Systematic Literature Review on the effect of fair-trade certification on rural coffee farmers' earnings and educational outcomes

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This review explores the effects of fair-trade certifications on coffee producers' income and education level. We focus on five Latin-American countries through 44 and 16 studies assessing income and education respectively. Additionally, for three African countries we found 17 studies on income and three studies on education. For all cases, the effects of certifications are measured by how they affect at least one of the indicators that proxy each variable: total gross income, expenditure, savings, credit, and income stability for income, and school attendance, school expenditure, school enrollment, and years of schooling for education. Finally, we conclude that fair-trade has a modest positive impact on rural coffee farmers' income and educational outcomes.

1. Introduction

Consumers have grown accustomed to connecting fair-trade coffee with the ideas of quality and ethical production. As for the ethical component, customers of fair-trade coffee willingly pay a premium to ensure that their product was grown, harvested, and produced in a sustainable way in terms of economic, social and environmental viability. However, consumers' journeys into the fair-trade world usually stop at the supermarket aisle where they pick between certified products or the cheaper generic alternatives. Consumers do not know whether their conscious purchase will actually result in any positive effects for coffee producers, which are active primarily in developing countries. The existing body of literature behind the benefits of fair-trade certifications provides mixed results. In most cases the analysis of those benefits is limited to that of the immediate change in economic conditions of farmers. In this work we attempt to clarify the often ambivalent relationship between fair trade and economic wellbeing while also adding another important factor that is key to promoting intergenerational progress and often overlooked in past systematic reviews: education. In addition, we attempt to produce an analysis that is widely generalizable. Most research conducted regarding fairtrade and coffee is centered around Latin America. To ensure trends are free from

regional bias we consider other major (although less documented) coffee-producing regions such as Southeast Asia and Africa.

2. Methods

We searched Web of Science and Scopus for quantitative studies related to the effect of fair-trade certification on coffee producers. We used the following search terms in title, abstract, or keywords:

- ["fair trade" OR fairtrade OR fair-trade OR certif*]
 AND
- 2) [coffee]

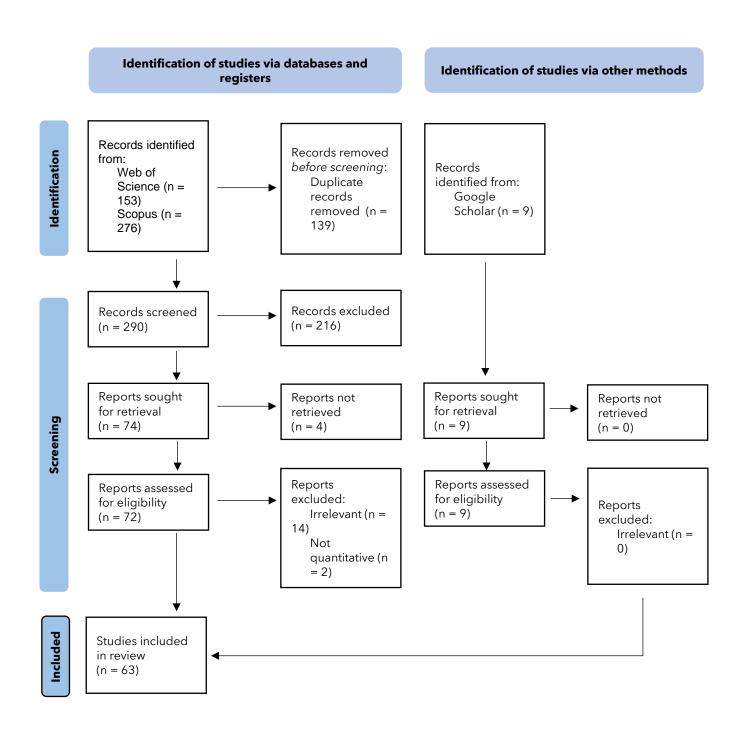
AND

- 3) ["latin america" OR "south america" OR "central america" OR farm* OR smallholder* OR small-holder* OR cooperative* OR co-operative* OR agriculture*]
 AND
- 4) [school* OR education OR income OR yield OR development OR economic* OR poverty OR impoverished]

The third search term originally encompassed geographical location, but we then expanded our study to include farmers and agricultural smallholders or cooperatives in other regions. This search strategy yielded 153 results on Web of Science and 276 results on Scopus. We removed duplicates, resulting in 290 records, and conducted a screening and eligibility procedure on the title, abstract, and keywords. Our criteria for inclusion in the screening process were as follows: (i) the articles had to involve fair-trade certification; (ii) the articles had to focus on coffee producers; (iii) the articles had to be quantitative studies; (iv) the articles could not be systematic reviews or narrative/historical reviews; (v) the articles had to be in English or Spanish; and (vi) the articles could not be outdated (pre-2005). After screening, 74 articles remained. We then conducted a deeper eligibility assessment, during which we analyzed the full-text studies to ensure that they were relevant in scope (i.e., they studied the effect of fair-trade certification on coffee producers' economic and/or educational outcomes). During this process, 16 further studies were removed from our review, and 4 studies could not be accessed. Lastly, we searched Google Scholar and identified 9 relevant studies not found in our database searches. This left us with a final count of 63 included studies.

For a detailed flow diagram of our screening and eligibility process, see the PRISMA diagram below:

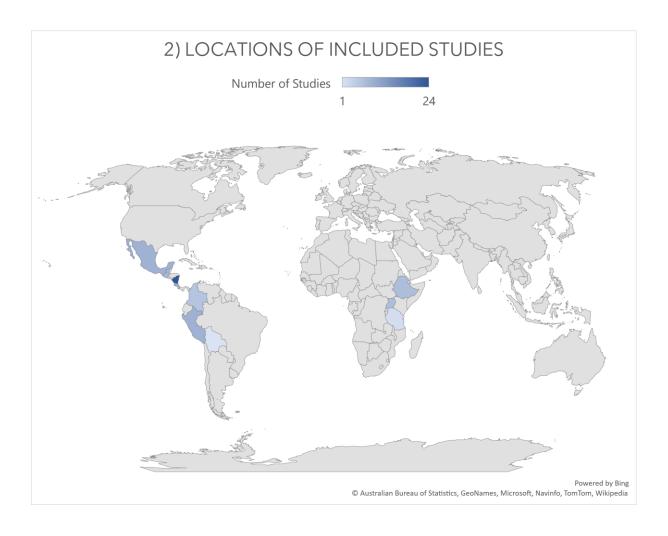
1) Prisma Flow Diagram



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Of the included papers, there were 44 studies situated in Latin America, 15 in Africa, and 4 in Asia (see illustration 2). Sample sizes for individual studies ranged from just a few

cooperatives to over 1500 coffee producers, indicating a wide variation in statistical power. Many of the studies used surveys and interviews for data collection, and some of them used administrative panel data; all the studies employed some regression analysis, with methods ranging from difference-in-differences, instrumental variables, probit and logit models, ordinary least squares, and several more specific models. 61 studies investigated income or economic outcomes, and 19 studies focused on educational outcomes.

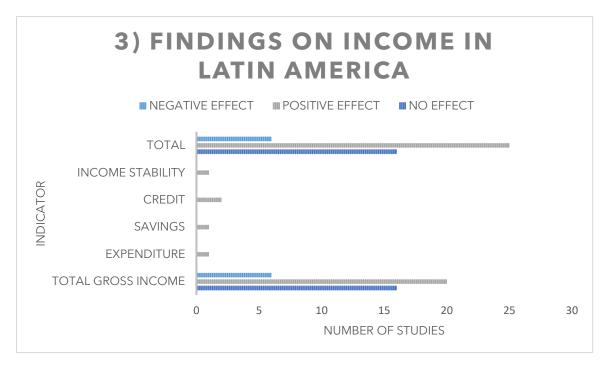


3. Results

3A: Findings on Income

3A.1 Studies in Latin America

In Latin America, the fair-trade literature indicates that certification benefits rural coffee farmers' income. Among the 44 studies measuring income, 25 find a positive effect, 6 a negative effect and 17 no effect.¹ Thus, while positive findings are predominant, there are nearly as many studies reporting negative or no effects. The indicators reported are total gross income, expenditure, savings, credit, and income stability (see illustration 3).²



In this subsample, most studies estimate total gross income. Among these, 20 studies find a positive effect. Ronchi (2002) suggests that coffee income is 39% higher for fair-trade compared to conventional farmers. Another study (Haggar, Soto, Casanoves et al, 2017) reports a 43% difference in income between the two groups and attributes it to increased productivity. Mitiku, De Mey and Nyssen (2017) believe that certification increases income and reduces poverty. However, almost all other studies find only "modest" (Ruben, Fort, Zuniga-Aris, 2009) positive effects. For example, Weber (2011) measures a 5% difference in total household income between certified and non-certified farmers. This is equivalent to 26 additional dollars per household member in annual income. One study (Dragusanu,

¹ While the sample is 44 studies, certain studies show positive effects for some indicators and negative or no effect for other indicators. Therefore, the sum of the number of positive, negative and no effect studies does not equal the sample size.

² See Appendix Table 1 for further details on illustration 3.

Montero & Nunn, 2018) finds that only certain workers in the coffee community benefit from certification. Farm owners experience a 2.2% increase in income. In contrast, unskilled workers (the poorest group) do not see a change in income. Additionally, nonfarm workers (the richest group) endure a decline of 2.6% in income. Hence, for this study, certification affects income inequality more than income itself. It is also worth noting that 16 studies find no effect and 6 studies negative effects. For example, Beuchelt and Zeller (2011) argue that certified producers are more often below the absolute poverty line than conventional producers.

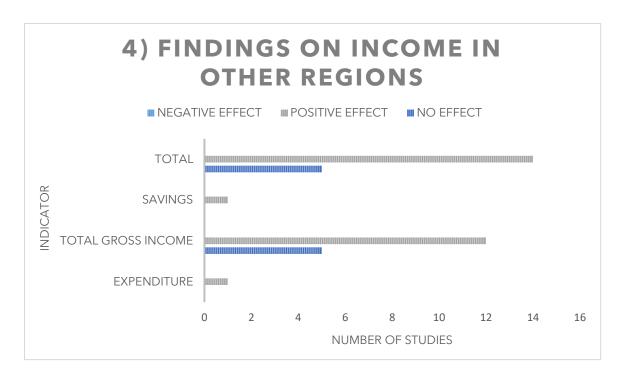
One study (Ruben, Fort, 2009) uses household expenditure as a proxy for income and estimates a negative effect. Another study (Nygren, 2009) suggests that there is no effect on income, but income stability is higher for certified farmers.

A few studies measure fair-trade's influence on credit and savings. In particular, Lyon (2008) finds no income effect but an increased credit access for certified farmers. According to Lyon, incomes stagnate due to higher debt burdens related to increased production costs. Utting-Chamorro's study (2005) supports these findings. The author adds that volatile coffee prices and lack of government support hinder improvements in earnings.

The cause of the potential increase in income is also unclear. Some say (Barham, Callenes, Gitter et al, 2010) that improved yields are the source of higher earnings. Weber and Barham (2012) agree. They show that certified farmers produce around 328 more pounds of coffee per hectare than uncertified producers. Thereby, they gain 1120 dollars of additional income per year. The price premium through certification only leads to 187 additional dollars. Other studies (e.g., Mendez, Bacon, Olsen et al, 2010) say that increased income stems from higher prices of fair-trade coffee.

3A.2 Studies in other regions

In our sample, 17 studies assess the impact of certification on income in regions other than Latin America. Of these, 14 studies report a positive effect and 5 studies no effect. In this subset, the indicators reported are total gross income, expenditure, and savings (see illustration 4).



Nearly all studies use total gross income as an indicator. Of these, 13 find positive effects and 5 no effects. One study (Karki, Jena, Grote, 2016) sees a 17% increase in income experienced by the poorest farmers in the coffee community. For Bowlig, Gibbonm and Jones (2008) household income rises by 12.5% due to a 75% increase in coffee revenue. Sebunya, Morawetz, Schader et al (2016) discuss that income is only higher for Arabica farmers (by 151%) but not for Robusta coffee. In contrast, another study (Astuti, Offermans, Kemp et al, 2015) claims that Robusta and Arabica farmers experience a 5.4% and a 2.4% rise in earnings, respectively. Many other studies find negligible or no effects. Minten, Dereje, Engida et al (2017) say that farmer annual income increases by \$22 US dollars. Similarly, Mitiku, De Mey, Nyssen et al (2017) find that certification doubles coffee income but that this does not translate into higher household income or a reduction in poverty.

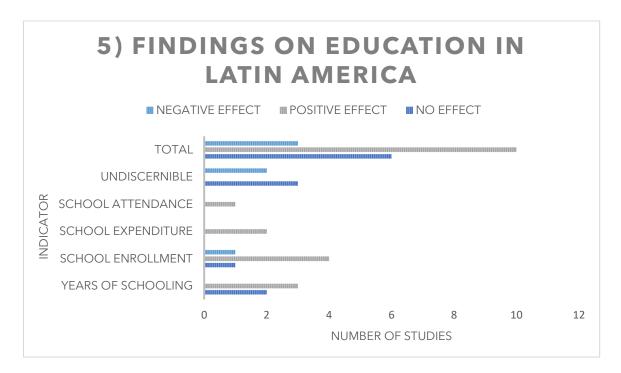
One study (Chiputwa, Spielman and Qaim, 2015) identifies a 30% increase in expenditure through certification. Lastly, Handindo, Haeseb, Demisec et al (2019) argue that certification does not influence income but increases savings by 2566.66 dollars.

In contrast to the previous sample (see 3A.1), there is some consensus on the source of the observed effect in non-Latin American countries. Positive income effects stem from the higher price of fair-trade coffee (e.g., Jena, Chichaibelu, Stellmacher et al, 2011). Minimal, no, or negative effects arise from high costs of production (e.g., Minten, Dereje, Engida et al, 2017) and low productivity (Handindo, Haeseb, Demisec et al, 2019).

3B: Findings on Education

3B.1 Studies in Latin America

Our search found 16 studies discussing the impact of fair-trade certification on Latin American coffee farmers' educational attainment. Of these, 10 report positive effects, 3 negative effects and 6 no effect.³ Hence, like above (see section 3A.1), the number of studies reporting improvements is approximately equal to those showing no or negative effects. The indicators presented in our sample are school attendance, school expenditure, school enrollment, and years of schooling (see illustration 5).⁴ We added a category for studies (predominantly surveys) where it was undiscernible which indicator was assessed.



The study using school attendance as an indicator (Arnould, Plastina & Ball, 2006) finds differing effects across countries. In Peru and Guatemala, fair-trade is correlated with higher school and/ or university attendace. In Nicaragua, attendance is not affected.

Both studies assessing school expenditure observe higher investments in education for certified farmers. However, the cause of increased expenditure is unclear. One study (Barham, Callenes, Gitter et al, 2010) explains it through higher coffee yields. The other

³ See table 3 in the appendix for further clarification on this sample.

⁴ School expenditure refers to the investments made in education such as books, tuition fees, school uniforms, technical devices, etc.

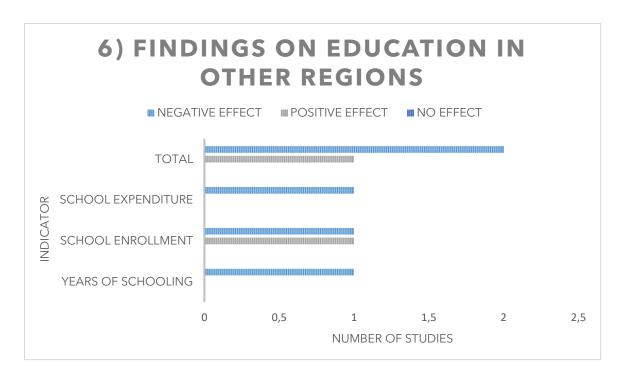
(Nygren, 2009) argues that social development premiums offered by fair-trade programmes is the origin of increased educational investments.

Most studies measure school enrollment. Arnould, Plastina and Ball (2009) find that fair-trade farmers' children are almost twice as likely to be currently enrolled in school compared to conventional farmers. In contrast, one panel data study (Dragusanu, Monero & Nunn, 2018) indicates that certification only advances education for a certain subgroup of the coffee community. While the schooling of farm and unskilled workers' children is unchanged, there is an adverse schooling effect for non-farm workers. Difference-in-difference analysis reveals that the probability of high school enrollment for non-farm workers' children decreased by 7.3 percentage points as a result of certification. Authors hypothesize that this difference arises from diverse income effects post-certification.

Finally, a few studies use the years of schooling indicator. A study in Colombia (Rueda & Lambin, 2013) suggests that children of certified farmers spend two additional years in school compared to non-certified farmers. In contrast, Weber (2012) finds that only girls are affected. They spend 0.7 years longer in school than their counterparts in non-certified households.

3B.2 Studies in other regions

Unfortunately, as for income, very few studies analyze fair-trade's impact on education in regions other than Latin America. Our sample size is 3. Among these, 2 studies find a negative effect and 1 study a positive effect. The indicators reported are years of schooling, school enrollment and school expenditure (see illustration 6).



One study reporting on school expenditure (Memken, Spielman, Qaim, 2017) finds that household education expenditure is 146% higher for certified farmers. The rest measure school enrollment using propensity score matching. Akoyi, Mitiku and Maertens (2020) estimates increased secondary school enrollment. For primary school enrollment, the positive effect is only statistically significant for boys. Interestingly, D'Haeseb, Demisec and Tamiratd (2019) study school enrollment in the same regions (Keffa and Jimma) in Ethiopia but find a negative and statistically significant effect on education solely for boys. Both these results contradict the findings in Latin America (Weber, 2012) where only girls increased school enrollment.

4. Discussion and Concluding Remarks

A. Findings

Most studies conclude that fair-trade has a modest positive impact on rural coffee farmers' income and educational outcomes. Consequently, both hypotheses phrased in the beginning of this paper succeed. Nonetheless, in all regions and for both outcomes variables, studies finding positive effects are nearly equal to those reporting no or negative effects.

B. Policy Implications

Given the results of this review, fair-trade certification's impact on farmers' living standards is smaller than anticipated. Hence, efforts to translate higher prices of fair-trade goods into real improvements for farmers must be made. While the costs of production are likely fixed, productivity and yields may be enhanced. Direct financial incentives for farmers could advance productivity. Alternatively, cooperatives could organize trainings about productivity-enhancing agricultural techniques. Finally, further incentives to spend additional earnings on education should be initiated. For example, fair-trade programs should offer more attractive premiums to farmers for keeping their children in school or investing in education.

C. Limitations

Our reported findings suffer from various limitations. Firstly, reverse causality may have affected our results. Multiple studies' balance tests report that more educated farmers and farm owners are more likely to be certified (e.g., Karani, 2021). This implies that observed effects of certification on income and education may be distorted by their inverse relationships. Secondly, due to poor research methods, collinearity between education and income is possible in many studies. Thirdly, all samples except the set of studies reporting income in Latin America are too small to extrapolate credibly to the wider population. In fact, we decided to include quantitative studies with research methods of varying quality in order to maintain a sufficiently large statistical power. If we had been more strict in our screening and eligibility criteria, we could have avoided studies with poor research methods and hence improved the reliability of our results. Lastly, as Minten, Dereje et al (2017) point out, most studies assume that farmers sell all their coffee through fair-trade cooperatives. Since farmers experience precarious situations, the temptation to sell coffee at a lower price and quality to other buyers is strong. Thus, farmers' revenue from fair-trade coffee may not represent their total income and may lead to biased estimates.

D. Potential for Future Research

Interpreting fair-trade's impact reliably requires further quantitative studies. Similarly, large-scale comparisons across continents, goods, and certification labels (e.g., "organic") might clarify our results. Additionally, a better understanding of how fair-trade improves earnings could lead to better policy choices. While many studies hypothesize the source of their observed effect, few test these beliefs. Nearly all fair-trade mechanisms certify

cooperatives rather than farms themselves. Hence, it would be interesting to know if fair-trade's effect on farmers' wellbeing could be strengthened by certifying their products directly. It is worth investigating whether cooperatives retain substantial amounts of revenue gained from certified coffee instead of passing it on to farmers.

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<u>Appendix</u>

Table 1: Summary Findings on income in Latin America

Indicators	Number of Studies finding "no effect"	Number of studies finding "positive effect"	Number of studies finding "negative effect"	Total number of studies
Total gross income	1 (Mendez, Bacon, Meryl, Olsen et al (2010)) 2 (Ruben, Fort, Zuniga-Arias (2009)) 3 (Sick (2008)) 4 (Nygren (2009)) 5 (Lyon (2008)) 6 (Utting, Chamorro (2007)) 7 (Beuchelt, Kiemen, Zeller (2010))	finding "positive effect" 1 (Valkila (2009)) 2 (Dragusanu, Monteru, Nunn (2018)) 3 (Arnould, Plastina, Ball (2009)) 4 (Ronchi (2002)) 5 (Barham and Weber (2012)) 6 (Barham, Callenes, Gitter et al (2010)) 7 (Bacon, Mendez, Gliessman et al (2008))	finding "negative effect" 1 (Bacon, Mendez, Gomez et al (2008)) 2 (Bacon, Sundstrom, Gomez et al (2014)) 4 (Segura, Zuniga-Arias (2009)) 5 (Ruben, Fort (2009)) 6 (Beuchelt, Zeller (2011))	number of studies 43
	8 (Beuchelt, Zeller (2013)) 9 (Dietz, Chong, Grabs, Kilian (2019)) 10 (Ibanez, Blackman (2016)) 11(Jena, Stellmacher, Grote (2015)) 12 (Vellema, Casanova, Gonzalez et al (2015)) 13 (Valkila, Nygren (2010)) 14 (Utting-Chamorro (2005)) 15 (Ruben, Fort (2012)) 16 (Vitae (2014))	8 (Mitiku, De Mey, Nyssen et al (2017)) 9 (Dammert, Mohan (2014)) 10 (Arnould, Plastina, Ball (2006)) 11 (Donovan, Poole (2016)) 12 (Estevez, Bhat, Bray (2017)) 13 (Haggar, Soto, Casanoves et al (2017)) 14 (Johannessen, Wilhite (2010)) 15 (Luna, Wilson (2015)) 16 (Weber (2011)) 17 (Utting (2009))		

		18 (Ruben, Fort, Zuniga-Aris (2009) 19 (Raynolds, Rosty (2019)) 20 (Mendez, Bacon, Olsen et al (2010))		
Expenditure		1 (Ruben, Fort (2009))		1
Savings		1 (Mendez, Bacon, Meryl, Olsen et al (2010))		1
Credit		1 (Lyon (2008)) 2 (Mendez, Bacon, Meryl, Olsen et al (2010))		2
Income stability		1 (Nygren (2009))		1
Total	16	25	6	47 (minus duplicates =44)

Table 2: Summary Findings on income in other regions

Indicators	Number of Studies finding "no effect"	Number of studies finding "positive effect"	Number of studies finding "negative effect"	Total number of studies
Total gross income	1 (Handindo, Haeseb, Demisec et al (2019))	1 (Vicola, Neilsona, Faila et al (2018))		
	2 (Mitiku, De Mey, Nyssen, Martens (2017)) 3 (Sebunya, Morawetz, Schader et al (2018)) 4 (Akoyi, Mitiku, Maertens (2020))	2 (Latynskiy, Berger (2016)) 3 (Karami, Mustada, Navega et al (2019)) 4 (Karki, Jena, Grote (2016))		
	5 (Astuti, Offermans, Kemp et al (2015))	5 (Sebunya, Morawetz, Schader et al (2018)) 6 (Chiputwa, Qaim (2016))		
		7 (Rijsbergen, Elbers, Ruben et al (2016))		
		8 (Bolwig, Gibbon, Jones (2008))		
		9 (Jena, Chichaibelu, Stellmacher et al (2011))		

		10 (Schuit,, Moat, Gole et al (2020)) 11 (Minten, Dereje, Engida, Tamru (2017)) 12 (Parrish, Luzadis, Bentley (2005))		
Savings		1 (Handindo, Haeseb, Demisec et al (2019))		
Expenditure		1 (Chiputwa, Spieman, Qaim (2015))		
Total	5	14	0	19 (minus duplicates =17)

Table 3: Summary Findings on Education in Latin America

Indicators	Number of Studies finding "no effect"	Number of studies finding "positive effect"	Number of studies finding "negative effect"	Total number of studies
Years of schooling	1 (Mendez, Bacon, Meryl, Olsen, et al (2008)) 2 (Mendez, Bacon, Meryl, Olsen et al (2010))	1 (Ronchi (2002)) 2 (Weber) 3 (Rueda, Lambin (2013))		5
School enrollment	1 (Dragusanu, Montero, Nunn (2018))	1 (Bacon, Mendez, Gomez et al (2008)) 2 (Arnould, Plastina, Ball (2009)) 3 (Bacon (2008)) 4 (Arnould, Plastina, Ball (2006))	1 (Dragusanu, Montero, Nunn (2018))	6
School expenditure		1 (Nygren (2009)) 2 (Barham, Callenes, Gitter et al (2010))		2
School Attendance		1 (Arnould, Plasina, Ball (2006))		1
Undiscernable	1 (Mendez, Bacon, Olsen, Petchers, Herrador ((2010)) 2 (Snider, Gallegos, Gutierrez, Sibelet (2017))		1 (Tellman, Gray, Bacon (2011)) 2 (Segura, Zuniga- Arias (2009))	5

	3 (Mendez, Bacon, Meryl, Olsen et al (2010))			
TOTAL	6	10	3	19 (minus duplicates =16)

Table 4: Summary Findings on Education in other regions

Indicators	Number of Studies finding "no effect"	Number of studies finding "positive effect"	Number of studies finding "negative effect"	Total number of studies
Years of schooling			1 (Meemken, Spielman, Qaim (2017))	
School enrollment		1 (Akoyi, Mitiku, Maertens (2020))	1 (Handino, D'Haeseb, Demisec et al (2019))	
School expenditure			1 (Meemken, Spielman, Qaim (2017)	
Total	0	1	3 (minus duplicates =2)	3

PRISMA Checklist



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 1
ABSTRACT	_		
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 1
INTRODUCTION Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Pages 1-2
	4	·	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 1
METHODS	_		Dans 0
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 2
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Pages 2-3
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Pages 2-3
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	/
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	/
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 1
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	1
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	1
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	1
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	1
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	1
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	1
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	1
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	1
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	1
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	,
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	1

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PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Pages 2-4
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	1
Study characteristics	17	Cite each included study and present its characteristics.	Appendix
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	1
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	1
Results of	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	/
syntheses	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	1
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	1
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	/
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	/
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	1
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Pages 5-10
	23b	Discuss any limitations of the evidence included in the review.	Page 11
	23c	Discuss any limitations of the review processes used.	Page 11
	23d	Discuss implications of the results for practice, policy, and future research.	Pages 11-12
OTHER INFORMA	TION		
Registration and	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	1
protocol	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	1
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	/
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	/
Competing interests	26	Declare any competing interests of review authors.	1
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	1

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

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