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The Fairtrade social premium and its implications for rural development

by Jorge Sellare

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The Fairtrade social premium and its implications for rural development

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Abstract. Fairtrade differentiates itself from other sustainability standards such as Rainforest Alliance and UTZ by demanding that buyers pay farmers at least a minimum price and a Fairtrade social premium. The social premium is a sum paid to cooperatives in addition to the agreed price to be used for projects that strengthen the cooperative or benefit the community in the villages more broadly and it is often mentioned in the literature as one of the key mechanisms through which Fairtrade engenders changes in the small farm sector. However, no previous study has explicitly analyzed what the social premium is used for, the decision-making processes of how to use the premium, and whether farmers, workers, and the local communities benefit from these projects. In this article, we first analyze how the use of the premium is related to cooperatives' organizational characteristics. Then, using instrumental variable regressions, we explore potential benefits of the social premium for the local communities. We analyze whether (i) participating in a certified value chain and (ii) living in a village with a premium-financed education project have an effect on household education expenditure. We find evidence that living in a village with a premium-financed education project has a positive effect on education expenditure among farmers, but does not affect expenditure among rural workers.

Keywords: certification; cooperatives; education; Fairtrade premium; social premium; sustainability standards

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1. Introduction

Developing countries in Latin America, Southeast Asia, and Africa still face major challenges in achieving the United Nations' Sustainable Development Goals (SDGs) by 2030, despite some progress in recent years (Moyer & Hedden, 2020). In the absence of government funds, private-sector investments in public goods can be an alternative to support socioeconomic development (Aust et al., 2020). Private-led initiatives that foster the development of global agricultural value chains are an effective option to support pro-poor economic growth in developing countries (Christiaensen & Martin, 2018; World Bank, 2020a). In this context, sustainability standards emerged as a mechanism to ensure that farmers in developing countries have access to higher-value markets and receive a better price for their produce while addressing consumers' concerns about social injustice and environmental degradation (Ladhari & Tchegnina, 2015).

One of the mechanisms that Fairtrade uses to foster sustainable development is the Fairtrade social premium¹, which is paid on top of the agreed price (per kg). It is to be used for projects that address the social, economic, and environmental needs of certified farmers and of the local communities (Fairtrade, 2019a). These projects include, but are not limited to, direct payments to farmers, investments in operations and production, and improvements in community infrastructure. In the small farm sector, the social premium is managed by the cooperatives, but decisions on how to spend it take place in a democratic arena, ensuring that individual and collective interests are heard (Loconto et al., 2019). As such, the Fairtrade social premium has a significant potential to be used as a means to privately finance community-led investments in infrastructure.

¹ Fairtrade refers to it simply as "Fairtrade premium" while the term "Fairtrade social premium" is often used in the academic literature.

The social premium has been pointed out by many studies as a key mechanisms through which Fairtrade benefits farmers and workers (Jena & Grote, 2017; Sellare, Meemken, & Qaim, 2020; Van den Broeck et al., 2017; van Rijn et al., 2019), especially in improving child education (Akoyi et al., 2020; Meemken et al., 2017). However, others have been critical of the social premium, arguing that not everyone benefits equally from these projects and that there are problems in the decision-making processes. Cramer et al (2017), for instance, noted that often the poorest did not benefit from community projects as they were not granted access to certain facilities. Other studies have pointed out that even when farmers and workers do benefit from these projects, the processes through which they are implemented are marked by patronage and exclusion (Dolan, 2010), and many farmers undervalue investments that are made to benefit the community as a whole (Ruben & Fort, 2012). Earlier studies have also highlighted how the effectiveness of projects financed with the social premium and the processes through which decisions are made often depend on the organizational structure of the cooperatives (Valkila & Nygren, 2010). However, these issues have never been empirically analyzed in the literature.

Systematically analyzing what the social premium is used for and whether it benefits local communities has been difficult if not impossible, given prevalent research designs. Almost all studies use data from household surveys, where either farmers or workers are sampled from a few purposefully selected cooperatives or commercial farms². Without data from a sufficiently large number of cooperatives, it is impossible to make generalizable statements about how cooperatives spend the social premium and whether it is indeed used to make substantial community investments. With better data, we can also analyze to what extent the use of the premium is associated with the organizational structure of these cooperatives. These are policy relevant issues also beyond Fairtrade and specific case studies. For example, a better understanding of how cooperative characteristics and community-benefiting investments are

² The two exceptions in the literature are the studies by Meemken et al. (2019) and Sellare et al. (2020).

related could help development agencies target cooperatives or invest in structures that will likely lead to greater benefits for communities.

In this paper, we use data from 1,000 farmers and rural workers (cooperative workers and farm workers) sampled from 50 cocoa cooperatives of Côte d'Ivoire to address the following research questions: 1) What is the Fairtrade social premium used for? 2) Are there associations between the organizational structure of cooperatives and how the social premium is used? 3) Who benefits from the projects implemented with the social premium? To the best of our knowledge, this is the first study that explicitly focuses on the use of the Fairtrade social premium and that provides empirical evidence on whether the social premium indeed fosters community-driven development. As such, we describe how a large number of randomly selected cooperatives use the premium and provide new insights on how the use of the social premium relates to the characteristics of these cooperatives. We also contribute to the literature by presenting empirical evidence of the effects of Fairtrade certification and the Fairtrade social premium on different actors, including not only smallholder farmers but also cooperative and farm workers (who are often not members themselves).

2. Fairtrade, the social premium, and child education

According to Fairtrade International, in 2016, more than 150 million Euros were paid to small producer organizations as social premium (Fairtrade, 2018), while the cocoa sector alone received 44 million Euros in 2018 (Fairtrade, 2019b). Around 40% of all Fairtrade certified cooperatives choose to invest part of the premium in community infrastructure and services (Loconto et al., 2019). The literature on Fairtrade certification often mentions these projects aimed at improving community welfare. These include investments in child education, promotion of health campaigns, improvements in the infrastructure of health clinics, construction of roads and bridges, installation of clean water facilities, construction of tanks

and latrines (Darko et al., 2017; Dragusanu & Nunn, 2018; Jena & Grote, 2017; Meemken et al., 2017; Ruben & Fort, 2012; Valkila & Nygren, 2010). We briefly discuss below some mechanisms through which cooperative characteristics might affect the use of the social premium and the mechanisms through which Fairtrade can affect child education.

Since in the small-farm sector the social premium is managed by the cooperatives, their organizational structure can affect how these funds are used. For example, the premium management structure and the form of participation can directly affect what the social premium is spent on. A formal separation between the premium decision-making processes from ordinary business decisions might support more investments in social projects. However, embedded decision-making can lead to a prioritization of projects aimed at improving the cooperatives themselves (Loconto et al., 2019). Other aspects can also play an important role. For example, cooperatives that are in their early stages of operation might choose to invest more on strengthening themselves (Valkila & Nygren, 2010). The extent to which cooperatives encourage members to participate in meeting and who these members are can also have an effect, as farmers might prefer investment that benefit them individually (Ruben & Fort, 2012).

Participation in a Fairtrade-certified value chain might affect child education both through an income and a substitution effect. The income effect relates to households experiencing income gains from participating in certified value chains and facing lower volatility in terms of income. These benefits might encourage higher investments in education and thus positively affect education expenditure (Gitter et al., 2012). The substitution effect describes a potential increase in the opportunity cost of a child's time in school, which could reduce both school enrollment rates and household education expenditure (Becchetti et al., 2013; Gitter et al., 2012).

Besides these two effects, Fairtrade can also affect education through community investments made with the social premium, such as building schools, providing financial assistance to cover

school-related expenses, or supporting awareness campaigns about the importance of child education (Akoyi et al., 2020; Dragusanu & Nunn, 2018; Karki et al., 2016; Meemken et al., 2017; Ruben & Fort, 2012). These community-led initiatives might have significant effects on school enrollment (Akoyi et al., 2020) and on the number of years that a child stay in school (Becchetti et al., 2013). Furthermore, they can encourage households to use a larger share of their income on education-related expenditures (Meemken et al., 2017). This effect is even more likely to be realized if households experience increases in income for commercializing in certified channels.

3. Materials and methods

3.1. Study area

This study was conducted in the Southeast of Côte d'Ivoire, an area that includes the traditional cocoa belt of West Africa. This area was purposefully selected because of its high number of Fairtrade certified cooperatives and non-certified cooperatives. Since the late 1970s, Côte d'Ivoire has been the world's leading cocoa-producing country, currently accounting for over 40% of the global cocoa production (FAO, 2020). The cocoa sector, dominated by smallholder farmers, has been one of the major drives of the economic growth of Côte d'Ivoire, but this economic success has not translated into higher equality. Around 50% of the rural population still lives below the poverty line (IFAD, 2017) and the families that rely on cocoa production for their livelihoods face serious threats to production, such as a myriad of pest and diseases, degraded soils, and old trees, all of which keep yields low (Wessel & Quist-Wessel, 2015).

The rural population faces several other challenges. According to the World Bank (2020b), around 64% of the rural population of Côte d'Ivoire does not have electricity in their homes and 44% still practice open defecation. Access to water services is deficient as 43% of the rural population does not have access to basic drinking water services, while only 10% have access

to basic hand-washing facilities in their homes, including soap and water. These figures show that the region still faces serious problems related to the provision of basic services.

Côte d'Ivoire has more than 600 cocoa cooperatives (MADR, 2017). Out of these, in 2017, 152 cooperatives were Fairtrade certified, with a total of 129,783 registered members (Fairtrade, 2019b). These cooperatives vary substantially in terms of size and many of them have registered members living in several villages. Their headquarters, however, are usually located in bigger towns. Together, these cooperatives sold over 150,000 MT of cocoa as Fairtrade certified in 2017, which has generated more than 26 million euros in Fairtrade social premium. This represents 70% of the social premium that has been paid to the world's cocoa sector in that year (Fairtrade, 2019b).

3.2. Sampling and data

For the empirical analyses, we use primary data collected between May and June 2018 from 500 farmers and 500 rural workers (cooperative workers and farm workers) randomly sampled from 50 cocoa cooperatives. With the help of local extension agencies, Fairtrade International, and other international organizations, we compiled a list of all cooperatives in the Southeast of Côte d'Ivoire. From this list, we randomly selected 25 certified cooperatives and 25 non-certified cooperatives. We interviewed the leader of each cooperative using a structured questionnaire, containing detailed questions about the organizational structure of the cooperative, such as the number of members and employees, volumes of cocoa commercialized, provision of services to members, assets owned, among others. We also presented the leaders of the cooperatives with a list of issues that are important for the functioning of the cooperative (e.g., choosing a new president, choosing the members of the board of directors, accepting new members, excluding members, hiring employees, etc.) and asked them to indicate which of these issues were decided democratically in the general assembly.

For the 25 certified cooperatives, we also collected data on the use of the Fairtrade social premium. More specifically, we asked the cooperative leadership to list all projects financed with the social premium that had been implemented between 2013 and 2017. For each project, we collected information about the purpose of the project, the total amount spent in West African Francs (CFA), the names of the villages where the projects were implemented, and whether services related to the project were exclusively provided/accessible to those affiliated to the cooperative. Cooperatives often have members in many different villages, and the catchment area of these cooperatives tend to overlap. Therefore, projects with public goods characteristics can theoretically benefit farmers from multiple cooperatives as well as non-members.

In addition to the cooperative leaders, we randomly sampled and interviewed 10 farmers, 5 cooperative workers, and 5 farm workers (locally known as *aboussant*) from each cooperative, using complete member and employee lists. We designed specific questionnaires for each group of respondents in which we captured data on socioeconomic characteristics, agricultural production, off-farm employment, among others. In all questionnaires, we included identical modules to capture information about life in their villages. We asked respondents to name the top three issues that should be addressed in their villages and how satisfied they were with the provision of basic services (e.g., health and education) on a scale from 1-10. By calculating the village mean of these variables, we obtain a picture of the perceived quality of the infrastructure and services available in the villages.

3.3. Classification of projects and education expenditure

The Fairtrade social premium can be used in a broad variety of projects. For the purposes of our analyses, we group these projects in ten categories, which will be used throughout the remainder of this article. These categories are described in Table 1.

Table 1. Classification of projects financed with the Fairtrade social premium

Project categories	Description
Ag. inputs	Purchase of fertilizers, pesticides, protective clothes, machetes, and other tools
Cooperative	Purchase of land, computers, vehicles, and other assets; construction/improvement of storage rooms, and headquarters' facilities; strengthening of the financial capacity of the cooperative
Credit	Provision of credit
Direct payments	Cash payment to farmers
Education	Construction/improvement of schools; promotion of education campaigns; provision of financial support for families to pay for education-related expenses
Health	Construction/improvement of health care centers; promotion of health campaigns
Other community infrastructure	Construction of radio towers, latrines, improvement of housing, purchase of generators
Roads/transportation	Construction/improvement of roads and bridges
Water	Construction of wells and hydraulic pumps
Miscellaneous	Provision of training for farmers and the cooperative staff; payment of certification fees; finance of reforestation and waste management projects

As explained in section 2, several sources report that the social premium is often used to finance projects related to child education. Therefore, we want to focus on education projects to illustrate whether the social premium can benefit the local community in the villages. In our analyses, we use household education expenditure per child as a proxy to educational quality, which has been used before in other studies that evaluate the effect of certification on child education (Becchetti et al., 2013; Meemken et al., 2017). This variable is defined as the total amount of money that a household spends in one year with child education, such as uniforms, school materials, and fees. This value is then divided by the number of children in schooling age (between 6 and 18 years) present in the household. In our data, 288 respondents reported not having any children in schooling age; hence they were omitted from the analyses.

3.4.Data analysis

3.4.1. Partial Least Squares (PLS)

Agricultural cooperatives are heterogeneous, and their characteristics possibly determine benefits for members. To understand how different cooperative characteristics are related to each other and to decision-making processes can be challenging, given the high number of

correlated variables that can affect these processes. To reduce the dimensionality of the data and to analyze how cooperative characteristics are correlated with the use of the Fairtrade social premium, we use Partial Least Squares (PLS).

PLS is a technique for multivariate statistical analysis that is often used for predictive modeling in Ecology (Carrascal et al., 2009; Johnson et al., 2016). Although PLS is not usually applied in Agricultural Economics, it is an appropriate technique for our empirical problem. It allows us to deal with high-dimensional data by converting a larger number of correlated variables into a set of linearly uncorrelated variables, often called components or latent variables. This is structurally similar to principal component analysis (PCA), as both techniques reduce the dimensionality of the data and calculate scores and loadings for each component. The main difference is that, in PLS, the dimension reduction technique used to calculate the components is supervised by the outcome, i.e., it chooses the components trying to maximize the covariance between the scores of the matrix X (predictors) and the scores of the matrix Y (outcome variables) (Carrascal et al., 2009). Another advantage of PLS is that Y can be a multivariate matrix, which allows us to model several outcome variables at the same time. This is relevant in our context since we want to look at the relationship between cooperative characteristics and the allocation of the social premium into several types of projects (Table 1). Furthermore, this technique allows us to use circles of correlations to visualize the data in a two-dimensional space and thus easily interpret how the variables are correlated.

Out of the 25 sampled certified cooperatives, 5 were excluded from the analysis. Three of them had not yet implemented any project using the premium, and the other 2 refused to disclose what they had used the premium for. We chose the variables in X taking into consideration different aspects of these cooperatives that might play a role in determining how well they function. Therefore, we chose variables that describe the cooperatives in terms of their governance structure, human, physical, and social capital. The complete list of variables can be

seen in Table 2. In the matrix \mathbf{Y} , we have variables that describe the share of the social premium that the cooperatives spent on different kinds of projects, which were categorized according to Table 1. The PLS was carried out in R using the *pls* package (Wehrens & Mevik, 2007).

3.4.2. Instrumental variable (IV) models

To analyze the effects of Fairtrade certification and premium-financed education projects on household expenditure with child education, we estimate four separate regression models: one for the full sample, and one for each sub-group of farmers, cooperative workers, and farm workers. All regression models are of the following type:

$$\log(1 + EE_{ijk}) = \alpha + \beta FT_{jk} + \gamma EP_k + \delta \mathbf{X}_{ijk} + \theta \mathbf{W}_{jk} + \varphi \mathbf{V}_k + \varepsilon_{ijk} \quad (1)$$

EE_{ijk} represents our outcome variable, the education expenditure per child for household i in cooperative j , and village k . To reduce the effect of outliers and facilitate the interpretation of the results, we log-transform the outcome variable. However, around 10% of the observations in our sample have reported zero expenditure with education, despite having school-aged children in the household. Since the natural logarithm of zero is undefined, to retain these observations for the analyses, we add a one to the outcome variable before taking the logarithm. FT_{jk} and EP_k are our dummy variables of interest. The former represents if the respondent participates in a Fairtrade certified value chain, i.e., if they are a member of a certified cooperative (farmers) or if they work for a certified employer (workers). The latter, EP_k , represents if the respondent lives in a village where an education project financed with the Fairtrade social premium was implemented. If the coefficients β and γ are positive and statistically significant, we can conclude, respectively, that certification and the social premium have positive effects on education expenditure.

In all regression models we control for vectors of household, cooperative, and village-level variables that might influence the certification status of respondents and expenditure with education, here represented respectively by X_{ijk} , W_{jk} , and V_k . It is noteworthy that since we did not collect village-level data, the variables in V_k were constructed calculating the village mean of variables captured in the farmer and worker questionnaires that proxy the perceived quality of the infrastructure and services provided in the villages. In all estimations, the error term ε_{ijk} is clustered at the village level. For these regressions, we excluded the 288 respondents that did not have any children between 6 and 18 years old in the household. Therefore, we used a total of 712 observations: 433 farmers, 147 cooperative workers, and 132 farm workers.

Whether cooperatives, farmers, and workers participate in a certified value chain is not determined at random. Although we control for a broad range of variables that might simultaneously influence (i) cooperatives' and households' ability and willingness to participate in a certified value chain, and (ii) expenditures in education, it is possible that we do not capture all factors. Therefore, we estimate the models above using an instrumental variable (IV) approach to test and control for endogeneity. We use three instruments that have been used in other studies conducted in the same setting (Meemken et al., 2019; Sellare et al., 2020): (i) the share of Fairtrade certified farmers in a 5 km radius³, (ii) the distance to the closest Fairtrade certified cooperative; and (iii) the mobile phone provider of the cooperative leader. These instruments are further explained and tested for validity below.

The first instrument captures social network effects at the household level. We argue that the more certified neighbors farmers have, the more likely they are to learn about the benefits of joining a certified cooperative. Our data indeed show a positive correlation between the number of certified neighbors farmers have and their own certification status, which indicates that our

³ For the analyses in which we use data from workers, we do not consider the location of the own household. Instead, we use the cooperative mean of the share of certified farmers in a 5 km radius.

instrument is relevant (Table A1). However, for an instrument to be valid, it must not affect the outcome variable other than through the treatment. One could expect that areas with a higher concentration of certified farmers are more likely to receive information about the importance of child education. However, child labor is a well-known issue in the cocoa sector and both the government and NGOs have implemented campaigns throughout the country to raise awareness about child labor and the importance of child education. Therefore, it is unlikely that areas with a higher share of certified farmers have better access to information about child education than other areas.

Our second instrument is defined as the distance from the respondent's house to the headquarters of the closest Fairtrade certified cooperative. Farmers who live close to the headquarters of a certified cooperative are more likely to learn about Fairtrade and join this cooperative. Similarly, the closer a farm or cooperative worker lives to the headquarters of a certified cooperative, the higher is the likelihood to work for a certified employer. Although living closer to the headquarters of a certified cooperative could mean easier access to information about child education, as explained above, child labor and child education are issues that the local population is very aware of, regardless of where they live.

The third instrument is defined as the primary cellphone network provider that the cooperative leader is subscribed to. In our study area, there are three network providers: Orange, MTN, and Moov. All of them offer similar services at similar costs, so the choice of which provider to subscribe to is mostly a matter of the strength of the network in a particular location and which provider the other people in one's own social network are subscribed to. There are economic advantages of communicating with people within the same network provider since companies offer discounts for calls and messages exchanged between their subscribers. Our data show that cooperatives whose leader is subscribed to the network Orange are more likely to be certified (Table A1). Therefore, it is likely that there is a more intense flow of information about

certification within the Orange network than between networks. One could argue that the decision to become certified might have influenced the leader's decision of to which network to subscribe to. However, our data show that people do not switch their main cellphone provider often. In fact, only three out of the 25 certified cooperative leaders interviewed switched their main provider after the cooperative became certified.

Using a falsification test as proposed by Di Falco et al. (2011), we show that none of our instruments are correlated with household education expenditure (Table A1). Furthermore, we show that our instruments pass the test of weak instruments ($p < 0.01$). As we have more instruments than endogenous regressors, we can also test whether our instruments are uncorrelated with the error term with a test of over-identifying restrictions. Hansen's J test statistic indicates that our instruments are valid. The results of these tests are shown in Tables A4-A7 in the Online Appendix. It is important to note that we do not instrument the variable EP_{ik} . However, in our regression specifications, we control for variables at the village level that describe the perceived quality of education in the villages and the presence of schools. With these variables, we proxy factors that could simultaneously affect the likelihood of a given village having an education project and household expenditure with education.

3.4.3. *Linear mixed models (LMM)*

Household expenditure with child education is more likely correlated within villages than between villages. Therefore, we can make use of the hierarchical structure of the data to obtain additional insights on the relationship between education expenditure and differences between villages. We follow the approach used by Krumbiegel et al. (2018) and use linear mixed models (LMM) to account for the variability in education expenditure caused by differences between villages. In other words, we expand the model described in equation (1) by adding the random effect u_k that captures the idiosyncratic differences between villages.

$$\log(1 + EE_{ijk}) = \alpha + \beta FT_{jk} + \gamma EP_k + \delta X_{ijk} + \theta W_{jk} + \varphi V_k + v_{ijk} + u_k \quad (2)$$

This approach allows us to see how much of the variance in education can be explained by differences at the village level after controlling for the covariates in X_{ijk} , W_{jk} , and V_k . A variance close to zero would suggest that endogeneity due to omitted variable bias at the village level is not a concern. We use likelihood ratio tests to test the null hypothesis that the random variance component u_k is not different from zero. The test statistics confirm that we cannot reject the null hypothesis in any of our regression models. Since differences between villages do not explain our outcome variable, this suggests that endogeneity at the village level is not a concern and that ordinary least squares (OLS) models without the random component are preferred instead of LMM (see Tables A4-A7 in the Online Appendix).

4. Results and discussion

4.1. Projects implemented with the Fairtrade social premium

Table 2 provides a summary of all the projects implemented with the Fairtrade social premium between 2013 and 2017. The 20 cooperatives that had implemented projects by the time of the interview reported using the social premium to finance 96 different projects, which totaled 1.4 billion CFA.⁴ The categories with the largest number of projects were “cooperative”, “education”, and “miscellaneous”, which includes projects related to training, reforestation, waste management, and certification fees. Projects related to agricultural production such as “ag. inputs”, “credit”, and “direct payments” were restricted to the members of the cooperatives, while all projects in the categories “health”, “roads/transportation”, and “water” were accessible to the whole village. Out of the 18 projects in the category “education”, five were restricted to the members of the cooperatives. The goal of these projects was to give financial assistance to

⁴ At the time of the survey, the exchange rate was 1 Euro = 656 CFA.

families to pay for costs related to education. The projects in the category “education” related to awareness campaigns and investments in infrastructure were accessible to the whole village.

Table 2. Use of the Fairtrade social premium between 2013-2017

Project categories	Number of projects implemented	Number of cooperatives that invested in each project category	Total value spent (in 1M CFA)	Mean value spent per project (in 1M CFA)	% of projects that the whole village has access to
Ag. inputs	8	7	165.2	20.7	0
Cooperative	39	17	630.4	16.2	7%
Credit	2	2	20.6	10.3	0
Direct payments	5	5	220.6	44.1	0
Education	18	12	175.5	9.7	72%
Health	2	2	43.7	21.9	100%
Miscellaneous	10	6	19.7	2.0	10%
Other community infrastruc.	3	2	42.9	14.3	33%
Roads/transportation	5	5	43.2	8.6	100%
Water	4	4	60.6	15.2	100%
Total	96	20	1,422.5	14.8	29%

Despite the large number of projects on education that were implemented, these represent only a small percentage of the total premium that was used by the cooperatives. The 39 projects related to investments in the cooperative account for almost 45% of the total money spent on projects between 2013 and 2017. The 18 projects on education account for less than 15% of the total. Investments in other projects with public goods characteristics, such as “health”, “roads/transportation”, and “water”, have also received only a fraction of the total social premium, with less than 5% each.

In our questionnaire, we asked respondents to name the top three types of services, infrastructure, and investments that are needed in their villages. Most respondents mentioned investments in education as a top priority, followed by investments in roads and health (Figure A1 in the Online Appendix). These figures point towards a mismatch between what the local population deems to be urgent needs in their villages and how the premium is being allocated to different kinds of projects. We should not immediately conclude that farmers are not being

heard in the decision-making process, but this indicates the need to investigate in more detail how these processes take place inside the cooperatives.

4.2.Cooperative characteristics and the use of the Fairtrade social premium

Here we explore whether the use of the Fairtrade social premium is correlated with the organizational structure of the cooperatives. Our data show that certified cooperatives can be rather heterogeneous in terms of their characteristics. Table 3 shows descriptive statistics for selected variables on cooperatives' governance structure, human, physical, and social capital. The certified cooperatives in our sample are very large and most of them have male leaders who have attended at least technical training post high school. The boards of directors have on average 9.8 members and 72% of them own farms larger than 5 ha.⁵ On average, 40% of the issues that are important for the functioning of the cooperatives are decided democratically in general assemblies and these meetings are attended on average by 46% of all registered members. Some of these variables have very large standard deviations, which indicates that these cooperatives are very heterogeneous.

⁵ In our data, the average cocoa farm has 4.9 ha. Other sources report that the average cocoa farm in West Africa has between 3 and 4 ha (Wessel & Quist-Wessel, 2015).

Table 3. Descriptive statistics for the cooperative characteristics used in the PLS (N=20)

Variable name	Description	Mean	SD
Assembly Particip.	Share of registered members that participate in the general assemblies	0.46	0.27
Board % big farms	Share of members in the board of directors who own farms larger than 5 ha	0.72	0.28
Board size	Number of members in the board of directors	9.80	2.07
Business plan	Cooperative has a business plan prepared for the following cocoa season (dummy variable)	0.80	0.41
Coop. age	Number of years that the cooperative has been operating	9.80	4.81
Coop. Lder. Edu.	Education of the leader of the cooperative in years	15.70	2.96
Coop. Lder. Female	Leader of the cooperative is female	0.20	0.41
Democratic decisions	Share of issues that are discussed and decided democratically in the general assembly	0.40	0.17
Ext. Support	Number of actors (NGOs, extension agencies, commercial partner, etc.) who help the cooperatives provide services to their members	2.35	1.57
No. Members	Number of members registered in the cooperative before it became Fairtrade certified	556.10	587.25
No. PCs	Number of computers owned by the cooperative in the year 2008	1.05	1.54
No. Vehicles	Number of vehicles owned by the cooperative in the year 2008	9.32	6.78
Yrs. FT Certif.	Number of years that the cooperative has been Fairtrade certified	4.35	1.73

We proceed by analyzing the relationship between the cooperative characteristics described in Table 3 and the use of the social premium. The results from the Partial Least Squares (PLS) are shown on a circle of correlations (Figure 1), where we can see the relationship between cooperative characteristics (vectors in black) and the use of the social premium (vectors in blue). When two vectors are close, forming a small angle, the two variables they represent are positively correlated, while vectors that form an angle close to 180° are negatively correlated. The length of the vectors on the plot represents how well the variables are represented by the two latent components on which the variables are being plotted. If a variable is perfectly represented by these two components, its vector will touch the circle. Variables that are not well represented by these components are placed closer to the center of the plot and their interpretation should be done carefully.

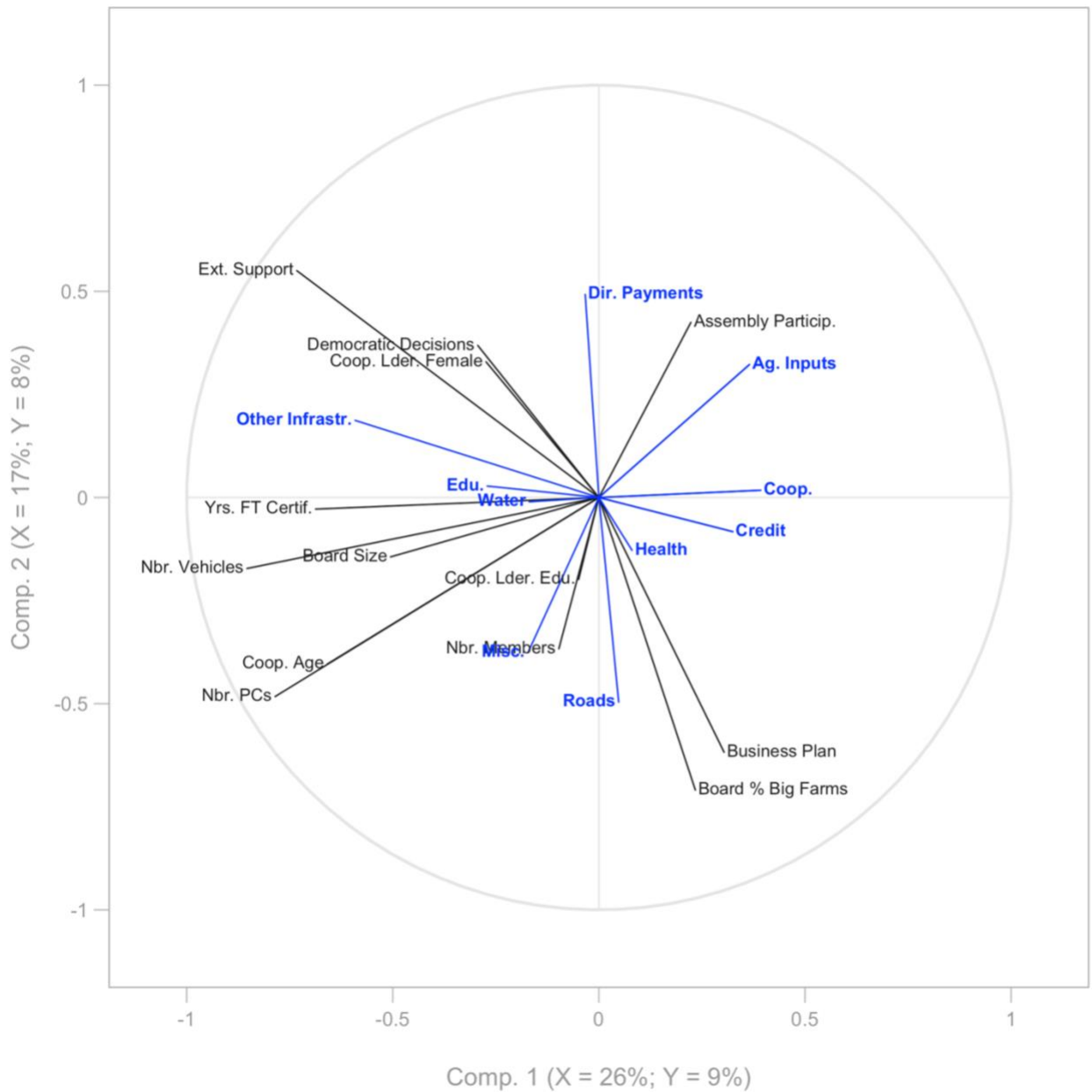


Figure 1. Circle of correlations based on the results of the Partial Least Square (PLS) analysis.

The two latent components calculated through the PLS explain together 43% of the variance in X but only 17% of the variance in Y . Since PLS chooses the components trying to maximize the covariance between the response and predictor variables, we would expect a high percentage of the variance in Y to be explained by a few components, which is not what we observe. This suggests that, overall, cooperative characteristics are not strong predictors of how the social premium is allocated into different projects. Nonetheless, the circle of correlations provides a

few insights about how individual cooperative characteristics are correlated with each other and with the allocation of the premium.

Investments in the cooperative are negatively correlated with the age of the cooperative, number of years that the cooperative has been Fairtrade certified, and number of computers and vehicles that it had in 2008. This confirms the hypothesis that cooperatives in the beginning of their operations are more likely to make investments to strengthen themselves, for example by purchasing new equipment, starting a revolving fund, or hiring more staff. Projects that have a more direct benefit to farmers, such as investments in agricultural inputs and direct payments, are positively correlated with the share of registered members that participate in the general assemblies. This is in line with previous studies that report that farmers prefer to invest the Fairtrade premium on projects that benefit them individually, such as credit or paying for technical assistance (Ruben & Fort, 2012). Variables that represent projects with public goods characteristics, such as education, water, and health, are the ones worse projected on the circle of correlations, thus suggesting that cooperatives make similar investments in these kinds of projects regardless of the characteristics of the cooperatives.

4.3. Effects on education

In this section, we analyze whether projects financed with the Fairtrade premium are beneficial to the local communities. Table 4 displays descriptive statistics for variables related to child education, differentiating between certified and non-certified households and villages with and without premium-financed project. We observe that certified households, either living in a village where an education project was implemented or not, have higher education expenditure per child than non-certified households living in villages without a project. We find no statistically significant differences between groups for distance to the nearest primary school nor for satisfaction with the education system, measured on a 10-points Likert scale.

Table 4. Descriptive statistics for variables at the household level

	(1)	(2)	(3)	(4)	(5)
	Full sample	Non-certified and no project	Non-certified and project ^a	Certified and no project ^a	Certified and project ^a
Education expenditure per child (in 1,000 CFA/child) ^b	122.74 (246.74)	85.10 (141.54)	127.26 (236.74)	143.66** (309.11)	236.55*** (293.18)
Distance to primary school (km)	1.68 (4.29)	1.72 (4.41)	1.03 (1.49)	1.74 (4.30)	1.57 (4.95)
Satisfaction with education system (1-10)	5.19 (2.18)	5.08 (2.07)	5.37 (2.06)	5.21 (2.28)	5.72 (2.32)
Observations	1,000	448	52	442	58

Note: Mean values are shown with standard deviations in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

^a For the statistical testing we used ANOVA and the Tukey-Kramer post-hoc test for multiple group comparisons; p-values indicate statistical significance of differences in means between those in the base category (i.e. Non-certified and no project) and the other categories.

^b For this variable, we are using only values from the households that have children, totaling 712 observations.

The descriptive statistics for the control variables used in our regression analyses are shown in Tables A2 and A3 in the Online Appendix. Looking at the full sample of respondents (i.e. farmers, cooperatives workers, and farm workers), we observe that the groups of certified and non-certified respondents are very similar in terms of their socioeconomic characteristics, including age, education, household size, risk aversion, and the value of asset's owned. Similarly, we do not observe statistically significant differences in how respondents perceive the quality of education in their villages and in their overall satisfaction with life in their villages. The most prominent differences are in the characteristics of the cooperatives that they are linked to. Our data show that certified cooperatives are, on average, older than non-certified cooperatives, they are more democratic in terms of how decisions are made, and they cooperate with a larger number of partners to provide training and services to members. When differentiating by whether respondents live in a village with a premium-financed education project (Table A3), we do not observe notable differences in terms of socioeconomic household characteristics either. However, at the 10% level, we observe that respondent who live in a village with a premium-financed project are more satisfied with the quality of education in their villages.

Figure 2 displays regression results and how (i) certification and (ii) living in a village with a premium-financed education project affects household education expenditure for the full sample, farmers, cooperative workers, and farm workers. For the full sample, we see positive statistically significant effects for both our variables of interest. Instrumental variable (IV) estimates show that being certified increases education expenditure by 52%, which is similar to the effects found by Meemken et al. (2017) in Uganda. Living in a village with a premium-financed education project increases education expenditure by 43%. However, the effects observed for the full sample are mostly driven by the group of farmers. Being certified does have a positive effect on education expenditure for farmers and cooperative workers, but not for farm workers. However, living in a village with a premium-financed project is only beneficial for farmers.

These results are in line with the findings from previous studies conducted in Côte d'Ivoire. These studies show that while Fairtrade has a positive financial effect on farmers and cooperative workers, it does not benefit farm workers (Meemken et al., 2019; Sellare et al., 2020). Studies conducted elsewhere have also reported that Fairtrade only has limited benefits to hired laborers (Valkila & Nygren, 2010; van Rijn et al., 2019). Therefore, if certification does not have an effect on overall income among farm workers, it is not surprising that it does not have an effect on education expenditure either. While living in a village with an education project also benefits farmers, it has no effect on cooperative workers. This might be explained by the fact that most cooperative workers live in larger towns with better infrastructure for schooling, thus having a project implemented in such places has no added benefit.

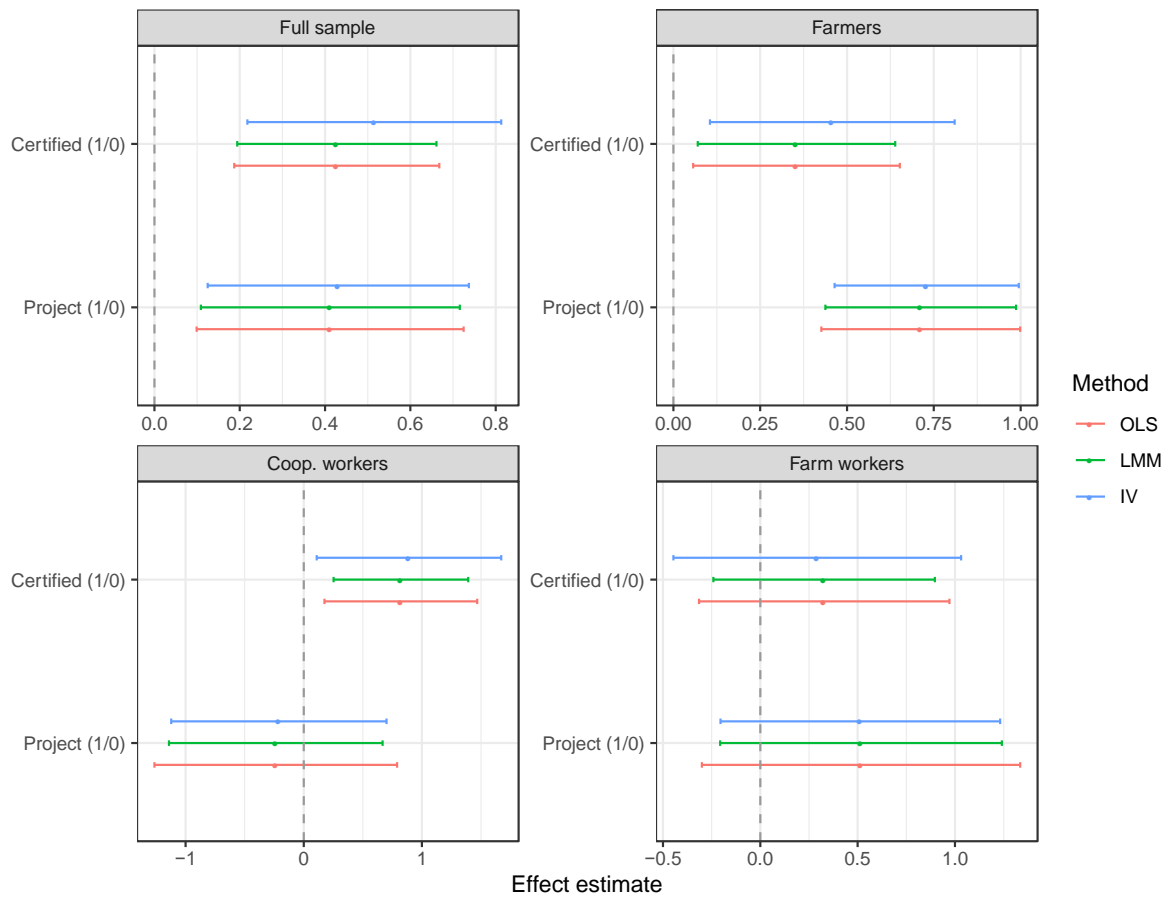


Figure 2. Effects of certification and education projects on household education expenditure (log)

Note: Point estimates from regression models are shown with 95% confidence intervals. Regressions include household, cooperative, and village-level control variables. Full results are shown in Tables A4-A7 in the Online Appendix.

We additionally ran our regressions using only data from the respondents who are not certified to analyze spillover effects of the social premium on non-certified households. These results are shown in Table A8 in the Online Appendix. Focusing only on non-certified households, we do not observe statistically significant effects of living in a village with a premium-financed education project, neither for the full sample nor for the sub-groups. This suggests that only farmer households that participate in certified value chains benefit from the social premium, despite the public good nature of most of these education projects. However, it is important to

note that the estimates are all positive in magnitude. A larger sample size might have resulted in significant estimates.

It is also noteworthy that our outcome variable only captures a specific aspect related to child education. Such education projects financed with the Fairtrade social premium could also benefit the wider rural community in terms of education quality offered in the villages. When the social premium is used to improve the facilities of schools in the villages, for example, this affects the quality of educational offers and benefits households regardless of their certification status. Attendance and drop-out rates could also be affected by education projects, if these projects are aimed at sensitizing families about the importance of keeping children in school (Akoyi et al., 2020). Therefore, we should be careful in concluding that community development projects implemented with the social premium do not benefit neither certified workers nor non-certified households more broadly.

4.4. Policy implications

The Fairtrade social premium was thought out as a mechanism to empower local communities and support community-driven development. Several studies suggest that these funds are indeed used to finance community investments (Darko et al., 2017; Dragusanu & Nunn, 2018; Jena & Grote, 2017; Meemken et al., 2017; Ruben & Fort, 2012; Valkila & Nygren, 2010). But can Fairtrade really make substantial community investments possible through its social premium? Our data suggests that this is not the case, since cooperatives use only a fraction of the social premium in community development projects (27% of the total). This is not a problem *per se*, as long as the decisions on how to use the premium were made democratically. However, since most benefits from the social premium are actually private, Fairtrade should avoid marketing it as a key component in its theory of change to support community-driven development.

NGOs and development agencies often partner up with cooperatives and use community-driven approaches to empower local communities and promote rural development (Casey, 2018). From a policy perspective, even when the economic returns are only modest, such initiatives are an appealing option, especially in contexts where public investments are lacking. However, as pointed out by previous studies, such initiatives that rely on democratic decentralization must be carefully designed and monitored to ensure that they can make the most out of these resources and have significant impacts on the communities (Ruben & Pender, 2004).

Since cooperatives are unlikely to make large investments in community projects on their own, Fairtrade and development agencies should foster the cooperation between cooperatives that have overlapping catchment areas so that they can pool their funds and efforts to invest more effectively in public goods (e.g., construction of wells, improvement of roads, promotion of health campaigns, etc.). However, another important policy consideration is that even projects with public goods characteristics could suffer from elite capture and the exclusion of certain groups (Cramer et al., 2017). Ensuring broad participation and transparency in the decision-making processes might reduce elite capture. But close monitoring throughout the implementation of these projects might be necessary to prevent the exacerbation of social and economic inequalities within the communities.

5. Conclusions

In this article, we have explored and discussed whether the Fairtrade social premium is used to improve basic infrastructure and the provision of services in rural communities. Using data from cocoa cooperatives from Côte d'Ivoire, we analyzed what kinds of projects are financed with the social premium and how its allocation into different kinds of projects is correlated with the organizational structure of these cooperatives. Our results suggest that cooperative characteristics are, overall, not strong predictors of how much premium these cooperatives

choose to invest in different types of projects. However, certain cooperative characteristics influence investment decisions in certain projects. We found, for example, a correlation between the share of registered members that attend the general assemblies and investments that benefit farmers directly (e.g., agricultural inputs and direct payments). These investments, together with investments in the cooperatives, make the bulk of the social premium, contrary to what previous studies suggested.

We have also analyzed whether (i) participating in a certified value chain and (ii) living in a village with a premium-financed education project affects household education expenditure. We show that participating in a certified value chain has a positive effect on education expenditure among farmers and cooperative workers. However, only certified farmers benefit from living in a village with a premium-financed education project. This finding suggests that even when cooperatives choose to invest in projects with public goods characteristics, not all members of the communities benefit equally from these investments.

Our study has two limitations that should be addressed in follow-up research. First, because we have cross-sectional data, we cannot observe time trends in how the social premium is used. There is likely a dynamic interaction over time between how cooperatives develop and what they spend the social premium on. To further explore the relationship between cooperative characteristics and the use of the premium, it would be important to have panel data and preferably count with an even larger number of cooperatives. Second, our analyses of the effects of the social premium on child education focused on a very specific aspect of education related to households' demand for education. Educational projects financed with the premium could have a positive effect on the supply, such as improving the quality of education. These improvements on the supply could benefit members of the communities that do not have the financial means to increase their expenditures with education. Future studies should collect data

that allow the analysis of other aspects related to child education, such as enrollment and schooling efficiency.

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7. Online Appendix

Table A1. Instrument falsification test

	(1) OLS Full sample	(2) OLS Farmers	(3) OLS Coop workers	(4) OLS Farm workers
Share of certified farmers (5km radius)		0.34 (0.77)		
Share of certified farmers (5km radius; coop mean)	0.70 (0.54)		0.63 (1.20)	-0.90 (2.20)
Phone operator of coop leader (1=Orange)	-0.17 (0.23)	-0.07 (0.28)	-0.39 (0.79)	0.05 (0.56)
Dist. to the closest certified coop	0.12 (1.05)	-0.09 (1.84)	-0.91 (2.32)	0.55 (5.05)
Education project (1/0)	0.16 (0.22)	0.30 (0.31)	0.25 (0.63)	0.96 (0.72)
Resp. = coop. worker	-0.50** (0.20)			
Resp. = coop. farm worker	-0.64*** (0.24)			
Female (1/0)	-0.75 (0.47)	-0.54 (0.54)	-1.66** (0.61)	0.00 (.)
Age	0.17*** (0.05)	0.17** (0.08)	0.29*** (0.08)	0.17 (0.22)
Age squared	-0.00*** (0.00)	-0.00* (0.00)	-0.00** (0.00)	-0.00 (0.00)
Education (yrs.)	0.07*** (0.02)	0.06** (0.02)	0.12** (0.05)	0.10 (0.07)
Risk aversion (1-10)	0.03 (0.05)	0.06 (0.06)	-0.12 (0.07)	0.13 (0.11)
Household size	-0.04 (0.02)	-0.06** (0.02)	-0.09 (0.07)	0.01 (0.07)
Dist. to input mkt. (km.)	-0.03 (0.02)	-0.03 (0.02)	-0.01 (0.15)	0.03 (0.07)
Dist. to road (km.)	-0.00 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.02 (0.02)
Dist. to the closest primary school (km.)	0.02 (0.02)	0.01 (0.03)	-0.47* (0.27)	0.03 (0.08)
Dist. to the closest secondary school (km.)	0.00 (0.01)	0.00 (0.01)	-0.02 (0.02)	0.02 (0.02)
(Log) Total value of assets 10 yrs. ago	0.10 (0.08)	0.15 (0.11)	-0.01 (0.12)	0.11 (0.22)
Satisfaction w/ education (village mean)	0.04 (0.18)	-0.06 (0.20)	0.47 (0.58)	0.58 (0.67)
Satisfaction w/ life (village mean)	0.45** (0.17)	0.42** (0.17)	-0.13 (0.61)	0.20 (0.81)
Satisfaction w/ health (village mean)	-0.29 (0.21)	-0.30 (0.32)	0.35 (1.11)	-1.22* (0.60)
Age of the coop (yrs.)	-0.03* (0.02)	-0.03 (0.02)	-0.05 (0.05)	-0.02 (0.05)
Share of decisions made democratically	-1.45*** (0.47)	-0.82 (0.82)	-3.81*** (1.23)	0.61 (1.62)
# service/inputs/training providers	-0.05 (0.08)	0.04 (0.12)	-0.33 (0.29)	0.11 (0.35)
District=Lacs	-0.05 (0.37)	-0.09 (0.60)	-0.99 (1.30)	-0.77 (1.12)
District=Lagunes	-0.36 (0.22)	-0.44 (0.31)	-1.03 (0.72)	-0.43 (0.57)
Constant	-2.67 (1.92)	-2.68 (2.84)	-3.51 (6.51)	-1.98 (9.16)
Observations	353	210	78	65

Note: Cluster robust standard errors shown in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2. Descriptive statistics for control variables by certification status

	(1) Full sample	(2) Certified	(3) Non-certified	(4) Mean diff.
Female (1/0)	0.06 (0.23)	0.08 (0.27)	0.03 (0.18)	0.05***
Age	43.66 (12.27)	43.20 (12.15)	44.12 (12.38)	-0.92
Age squared	2056.72 (1152.79)	2013.82 (1139.37)	2099.63 (1165.62)	-85.82
Education (yrs.)	6.55 (5.38)	6.52 (5.50)	6.58 (5.27)	-0.07
Risk aversion (1-10)	6.31 (2.32)	6.20 (2.33)	6.42 (2.30)	-0.22
Household size	5.86 (3.89)	5.94 (4.00)	5.77 (3.78)	0.17
Dist. to input mkt. (km.)	2.90 (5.30)	2.76 (4.93)	3.04 (5.65)	-0.27
Dist. to road (km.)	13.50 (15.41)	15.18 (15.73)	11.83 (14.92)	3.36***
Dist. to the closest primary school (km.)	1.68 (4.29)	1.72 (4.37)	1.65 (4.21)	0.07
Dist. to the closest secondary school (km.)	9.37 (10.79)	8.77 (9.45)	9.96 (11.97)	-1.19*
(Log) Total value of assets 10 yrs. ago	11.79 (1.50)	11.80 (1.55)	11.78 (1.45)	0.02
Religion = Catholic	0.29 (0.45)	0.29 (0.45)	0.29 (0.45)	0.00
Religion = Muslim	0.34 (0.47)	0.36 (0.48)	0.32 (0.47)	0.04
Age of the coop (yrs.)	7.70 (5.00)	9.48 (4.46)	5.92 (4.87)	3.56***
Share of decisions made democratically	0.39 (0.15)	0.41 (0.16)	0.37 (0.13)	0.04***
# service/inputs/training providers	1.56 (1.47)	2.24 (1.42)	0.88 (1.18)	1.36***
Satisfaction w/ education (1-10)	5.19 (2.18)	5.27 (2.29)	5.11 (2.07)	0.16
Satisfaction w/ life (1-10)	6.27 (2.05)	6.32 (2.08)	6.22 (2.03)	0.10
Satisfaction w/ health (1-10)	4.99 (2.13)	5.12 (2.25)	4.87 (1.99)	0.25*
Observations	1000	500	500	1000

Note: Mean values are shown with standard deviations in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Table A3. Descriptive statistics for control variables by whether respondents live in a village with a premium-financed education project

	(1) Full sample	(2) With project	(3) Without project	(4) Mean diff.
Female (1/0)	0.06 (0.23)	0.08 (0.28)	0.05 (0.23)	0.03
Age	43.66 (12.27)	43.33 (11.90)	43.70 (12.32)	-0.38
Age squared	2056.72 (1152.79)	2017.60 (1089.39)	2061.56 (1160.88)	-43.96
Education (yrs.)	6.55 (5.38)	5.58 (5.04)	6.67 (5.41)	-1.09**
Risk aversion (1-10)	6.31 (2.32)	5.98 (2.53)	6.35 (2.29)	-0.37
Household size	5.86 (3.89)	6.11 (3.85)	5.82 (3.90)	0.28
Dist. to input mkt. (km.)	2.90 (5.30)	3.55 (5.93)	2.82 (5.22)	0.73
Dist. to road (km.)	13.50 (15.41)	19.60 (17.82)	12.75 (14.93)	6.85***
Dist. to the closest primary school (km.)	1.68 (4.29)	1.32 (3.73)	1.73 (4.35)	-0.41
Dist. to the closest secondary school (km.)	9.37 (10.79)	8.18 (9.45)	9.52 (10.94)	-1.34
(Log) Total value of assets 10 yrs. ago	11.79 (1.50)	11.91 (1.43)	11.78 (1.51)	0.13
Religion = Catholic	0.29 (0.45)	0.27 (0.45)	0.29 (0.45)	-0.02
Religion = Muslim	0.34 (0.47)	0.42 (0.50)	0.33 (0.47)	0.09*
Age of the coop (yrs.)	7.70 (5.00)	8.83 (6.12)	7.56 (4.82)	1.27**
Share of decisions made democratically	0.39 (0.15)	0.30 (0.15)	0.40 (0.14)	-0.10***
# service/inputs/training providers	1.56 (1.47)	1.51 (1.10)	1.57 (1.51)	-0.06
Satisfaction w/ education (1-10)	5.19 (2.18)	5.55 (2.20)	5.15 (2.18)	0.41*
Satisfaction w/ life (1-10)	6.27 (2.05)	6.56 (2.30)	6.23 (2.02)	0.33
Satisfaction w/ health (1-10)	4.99 (2.13)	5.22 (2.30)	4.97 (2.10)	0.25
Observations	1000	110	890	1000

Note: Mean values are shown with standard deviations in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Table A4. Effects of certification and education projects on household education expenditure (log). Results for full sample.

	(1) OLS	(2) LMM	(3) IV
Certification (1/0)	0.43*** (0.12)	0.43*** (0.12)	0.52*** (0.15)
Education project (1/0)	0.41** (0.16)	0.41*** (0.15)	0.43*** (0.16)
Resp. = coop. worker	-0.30* (0.17)	-0.30* (0.17)	-0.30* (0.17)
Resp. = coop. farm worker	-0.54*** (0.16)	-0.54*** (0.16)	-0.54*** (0.16)
Female (1/0)	-0.24 (0.30)	-0.24 (0.29)	-0.26 (0.29)
Age	0.18*** (0.03)	0.18*** (0.03)	0.18*** (0.03)
Age squared	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Education (yrs.)	0.06*** (0.01)	0.06*** (0.01)	0.06*** (0.01)
Risk aversion (1-10)	0.06** (0.03)	0.06** (0.03)	0.06** (0.03)
Household size	-0.04** (0.02)	-0.04** (0.02)	-0.04** (0.02)
Akan ethnicity (1/0)	0.23 (0.18)	0.23 (0.17)	0.24 (0.17)
Dist. to input mkt. (km.)	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)
Dist. to road (km.)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Dist. to the closest primary school (km.)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)
Dist. to the closest secondary school (km.)	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)
(Log) Total value of assets 10 yrs. ago	0.09* (0.05)	0.09* (0.05)	0.09* (0.05)
Religion = Catholic	0.11 (0.12)	0.11 (0.12)	0.11 (0.12)
Religion = Muslim	0.21 (0.18)	0.21 (0.18)	0.21 (0.18)
Age of the coop (yrs.)	-0.02* (0.01)	-0.02** (0.01)	-0.03** (0.01)
Share of decisions made democratically	-0.74** (0.32)	-0.74** (0.31)	-0.74** (0.32)
# service/inputs/training providers	0.06 (0.05)	0.06 (0.05)	0.05 (0.05)
Satisfaction w/ education (village mean)	-0.04 (0.09)	-0.04 (0.09)	-0.04 (0.09)
Satisfaction w/ life (village mean)	0.43*** (0.11)	0.43*** (0.11)	0.42*** (0.11)
Satisfaction w/ health (village mean)	-0.14 (0.09)	-0.14 (0.09)	-0.14 (0.09)
District = Lacs	0.01 (0.33)	0.01 (0.33)	0.04 (0.31)
District = Lagunes	-0.27* (0.14)	-0.27* (0.14)	-0.24* (0.14)
Constant	-4.06*** (1.26)	-4.06*** (1.24)	-4.04*** (1.23)
Wu-Hausman F-statistic. ^a			0.97
Kleibergen-Paap Wald F statistic ^b			112.05***
Hansen J statistic. ^c			1.18
LR Test ^d		0.00	
ICC ^e		5.79e-20	
Observations	712	712	712

Note: Cluster robust standard errors are shown in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

^a Test of endogeneity (H_0 : certified variable is exogenous)

^b Test for weak instruments (H_0 : coefficients of instruments in first stage are not different from zero)

^c Test of over-identifying restrictions (H_0 : instruments are uncorrelated with the error term)

^d Likelihood ratio test (H_0 : the variance component of the model is not different from zero)

^e Interclass correlation coefficient for the village random effect

Table A5. Effects of certification and education projects on household education expenditure (log). Results for subsample of farmers.

	(1) OLS	(2) LMM	(3) IV
Certification (1/0)	0.35** (0.15)	0.35** (0.15)	0.45** (0.17)
Education project (1/0)	0.71*** (0.14)	0.71*** (0.14)	0.73*** (0.14)
Female (1/0)	-0.36 (0.34)	-0.36 (0.33)	-0.36 (0.32)
Age	0.18*** (0.06)	0.18*** (0.06)	0.18*** (0.05)
Age squared	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Education (yrs.)	0.03 (0.02)	0.03* (0.02)	0.03* (0.02)
Risk aversion (1-10)	0.05 (0.03)	0.05 (0.03)	0.05 (0.03)
Household size	-0.04** (0.02)	-0.04*** (0.02)	-0.04*** (0.02)
Akan ethnicity (1/0)	0.12 (0.24)	0.12 (0.24)	0.12 (0.24)
Dist. to input mkt. (km.)	-0.02 (0.02)	-0.02 (0.01)	-0.02 (0.01)
Dist. to road (km.)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Dist. to the closest primary school (km.)	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)
Dist. to the closest secondary school (km.)	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)
(Log) Total value of assets 10 yrs. ago	0.04 (0.07)	0.04 (0.07)	0.04 (0.07)
Religion = Catholic	0.23 (0.17)	0.23 (0.17)	0.22 (0.17)
Religion = Muslim	0.09 (0.28)	0.09 (0.28)	0.08 (0.28)
Age of the coop (yrs.)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Share of decisions made democratically	-0.41 (0.44)	-0.41 (0.43)	-0.41 (0.41)
# service/inputs/training providers	0.03 (0.06)	0.03 (0.05)	0.02 (0.05)
Satisfaction w/ education (village mean)	-0.07 (0.09)	-0.07 (0.09)	-0.08 (0.09)
Satisfaction w/ life (village mean)	0.47*** (0.12)	0.47*** (0.11)	0.46*** (0.11)
Satisfaction w/ health (village mean)	-0.16 (0.11)	-0.16 (0.11)	-0.16 (0.10)
District = Lacs	0.19 (0.37)	0.19 (0.35)	0.23 (0.34)
District = Lagunes	-0.29* (0.15)	-0.29** (0.14)	-0.27* (0.14)
Constant	-3.20 (2.00)	-3.20 (1.95)	-3.14 (1.94)
Wu-Hausman F-statistic. ^a			0.73
Kleibergen-Paap Wald F statistic ^b			72.89***
Hansen J statistic. ^c			0.69
LR Test ^d		4.5e-13	
ICC ^e		5.45e-22	
Observations	433	433	433

Note: Cluster robust standard errors shown in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

^a Test of endogeneity (H_0 : certified variable is exogenous)

^b Test for weak instruments (H_0 : coefficients of instruments in first stage are not different from zero)

^c Test of over-identifying restrictions (H_0 : instruments are uncorrelated with the error term)

^d Likelihood ratio test (H_0 : the variance component of the model is not different from zero)

^e Interclass correlation coefficient for the village random effect

Table A6. Effects of certification and education projects on household education expenditure (log). Results for subsample of cooperative workers.

	(1) OLS	(2) LMM	(3) IV
Certification (1/0)	0.82** (0.32)	0.82*** (0.29)	0.89** (0.40)
Education project (1/0)	-0.24 (0.51)	-0.24 (0.46)	-0.21 (0.47)
Female (1/0)	-0.40 (0.50)	-0.40 (0.46)	-0.42 (0.43)
Age	0.23*** (0.07)	0.23*** (0.06)	0.23*** (0.06)
Age squared	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Education (yrs.)	0.09** (0.04)	0.09** (0.04)	0.09*** (0.03)
Risk aversion (1-10)	-0.04 (0.04)	-0.04 (0.04)	-0.04 (0.04)
Household size	-0.05 (0.04)	-0.05* (0.03)	-0.06* (0.03)
Akan ethnicity (1/0)	0.30 (0.55)	0.30 (0.50)	0.30 (0.49)
Dist. to input mkt. (km.)	-0.04 (0.05)	-0.04 (0.05)	-0.04 (0.05)
Dist. to road (km.)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Dist. to the closest primary school (km.)	-0.01 (0.13)	-0.01 (0.12)	-0.01 (0.12)
Dist. to the closest secondary school (km.)	-0.04* (0.02)	-0.04* (0.02)	-0.04* (0.02)
(Log) Total value of assets 10 yrs. ago	0.03 (0.12)	0.03 (0.11)	0.03 (0.11)
Religion = Catholic	0.11 (0.35)	0.11 (0.32)	0.11 (0.31)
Religion = Muslim	0.43 (0.50)	0.43 (0.46)	0.44 (0.43)
Age of the coop (yrs.)	-0.08** (0.04)	-0.08** (0.03)	-0.08** (0.03)
Share of decisions made democratically	-1.52 (1.18)	-1.52 (1.08)	-1.53 (1.06)
# service/inputs/training providers	0.03 (0.12)	0.03 (0.11)	0.02 (0.11)
Satisfaction w/ education (village mean)	-0.07 (0.38)	-0.07 (0.34)	-0.07 (0.34)
Satisfaction w/ life (village mean)	0.43 (0.33)	0.43 (0.30)	0.43 (0.29)
Satisfaction w/ health (village mean)	0.27 (0.29)	0.27 (0.27)	0.27 (0.26)
District = Lacs	-0.79 (0.77)	-0.79 (0.70)	-0.76 (0.70)
District = Lagunes	-0.47 (0.43)	-0.47 (0.39)	-0.45 (0.37)
Constant	-5.54* (2.95)	-5.54** (2.70)	-5.58** (2.61)
Wu-Hausman F-statistic. ^a			0.08
Kleibergen-Paap Wald F statistic ^b			60.44***
Hansen J statistic. ^c			2.11
LR Test ^d		2.3e-13	
ICC ^e		2.65e-22	
Observations	147	147	147

Note: Cluster robust standard errors shown in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

^a Test of endogeneity (H_0 : certified variable is exogenous)

^b Test for weak instruments (H_0 : coefficients of instruments in first stage are not different from zero)

^c Test of over-identifying restrictions (H_0 : instruments are uncorrelated with the error term)

^d Likelihood ratio test (H_0 : the variance component of the model is not different from zero)

^e Interclass correlation coefficient for the village random effect

Table A7. Effects of certification and education projects on household education expenditure (log). Results for subsample of farm workers.

	(1) OLS	(2) LMM	(3) IV
Certification (1/0)	0.33 (0.32)	0.33 (0.29)	0.29 (0.38)
Education project (1/0)	0.52 (0.41)	0.52 (0.37)	0.51 (0.37)
Female (1/0)	0.00 (.)	0.00 (.)	0.00 (.)
Age	0.16 (0.10)	0.16* (0.09)	0.16* (0.09)
Age squared	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Education (yrs.)	0.12** (0.05)	0.12*** (0.04)	0.12*** (0.04)
Risk aversion (1-10)	0.14* (0.08)	0.14** (0.07)	0.14** (0.07)
Household size	-0.02 (0.05)	-0.02 (0.05)	-0.02 (0.05)
Akan ethnicity (1/0)	0.39 (0.48)	0.39 (0.43)	0.38 (0.44)
Dist. to input mkt. (km.)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)
Dist. to road (km.)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Dist. to the closest primary school (km.)	-0.01 (0.03)	-0.01 (0.03)	-0.01 (0.03)
Dist. to the closest secondary school (km.)	0.02 (0.02)	0.02* (0.01)	0.02* (0.01)
(Log) Total value of assets 10 yrs. ago	0.11 (0.14)	0.11 (0.13)	0.11 (0.13)
Religion = Catholic	-0.05 (0.57)	-0.05 (0.51)	-0.05 (0.51)
Religion = Muslim	0.46 (0.38)	0.46 (0.34)	0.46 (0.33)
Age of the coop (yrs.)	-0.02 (0.04)	-0.02 (0.03)	-0.01 (0.03)
Share of decisions made democratically	0.14 (1.10)	0.14 (1.00)	0.14 (0.99)
# service/inputs/training providers	0.06 (0.14)	0.06 (0.12)	0.06 (0.12)
Satisfaction w/ education (village mean)	-0.03 (0.21)	-0.03 (0.19)	-0.03 (0.19)
Satisfaction w/ life (village mean)	0.28 (0.26)	0.28 (0.23)	0.29 (0.24)
Satisfaction w/ health (village mean)	-0.37 (0.23)	-0.37* (0.21)	-0.37* (0.21)
District = Lacs	-0.16 (0.58)	-0.16 (0.52)	-0.17 (0.53)
District = Lagunes	-0.35 (0.41)	-0.35 (0.37)	-0.36 (0.38)
Constant	-3.98 (2.67)	-3.98 (2.42)	-3.99* (2.40)
Wu-Hausman F-statistic. ^a			0.02
Kleibergen-Paap Wald F statistic ^b			78.02***
Hansen J statistic. ^c			1.49
LR Test ^d		0.00	
ICC ^e		4.88e-20	
Observations	132	132	132

Note: Cluster robust standard errors shown in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

^a Test of endogeneity (H_0 : certified variable is exogenous)

^b Test for weak instruments (H_0 : coefficients of instruments in first stage are not different from zero)

^c Test of over-identifying restrictions (H_0 : instruments are uncorrelated with the error term)

^d Likelihood ratio test (H_0 : the variance component of the model is not different from zero)

^e Interclass correlation coefficient for the village random effect

Table A8. Spillover effects of education projects on household education expenditure (log)

	(1) OLS Full sample	(2) OLS Farmers	(3) OLS Coop workers	(4) OLS Farm workers
Education project (1/0)	0.31 (0.20)	0.39 (0.34)	0.42 (0.54)	0.79 (0.52)
Resp. = coop. worker	-0.55** (0.22)			
Resp. = coop. farm worker	-0.67*** (0.24)			
Female (1/0)	-0.75 (0.49)	-0.48 (0.57)	-1.80*** (0.57)	0.00 (.)
Age	0.17*** (0.04)	0.17** (0.08)	0.28*** (0.07)	0.18 (0.23)
Age squared	-0.00*** (0.00)	-0.00** (0.00)	-0.00*** (0.00)	-0.00 (0.00)
Education (yrs.)	0.07*** (0.02)	0.06** (0.03)	0.12** (0.05)	0.13 (0.08)
Risk aversion (1-10)	0.04 (0.05)	0.06 (0.06)	-0.09 (0.07)	0.11 (0.11)
Household size	-0.04 (0.02)	-0.06** (0.03)	-0.10 (0.08)	0.03 (0.09)
Akan ethnicity (1/0)	-0.21 (0.26)	-0.40 (0.37)	-0.29 (0.90)	-0.18 (0.82)
Dist. to input mkt. (km.)	-0.03* (0.02)	-0.04 (0.02)	-0.07 (0.10)	0.01 (0.06)
Dist. to road (km.)	0.00 (0.01)	-0.00 (0.01)	0.01 (0.01)	0.01 (0.02)
Dist. to the closest primary school (km.)	0.03 (0.02)	0.02 (0.03)	-0.51* (0.25)	0.04 (0.05)
Dist. to the closest secondary school (km.)	-0.00 (0.01)	-0.00 (0.01)	-0.01 (0.02)	0.03 (0.02)
(Log) Total value of assets 10 yrs. ago	0.09 (0.08)	0.15 (0.10)	-0.03 (0.13)	0.13 (0.20)
Religion = Catholic	0.17 (0.19)	0.21 (0.26)	-0.27 (0.64)	0.19 (0.74)
Religion = Muslim	-0.01 (0.29)	-0.13 (0.42)	-0.31 (0.81)	0.63 (0.77)
Satisfaction w/ education (village mean)	0.09 (0.16)	-0.05 (0.16)	0.28 (0.41)	0.33 (0.44)
Satisfaction w/ life (village mean)	0.41** (0.16)	0.37** (0.15)	-0.01 (0.50)	0.33 (0.71)
Satisfaction w/ health (village mean)	-0.31 (0.18)	-0.31 (0.26)	0.73 (0.66)	-1.05** (0.40)
Age of the coop (yrs.)	-0.02 (0.02)	-0.02 (0.02)	-0.05 (0.05)	-0.04 (0.06)
Share of decisions made democratically	-1.38** (0.51)	-0.74 (0.82)	-4.01*** (1.28)	0.84 (1.81)
# service/inputs/training providers	-0.04 (0.08)	0.05 (0.11)	-0.27 (0.28)	0.25 (0.41)
District = Lacs	0.04 (0.38)	-0.05 (0.50)	-0.55 (0.94)	-0.27 (0.82)
District = Lagunes	-0.29 (0.21)	-0.40 (0.24)	-0.93 (0.58)	-0.28 (0.53)
Constant	-2.62 (1.71)	-2.22 (2.61)	-4.89 (5.38)	-3.21 (8.83)
Observations	353	210	78	65

Standard errors are shown in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

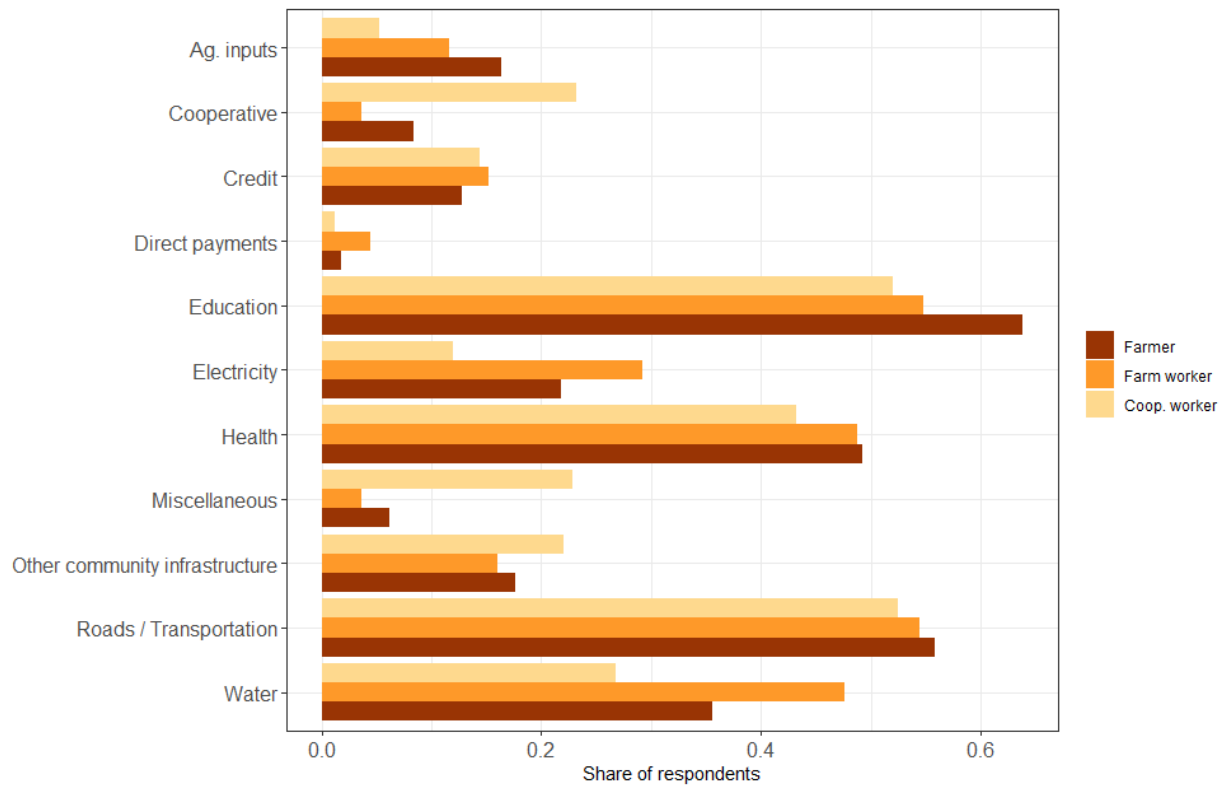


Figure A1. Most pressing needs of the villages that should be addressed