of PPE is not disaggregated for job types, which — ideally — should be done to get a better understanding of the use of relevant PPE at the right moments. For example, plant workers would need fewer protective measures than workers involved in application of pest control.

Results based on the worker survey show that the time interval of entry after pesticide application is slightly longer at newly-certified plantations. Administrators at certified plantations also observed a larger increase in RIE in the past two years than administrators at non-certified plantations. Like for pest control notification, it is likely that the difference in RIE is attributable to RA certification, as safety regulations are at the core of the RA standard.

Existence of natural vegetation zones and application of integrated pest control methods is similar at certified and non-certified plantations.

Natural vegetation is generally limited at banana plantations. In addition, RA-certified farms are only required to meet minimal natural vegetation criteria. With respect to IPM, practices are likely to be similar at certified and non-certified farms, due to industry-wide pest control practices that are recommended in the banana sector.

Production indicators

Newly certified plantations had higher banana yields than did non-certified plantations, but it is not clear how much can be attributed to RA certification status.

Improved worker conditions and farm practices, stimulated by certification, may, in the longer run, also contribute to higher yields. Results show that banana productivity (production per hectare) is significantly higher at RA-certified plantations than at non-certified plantations. The relation between certification and productivity is in line with various studies about the impact of RA certification in the coffee sector (e.g., see Haggar et al. (2012) on costs and benefits of sustainable coffee production in Nicaragua, and Hughell and Newsom (2013) on impact of RA certification on coffee plantations in Colombia. However, as far as we are aware, there is no published research about the relationship between certification and yields in banana plantations.

Current yield differences are likely related to affiliation to the trader. Traders provide technical assistance through their own agronomists, although the amount and quality of training provided varies. It is thus not possible to (fully) attribute this result to RA certification. However, higher productivity may be related to RA certification in the longer term.

Recommendations

The results of this study have led to a number of policy and research related policy recommendations.

Policy recommendations

Together with supply chain actors, Rainforest Alliance should look into incentives to increase wages.

Data show that wages on certified plantations are slightly higher than on non-certified plantations, especially when taking into account the higher number of monthly working hours among permanent workers. Workers at certified plantations, especially those workers with permanent contracts, also more often have access to monetary benefits. These could make a significant contribution to annual incomes. However, reported wages are just above or close to the national minimum wages. And according to more than half of the workers, wages are deemed insufficient to cover all daily needs.

Hence, it is recommended to look for plantation level incentives to increase wages at certified plantations. Note that this second point is addressed in the 2017 Rainforest Alliance standard, which had just come into effect at the time of the study. The standard includes the living wage concept as a means of addressing worker wages.[12]

Together with supply chain actors, Rainforest Alliance could address the position of temporary workers.

Workers with a temporary contract receive lower salaries and have access to monetary and in-kind benefits less often than workers with a permanent contract. Ideally, certification would also provide incentives to plantation owners to further strengthen the position of temporary workers. Results indicate that the fraction of permanent workers is larger on certified plantations than on non-certified plantations, although the difference is not statistically different. As the majority of workers has a temporary contract, receiving lower wages and fewer benefits, the position of temporary workers could be addressed. Together with supply chain actors, RA could address how benefits related to certification interact with benefits that are part of national labour law, and how these relate to contract types. It is also recommended to look for incentives to further strengthen the position of temporary workers on certified plantations, and to assess whether some temporary workers could receive a permanent contract.

Together with supply chain actors, Rainforest Alliance could address access to in-kind benefits, as on both certified and non-certified plantations, administrators and workers report differently on access to in-kind benefits.

It was expected that RA certification would increase access to in-kind benefits. However, results from the surveys show that plantation owners systematically report more access to in-kind benefits than workers do. It is not clear whether this is due to knowledge differences, or to the fact that workers may have access to in-kind benefits but do not use them, or to incentives to over or underreport access to benefits. This is something to investigate further. Hence, together with actors in the banana supply chain, Rainforest Alliance could address understanding of and access to in-kind benefits in training sessions with workers and plantation managers.

Together with supply chain actors, Rainforest Alliance could look into possibilities for alternative pest control methods.

Results from this study indicate that all certified plantations use aerial fumigation for pest control. This is a widespread practice in the banana production sector. Safety regulations are strict, especially at RA-certified plantations. However, aerial fumigation comes with high risks for the environment and human health. It is not fully clear to what extent trading companies are involved in plantation management decisions, including decisions about pest control. Therefore, together plantation management and trading companies, RA could investigate the possibility of introducing feasible alternative pest control methods that could reduce aerial fumigation.

Research recommendations

To better understand causal relationships between certification on social, environmental, and production indicators in the banana sector, further research is needed.

To date, very little published research exists about causal relationship between certification and social, environmental, and production indicators.

[12] Currently, a living wage benchmark is being calculated for the agriculture sector in the Uraba region. This will be relevant for certification in the future (see https://www.globallivingwage.org/countries/colombia/).

Even though the current study cannot point out the direction of causality directly, it provides a valuable contribution to existing literature. However, it is a topic that needs to be examined further, using good comparison groups, large samples, and multiple data collection rounds over time. The next three research recommendations address these issues in more detail.

Increase the sample of certified and non-certified plantations, and make sure that the sample is balanced in terms of trader affiliation and size.

The design of the current study was not optimal for several reasons. All certified plantations are affiliated to the same trader, and certified and non-certified plantations differed in terms of size.

This has implications for this study, as it potentially confounds the findings. For a future study, it is important to increase the sample of plantations, and make sure that plantation characteristics are orthogonal to certification status.

Increase the sample of workers, stratified by job types and contract status, as this would allow for a more precise assessment of wages and help draw better conclusions about the use of relevant personal protective equipment.

To improve the assessment of wages, it is recommended to select a larger sample of workers, stratified not only on contract status but also on type of jobs. This will allow the researchers to assess how job types interact with contract status and salaries, and will be conducive in making more precise estimates of monthly salaries.

Implement a second wave of data collection to trace changes over time, and confirm causal relationships between RA certification and outcome indicators.

Carrying out a second wave of data collection in a few years would be valuable for two related reasons. First, a follow-up analysis of the same sample of plantations would allow Rainforest Alliance to track whether differences between certified and non-certified plantations change over time. Possibly, some effects will increase over time, as the results of some changes related to certification, may need time to become visible (and measurable). It is also possible that other differences become smaller, such as the costs of production.

Second, a follow-up study would allow for more reliable conclusions on the attribution of differences to RA certification. In other words, it would allow the research team to identify causal relationships with more confidence.

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Appendix 1 Indicator definition

Wages

To calculate hourly wages from the available survey data, some calculations and choices have been made. These are explained below.

Admin data

From the data from the administration survey, the lowest on-plantation wage and the average on-plantation wage was calculated, for both the low and the high season. In the survey, wages could be reported per hour, per day, per week or per month. From the answers given it is evident “per month” was not always well understood, as respondents did not report the total amount of hours here but did indicate the length of time was 4 weeks, which is indeed almost a month.

Administrators reported their wages as monthly or daily, for up to five activities at the plantation.

Wages were calculated per hour and per month. To reach hourly wages, the following steps were taken:

- Wages reported daily are divided by the average number of hours reported per week
- Wages reported monthly are divided by 4.33 weeks per month and by the number of hours reported per week
- Hourly wages are calculated for each of the five activities and in the end averaged.

To reach monthly wages, the following (similar) steps were taken

- Wages reported as daily are multiplied by 26 days per month
- Wages reported as daily that did not match with the reported hours, were excluded (n=29), which resulted in 103 observations for all activities left
- Wages reported as monthly were left as they were

Worker data

Workers reported either their daily (n=59), weekly (n=16) or monthly wage (n=127), for up to 3 jobs or tasks. To calculate the worker level wages, the following preparatory steps were undertaken for hourly wage:

- Second task hours without explanation and that created inconsistent results were dropped;
- Wages for high and low season and tasks were adjusted to have the same unit for each worker;
- In some cases, reported monthly wages were inconsistent with the total number of hours reported in that month. In these cases, it was assumed that the average daily or weekly wage was reported, instead of the total monthly wage.

Subsequently, average hourly wages were calculated for the 3 main jobs together.

Some of the amount of working hours reported by the farmers may have been under- or overestimated. In addition, the working period for the wage paid (per hour, per week, per month or per job) is unreliable for some farmers. Hourly wages were excluded if they exceeded 9,765 pesos (which is three times the minimum wage). Consequently, 4 observations for the high season and 2 observations for the low season were excluded from the analysis.

To calculate the worker level monthly wages, the following was done:

- Daily wages were multiplied by 26 working days to get an estimate for the monthly wage (in Colombia workers usually work 6 out of 7 days per week);
- Weekly wages were multiplied by 4.33 weeks to get an estimate for the monthly wage.

In this way, the average monthly wage was calculated for both the high and low season.

A comparison of these wages should be done with caution; keeping in mind that 62% of workers are actually part-time employed and therefore receive less than a minimum wage (per month). Also, when comparing monthly rates to the national minimum wage, it must be remembered permanent workers receive many benefits on top of their monthly wage, and a bare comparison may not be precise.

Other indicators

Other indicators used in the analysis are constructed as indicated in the table below:

Indicator	Description	Definition
banarea	Proportion of total plantation area cultivated by bananas	total area used for banana production / total plantation area
wtothrpm_high	average hours/week high season for all jobs	total hours summed per week all jobs high season
inkind_count	amount of in-kind benefits received out of 14	counted amount of in-kind benefits
monben_count	amount of monetary benefits received out of 8	counted amount of monetary benefits

Appendix 2 - 5 Provided separately

Appendix 2	Statistical overview & regression results
Appendix 3	Regression results
Appendix 4	Administrative survey
Appendix 5	Worker survey

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The mission of Wageningen University and Research is ‘To explore the potential of nature to improve the quality of life’. Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 5,000 employees and 10,000 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.