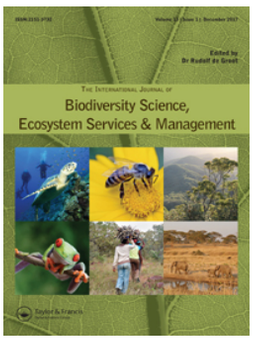


International Journal of Biodiversity Science, Ecosystem Services & Management

ISSN: 2151-3732 (Print) 2151-3740 (Online) Journal homepage: https://www.tandfonline.com/loi/tbsm21

Reviewing the impacts of coffee certification programmes on smallholder livelihoods

Joshua G. Bray & Jeffrey Neilson

To cite this article: Joshua G. Bray & Jeffrey Neilson (2017) Reviewing the impacts of coffee certification programmes on smallholder livelihoods, International Journal of Biodiversity Science, Ecosystem Services & Management, 13:1, 216-232, DOI: 10.1080/21513732.2017.1316520

To link to this article: https://doi.org/10.1080/21513732.2017.1316520

Published online: 24 Apr 2017.

INTERNATIONAL JOURNAL OF BIODIVERSITY SCIENCE, ECOSYSTEM SERVICES & MANAGEMENT, 2017
VOL. 13, NO. 1, 216–232
http://dx.doi.org/10.1080/21513732.2017.1316520

Taylor & Francis
Taylor & Francis Group

SPECIAL ISSUE: CERTIFYING ENVIRONMENTAL SOCIAL RESPONSIBILITY

REVIEW ARTICLE

Reviewing the impacts of coffee certification programmes on smallholder livelihoods

Joshua G. Bray and Jeffrey Neilson

School of Geosciences, Sydney University, Sydney, Australia

ABSTRACT

Certification programmes and voluntary standards for sustainability are now a common feature of many agricultural landscapes worldwide. The rapid expansion of such programmes has only recently been accompanied by concerted attempts to assess the lived experience of enrolled producers. This article reviews empirical research assessing the impact of certification programmes on coffee smallholder livelihood assets, and presents an initial framework for both conceptualising and analysing change in livelihood assets resulting from certification. Several of the reviewed studies identified enhanced livelihood assets arising from certification under specific institutional and contextual settings, but causation was difficult to establish. A greater number of studies found either neutral or mixed impacts, and a small number reported negative impacts. While a consensus has yet to be reached regarding all livelihood impacts of certification programmes, we present a series of propositions that reflect widely reported impacts. Further findings drawn from the review include: (i) stronger pre-existing institutions within the producer community are more likely to result in benefits for individual households; (ii) the value chain structures through which certification programmes are implemented are highly varied and strongly influence livelihood outcomes; and (iii) methodologically, existing studies rarely present either reliable baseline data or a realistic control group for comparison, making causation difficult to establish.

ARTICLE HISTORY
Received 4 April 2016
Accepted 24 March 2017

EDITED BY
Dagmar Mithöfer

KEYWORDS
Smallholders; livelihoods; coffee; certification; sustainability; standards; value chains; fair trade

1. Introduction

This review article examines empirical studies of the impacts of third-party certification schemes, such as Fair trade, Certified Organic, UTZ, and Rainforest Alliance, all of which have gained market prominence over the last 15 years. The focus of this review is to assess whether the livelihood assets (also referred to as capitals) of certified smallholders have been impacted as a result of these schemes, which purportedly aim to improve market fairness, encourage environmental sustainability, and to support social development of producers. However, the schemes have been criticised for the lack of credible evidence of their impact, particularly the long-term impacts on the smallholders they purport to support (Blackmore & Keeley 2012). This review, therefore, addresses the urgent need to better understand the current state of evidence of impacts from certification programmes, as presented in peer-reviewed publications, and to delineate the specific impact pathways through which change is likely. Our review is focused on the coffee sector, where certification schemes have a relatively long history.

Certification refers to the broad family of voluntary standards set by third-party organisations, against which producers are independently audited and certified (or verified in some cases). The standards themselves vary considerably, from organic standards that demand producers abstain from the use of agricultural chemicals but which contain few social criteria, through to Fair Trade Certification, which demands adherence to particular social and economic principles, but with fewer environmental requirements. The standards established by UTZ and the Sustainable Agriculture Network (Rainforest Alliance) present themselves as being more holistically concerned about sustainability, and include a broader range of economic, social, and environmental criteria. There are likely to be differences in the livelihood impacts of these diverse programmes, and some of these distinct impacts are discussed below. However, our aims in this paper are to commence an initial assessment of reported impacts on livelihood change from voluntary standards in general, and to identify likely impact pathways.

Any producer, or producer group, that has been audited as complying with a particular standard is able to use the certification label for marketing their product, on the assumption that buyers value the label. There are, however, costs associated with

CONTACT Joshua G. Bray joshua.bray@sydney.edu.au

certification. These include the possible costs of modifying the production system to meet the standard, the costs of record-keeping and administration, the costs of implementing farmer training, the costs of undergoing an audit, and the costs of actually using the label. Irrespective of whether these costs are borne directly by producers or indirectly (paid for by others downstream, such as traders and roasters in the coffee sector), it is ultimately necessary for the benefits of certification to be assessed against these costs and against the likely benefits derived from alternative investments in sustainability. None of the studies we review here, however, attempts to calculate these full costs.

Certification can be considered a market-based method of assigning value to a given quality in a commodity, whether environmental, social, or economic. However, to whom value is assigned is not always clear. Giovannucci and Potts (2008) suggest that certification is a method both for consumers to reduce the social and environmental externalities of their consumption, and for branded manufacturers to mitigate the risk of long-term supply shortages. Alternatively, certification is elsewhere claimed to primarily improve the livelihood security of producers – economically, socially, and environmentally by becoming part of a social justice movement (Arnould et al. 2009). Meanwhile, Millard (2011) suggests that certification should be primarily considered a market-based mechanism to incentivise farmers to apply sustainable production methods, or what Lipschutz (2015) interprets as a 'social contract' between consumers and producers. This plurality of ways that certification can be conceptualised, and subsequently utilised, may partly explain the variety of impacts presented in this review, as different participants may have different expectations from the same process.

This review is timely: the market has become crowded with competing labels (Barham & Weber 2012), and has even created a market for standards themselves (Reinecke et al. 2012). Our discussion in this article is predicated on the assumption that a market value for standards exists, although we accept that continued growth in market demand for certified products is by no means assured. Previously, Millard (2011) implied from the 'soaring' sales of certified products that major companies would not commit to certification if not for a positive response from consumers. However, it has also been widely reported (Renard 2005; Bacon et al. 2008; Lazaro et al. 2008; Blackmore & Keeley 2012; and KPMG 2013) that less than 50% of all certified coffee is actually sold as such.

A number of previous stand-alone literature reviews concerning the impact of certification schemes on coffee producers have been published, several of which have been funded by certification agencies[1] and only two of which are peer-reviewed. These are: Nelson and Pound (2009); the peer-reviewed Blackman and Rivera (2011); International Trade Centre (2011); Blackmore and Keeley (2012); Milder et al. (2012); KPMG (2013) on behalf of SUSTAINEO; UTZ Certified (2014). The peer-reviewed article by DeFries et al. (2017) was published as this article was being finalised for publication. Blackman and Rivera (2011) urge caution about the results available in the literature, concluding that empirical evidence on the benefits of certification is limited. They identified several studies that found positive impacts, but only 14 of the 37 studies examined were deemed to have used a credible methodology. Of these, less than half (only six) identified clear environmental or socio-economic benefits. Similarly, cautious observations were made by the Blackmore and Keeley (2012), Milder et al. (2012) KPMG (2013), and DeFries et al. (2017) reviews, while the 2014 UTZ report reported overwhelmingly positive impacts. None of these previous reviews explicitly uses the framework of livelihood assets to assess impacts.

In this review, we are specifically interested in the recorded impact of certification programmes on livelihoods, and the specific pathways through which such impacts may be taking place. We have adopted the sustainable rural livelihoods framework, as originally suggested by Chambers and Conway (1991) and further developed by Scoones (1998), Bebbington (1999), and others. This framework considers how households and individuals utilise their tangible and intangible assets to develop a livelihood strategy, which is ultimately mediated by broader institutional settings and processes. The adopted livelihood strategy then results in outcomes for household livelihoods and sustainability. A now standard approach within the livelihood framework, which we follow, is to assess the following five 'capitals' or 'assets' employed to develop a livelihood strategy:

- Human capital; skills, knowledge, education, good health, and physical capability,
- Social capital; social networks, social claims, relations, affiliations, and associations,
- Natural capital; natural resource stocks (such as land and water) and other environmental services,
- Physical capital; infrastructure, housing, tools, and equipment, and
- Financial capital; wages, cash reserves, savings, access to credit.

The direct application of the livelihood framework to measure the impact of certification was identified in three studies (Bacon 2005; Parrish et al. 2005; Utting 2009), while others (such as Rueda & Lambin 2013) adopt a similar approach without explicitly referencing the framework. Many of the studies do, however, implicitly

address impacts on livelihoods. The analysis in this paper presents a realistic assessment of how each of the five livelihood capitals could be logically influenced by certification, and seeks to establish a foundational understanding of impact pathways that will assist future assessments. The livelihood framework is particularly useful in assessing sustainability programmes at the household and individual level, as it provides a people-centric approach that recognises the myriad ways that various asset classes are combined and transformed to meet desirable life outcomes (Bebbington 1999). This is consistent with the multifaceted nature of the impact pathways envisaged by advocates of certification programmes.

The following section introduces the framework of impact pathways presented by certification schemes. This is followed by an overview of the methodology used in the review. We then commence our main discussion through five separate sections (each relating to a specific livelihood capital) that present possible impact pathways and then review findings relevant to each capital. The final section concludes the review and presents our main propositions.

2. Impact pathways

Prior to assessing the reported impacts of certification in the peer-reviewed literature, it is necessary to first understand the mechanisms and processes through which standards and certification should, in theory, contribute to enhanced livelihood outcomes for producers. This is often expressed through a 'theory of change', and many certification organiszations have published their own theory of change to understand these processes (Fair trade International 2015; Sustainable Agriculture Network 2016; UTZ 2016; and 4C Association 2013[2]). A theory of change helps us to assess livelihood impacts against the criteria and expectations of certification organizations themselves.

Establishing the intended impact pathways of certification necessarily sets the benchmark against which research into the efficacy of certification should be undertaken. The published theories of change each identify how smallholders are expected to be impacted by standards. The primary impact pathways through which livelihood improvements are expected, as identified in the theories of change, are fourfold: (i) the provision of farmer training (e.g. 4C Association 2013; Sustainable Agriculture Network 2016; and UTZ 2016), which has a direct impact on human capital, and which is expected to result in more profitable farm practices, better financial management (financial capital), improved conservation of natural resources (natural capital), and enhanced attention to health and hygiene (human capital); (ii) the development of stronger producer organizations (social capital), which engender active participation, enhanced negotiating capacity, stable social relations, and enhanced transparency (4C Association 2013; Fair trade International 2015; UTZ 2016); (iii) the direct provision of inputs, equipment, and infrastructure by downstream buyers (physical and financial capital), often as part of enhanced investment by buyers in their supply chain (4C Association 2013; UTZ 2016); and (iv) enhanced product marketing (e.g. UTZ 2016), including higher farm-gate prices (e.g. Fair trade International 2015), reduced vulnerability to price fluctuations and longer term relationships with buyers (e.g. 4C Association 2013), all of which would improve the financial capital of producers. Finally, certification schemes mandate a particular kind of behaviour and practice by producers in return for improved market access, and this is expected to be beneficial to producers, often in the medium to long term.

More broadly, the ISEAL Alliance (a non-government organization that establishes codes of practice for standard-setting organizations, of which the 4C association, Fair trade, Sustainable Agriculture Network/Rainforest Alliance (SAN/RA), and UTZ are all full members) has a long-term goal of ensuring certification systems can contribute to poverty alleviation and improved livelihoods (ISEAL 2013). ISEAL (2013) 'conceptual framework' details pathways for sustained improvements in the human, social, environmental, economic, and political spheres, each of which can be directly related to a livelihood capital. As a result, there is a reasonably sound relationship, as presented across the published theories of change pathways, which links certification schemes with the expected enhancement of livelihood capitals.

While general outcomes are provided by these pathways, the certification schemes rarely specify outcome targets (Tscharntke et al. 2015). However, there are broader expected impacts generally shared between the schemes, which include improved product quality and yield and thus income, better standard of living for producers and workers, and a better environment. The specific time frame to achieve these goals are usually limited to short-, medium- and long-term goals, although the timeframes explored in the reviewed studies were rarely more than a temporal snapshot.

3. Methodology

This review reports on findings published in English-language peer-reviewed studies.[3] We included publications in our review based on the following criteria:

- The study was empirical, involving a field-based methodology in coffee-producing regions;
- The study attempted to address at least one of the five livelihood capitals (but not necessarily applying the sustainable livelihoods framework);
- The study presented an actual experience of certification, rather than a theoretical or general discussion; and

- The study had to consider the impacts on, or demonstrate relevance towards, smallholders (our special area of interest).

The title, abstract and keywords of each article was initially assessed, with a total of 51 articles satisfying these criteria. Blackman and Rivera (2011) present a detailed discussion around selection of counterfactuals[4] as part of their methodology, which we have generally followed, although we did not dismiss those studies with less apparent rigour in ascertaining cause and effect. Indeed, Blackman and Rivera (2011, p. 1181) reported that the absence of a counterfactual 'did not spur unduly positive assessments of certification benefits'. The results of our content analysis across these 51 studies, highlighting regional focus, scheme type, methods, coverage of livelihood capitals, and general impact are detailed in Appendix A, Appendix B, and Appendix C. Twelve studies used qualitative analysis only, while eight studies used mixed qualitative and quantitative methods. The remaining 31 papers used quantitative analysis.

Where the empirical evaluations focus on more than one commodity (such as coffee and cocoa), we have maintained focus on the specific outcomes for coffee production wherever possible. Analyses of the impacts of organic (usually IFOAM) and Fair trade dominate the literature (refer to Appendix C), a likely result of the longer history of these schemes.

Geographically, Central American case studies make up 30 of the 51 studies, four studies were multiregional, six were located in South America, eleven in Africa, and only three in Asia. The studies suggest considerable contextual diversity both within and between countries, making generalised statements difficult. We did not identify any randomised controlled trials on the impacts of certification programmes, which might more rigorously minimise the influence of confounding factors.

4. Impact pathways for human capital

The human capital of farmers could conceivably be improved by certification through the following pathways: (i) skills development as a result of training and agronomic services; (ii) the allocation of group premiums towards local education and health care facilities; and (iii) improved producer income, which is then spent by individuals on health and education.

4.1. Education

There is some evidence that certification correlates with improved educational attainment following the introduction of certification (Bacon et al. 2008; Arnould et al. 2009; Valkila & Nygren 2010) and that premiums paid to cooperatives have been invested into education programmes (Utting-Chamorro 2005). Gitter et al. (2012) found that household participation in a Fair trade-organic cooperative resulted in a 0.7% increase in schooling for girls. These articles, however, are generally cautious in attributing causation directly to certification, citing possible external influences from other associated development projects or selection bias towards the initial involvement of better-educated individuals.

Mendez et al. (2010) found certification had little impact on education in Central America. Ruben and Fort (2012) found uneven impacts from Fair trade on education levels in their Peruvian case study, although they considered it 'likely' that part of the price premium was channelled into education.

Conversely, the education of producers appears to be a key factor determining both the likelihood of becoming involved in certification in the first instance and the capacity to benefit from certification. Valkila and Nygren (2010) noted that consideration of education a priori to certification was important in understanding the impacts of certification on producers in Nicaragua. Jena et al. (2012) also found that a higher level of education (and social capital) enabled Ethiopian producers to reap more benefits from the distribution of a premium within a cooperative. The labour and time required to meet the bureaucratic nature of the certification process appear harder for less literate producers or less organised cooperatives.

4.2. Training, skills, and capacity building

Several studies use the phrase 'capacity building' to describe the institutional support available to farmers from schemes (e.g. Raynolds et al. 2004; Utting-Chamorro 2005; Utting 2009; Mendez et al. 2010; Valkila & Nygren 2010). Sometimes, training is indirect, and is dependent on NGO-supported agronomists to build skills necessary to achieve certification (Valkila 2009). Jurjonas et al. (2016) reported substantial government support for Mexican coffee farmers striving for certification. The extent and quality of training that farmers receive both prior to and after certification is frequently a function of their access to cooperative and state-based services (Bacon et al. 2008).

When executed effectively, training has been reported to result in increased trust in a cooperative and improved information sharing. Jena et al. (2012) found that while the difference is modest, certified cooperatives in Ethiopia are more likely to offer training to members than non-certified cooperatives. Provision of training, associated with certification, was further reported to result in positive improvements in skill levels and agronomic practices (Utting 2009; Vellema et al. 2015; – both in South America).

Bose et al. (2016) reported positive impacts on book-keeping skills among certified producers in India. Smith (2013) recorded improved access for women to train once enrolled in Fair trade, as a result of active encouragement by cooperatives with gender-balanced boards. Smith (2013) also notes that if women are assigned positions of authority within an organiszation, this results in increased skill levels among women. The actual benefits received by individual farmers, however, were found to be dependent on cooperative leadership (Utting 2009; Elder et al. 2012).

In summary, certification does appear to be associated with increased farmer-training activities, which it is presumed (and sometimes demonstrated) will result in skills development, enhanced human capital, and ultimately improved practices and livelihood outcomes. The quality, relevance, and effectiveness of training received by farmers is heavily dependent on the management capacity of producer organizations and other support structures, both from within the value chain and external to it. While training has the potential to improve skills and knowledge over the long term, local leadership and effective institutions are necessary to make the most of these opportunities.

4.3. Health

A broad range of factors influence community health, such as drinking water source, diet and nutrition, sanitation, gender equity, wealth and income, place of residence, age, and genetics. The quality of community healthcare is commonly dictated by government policy and programmes rather than by cooperative provisions or within a certified value chain. It is difficult to ascertain the specific impact of sustainability programmes on those services, including healthcare, education, and infrastructure, that are widely held to be public goods and it is probably unrealistic to expect significant impact in these areas.

Unsurprisingly, it is rare that meaningful improvements in healthcare provision or health outcomes can be attributed to certification (Jena et al. 2012). Arnould et al. (2009) asserted that producers with more than 6 years Fair trade participation had improved health indicators relative to other producers. These long-term participants had better access to healthcare, potentially reflecting the greater investment of their cooperatives in healthcare facilities, assuming there was no initial selection bias. While case studies such as Valkila and Nygren (2010) note the *potential* of cooperatives to invest in healthcare, it is not widely reported. Downstream value chain actors might also choose to invest in healthcare provision in association with certification, but this is not mandatory and was not reported.

Another pathway to improved community health is anticipated through more responsible storage and use of agrochemicals (Gobbi 2000), use of worker safety equipment, and improved waste management, all of which are mandated practices by some certification schemes (Barham & Weber 2012; Chiputwa et al. 2015; Bose et al. 2016). Despite this presumed impact pathway, specific investigation of these potential health benefits were not examined in the empirical case studies.

5. Impact pathways for social capital

Certification is expected to enhance social capital through: (i) the strengthening of producer organizations (such as cooperatives); (ii) enhanced networking opportunities for farmers, thereby facilitating access to services from public and private organizations; and (iii) the empowerment of individuals mandated by schemes who might otherwise be marginalised within the community, such as women and informal rural labour.

Initial enrolment in a certification scheme appears dependent on prior social networks and connections, a process with the potential to increase inequality. Wollni and Zeller (2007), Jena et al. (2012), and Vellema et al. (2015) all identified how social capital generated through education affected participation in both cooperatives and certification programmes. Tovar et al. (2005) and Pinto et al. (2014) find that organic certification in Mexico favours (both economically and socially) larger coffee producers able to handle the complexity of certification standards and as such may entrench inequality within the community. Thus, social capital may be considered both a potential outcome of certification and also a crucial pathway to initially engage with certification.

5.1. Producer organization

Positive impacts on the functioning of producer organisation were reported by Utting (2009), while both Raynolds et al. (2004) and Ruben and Fort (2012) found that the capacity building nature of Fair trade played an important role in producer empowerment, leading to a gradual build-up of social capital. Ruben et al. (2009) and Ruben and Fort (2012) also found growers generally had a positive perception of Fair trade's impact on the functioning of their cooperative. Rueda and Lambin (2013) reported increased access to social networks that were not present prior to certification, and a clear impact pathway towards enhanced social capital through improved functioning of producer organizations seems likely.

Effective prior producer organisation (such as good management and leadership) was also widely reported to enable the successful introduction and implementation of certification schemes (Tovar et al. 2005;

Lyon et al. 2010; Bacon 2005; Jena et al. 2012; Utting 2009).

5.2. Gender

The impact on women and gender is extensively discussed in the literature, most recently by Utting (2009), Lyon et al. (2010), Ruben and Zuniga (2011), Smith (2013), KPMG (2013), and Valkila (2014). The patriarchal nature of many agrarian societies, in combination with the cultural and social roles expected of women, may limit the impact of certification on gender equality (Bacon et al. 2008; Smith 2013). Smith (2013) finds that across 20 international studies, Fair trade has mixed results in improving livelihoods for women, noting that in some cases inequality is exacerbated (e.g. Lyon et al. 2010), while others recorded improving women's participation (Elder et al. 2012; Chiputwa & Qaim 2016), income, well-being, and position within households (Smith 2013). Kasente (2012) presented very mixed results from Uganda, including a positive gender impact on inclusive decision-making alongside increased labour requirements for women.

Two studies of the Nicaraguan coffee industry (Utting-Chamorro 2005; Utting 2009) reported positive impacts of Fair trade on women, including confidence and managerial capacity, despite a gender disparity favouring males in Fair trade enrolment. Utting-Chamorro (2005) also noted decreasing domestic abuse and an increase in male housework participation. We conclude, however, that a consensus has yet to be reached regarding the gender impacts of certification, and a clear impact pathway towards female empowerment is difficult to identify.

5.3. Labour

Most case studies on the impacts on smallholders eschew discussion of the vexed issue of informal labour on smallholder farms, which is a complicated yet necessary area for future research. Where specific research on informal labour has been conducted, it was noted that there was little difference in working conditions before and after Fair trade's introduction (Valkila 2009; Valkila & Nygren 2010). Several studies reported that organic certification resulted in an increased reliance on labour (associated with mulching, composting, and weeding without the aid of labour-saving chemicals), thereby increasing labour demand within the community (Ruben et al. 2009; Valkila 2009; Blackman & Naranjo 2012). However, these work opportunities were often particularly arduous, which may have resulted in negative livelihood outcomes more broadly. This was demonstrated by Kasente (2012) who noted that certain organic certification guidelines such as increased organic fertiliser application, specifically result in increased labour for women, who traditionally performed this activity.

6. Impact pathways for physical capital

The impact of certification on physical capital could occur through the following pathways: (i) the investment of premiums by cooperatives and individuals into physical infrastructure, equipment, and facilities; (ii) investments made by buyers directly into physical assets as a result of tighter value chain linkages; (iii) encouraging other actors (such as governments or NGOs) to build physical infrastructure (i.e. a secondary result of enhanced social capital); and (iv) requiring producers themselves to invest in processing facilities (such as waste water treatment). However, findings on the impact of certification on physical capital within the empirical case studies were limited.

6.1. Infrastructure

Ruben and Fort (2012) reported that Fair trade cooperatives invested most of their premium into roads, while Chiputwa et al. (2015) reported investment of premiums into processing facilities in Uganda. Bacon et al. (2008) also found participation in Fair trade certified cooperatives correlated with improved infrastructure investment (on-farm investments and improved housing). In contrast, Utting (2009) notes that premiums paid at the cooperative level are generally insufficient to encourage meaningful investment in physical infrastructure within respective communities, particularly over the short term. The institutional capacity of (and education levels within) a cooperative was found to determine the willingness and ability to direct premiums into infrastructure, partly due to the ability to draft infrastructure funding proposals (Jena et al. 2012, 2017).

Higher and more stable prices resulting from certification (see discussion on financial capital below) were related to producers increased willingness to invest in physical capital, such as their own processing equipment (Bolwig et al. 2009; Chiputwa et al. 2015). However, while some physical assets are often individually owned (such as houses, drying yards, and some processing and farm equipment), much infrastructure is collectively owned (e.g. public roads, schools, health centres, or cooperative machinery). Therefore, investments are frequently made by non-household actors, such as producer organizations, governments, NGOs, and firms. The ability to link physical capital improvements specifically to certification is complicated by the fact that much public infrastructure will likely benefit both certified and non-certified farmers in a particular community (Ruben & Fort 2012).

In summary, improvement in physical capital appears limited to smaller capital goods, such as

machinery and post-harvest equipment, and is most widely reported for Fair trade, where a collective development premium is paid. Overall, however, this is not widely explored in the literature and it appears unrealistic to expect significant direct impacts on physical capital resulting from certification, especially in comparison to public investments.

7. Impact pathways for natural capital

Certification may impact the stock of natural capital in a producing region as a consequence of: (i) the introduction and mandating of good agricultural practices, including soil conservation and protection, responsible use of farm chemicals, and reduced extraction of water from natural waterbodies; and (ii) the active promotion of habitat protection or restoration by farmers (e.g. requirements for buffer zones, prescribed shade tree diversity and density, and prohibitions on land clearing). These pathways essentially rely on a compliance mechanism, whereby producers are required to adhere to a new set of environmental standards. A final indirect pathway may exist where sustainability standards focus on productivity improvements and intensification, which could reduce pressure on marginal and forested lands (although enhanced productivity could also make marginal lands more profitable, thereby encouraging expansion).

Changes in natural resource management outcomes are difficult to measure (Philpott et al. 2007) and are frequently monitored at the regional rather than farm scale. The need for long-term monitoring is perhaps the greatest in natural capital. This is because of the longer time frame needed to build natural capital (Haggar et al. 2015) and the time taken for changes in natural resource management to have measureable impacts (e.g. habitat recovery, soil conservation). As a result, it is unsurprising that the literature is limited in addressing this area (London 2012).

7.1. Habitat conservation

Habitat could be protected on coffee farms through requiring a higher density of shade trees and by forbidding clearing of new land. However, measuring the impact of certification schemes on broader forest landscapes presents a considerable methodological challenge. Thus, the extent of certification's impact on the management of forested land (including commons) is unclear from the literature. Many smallholders have a high dependency on local forests for non-timber forest products and, in many cases, have a history of effective management (Philpott et al. 2007), such that it has been reported that certification schemes may even curtail these activities (El Ouaamari & Cochet 2014). In Tanzania, Fair trade was reported to have negligible direct impacts on natural capital (Parrish et al. 2005), but certified producers have been found to have a resulting positive attitude towards environmental protection (Utting-Chamorro 2005; Utting 2009; Ibnu et al. 2015). In the words of Blackman and Naranjo (2012, p65), 'Certification can alter management practices more easily than it can ecological practices'. Rueda et al. (2015) note several factors affecting conservation outcomes in Colombia, including strong institutional support, and this is a likely reason for strong environmental gains among certified Colombian producers in the Rueda and Lambin (2013) study.

Philpott et al. (2007) report it may be difficult for Fair trade producers to implement ecological and economically sustainable practices simultaneously. Highlighting the mixed nature of results from our review, Ruben et al. (2009) found that implementing conservation management practices may be excessively costly, but Ibnu et al. (2015) found the adoption of these required practices can be financially advantageous. Pinto et al. (2014) found that land was being set aside for conservation as a result of group certification, when combined with government regulations and enforcement.

Certified forest coffee areas in Ethiopia have recorded slightly less (1.7%) deforestation following implementation of certification (Takahashi & Todo 2013). Despite finding generally positive impacts from certification, Rueda and Lambin (2013) found that farmers within their study continued to expand their areas of production, regardless of certification status.

7.2. Soil and water resources

There is little consideration in the literature of the impact of certification on producer soil or water resources. Assessing these impacts is complicated, as it is highly dependent on pre-existing management practices and how readily farmers can adapt to certification requirements. The requirement for rigorous methodologies, including comprehensive soil and water sampling, appears to have discouraged extensive research into this topic.

Notwithstanding these limitations, a range of improved watershed protection measures were associated with organic certification in Costa Rica (Blackman & Naranjo 2012) and RA certification in Colombia (Rueda & Lambin 2013). Gobbi (2000) further reports that bird-friendly certification assisted the build-up of organic matter in the soil and improves local water quality. Rueda and Lambin (2013) also report that RA-certified farmers in Colombia are far more likely than non-certified farmers to use soil analysis to guide chemical application.

Given these findings, and notwithstanding the need for more rigorous impact studies, it seems likely that the requirements of certification schemes are resulting in enhanced natural capital as a result of improved management of water and soil resources.

A related aspect is waste management, which is rarely mentioned in the literature, despite it being common across certification scheme guidelines. Rueda and Lambin (2013) found 90% of RA-certified farmers engaged in some degree of waste management, compared with 30% of non-certified farmers, and those certified farmers had changed their behaviour since the introduction of certification.

7.3. Chemical use

Organic certification has predictably been associated with reductions in chemical inputs (Blackman & Naranjo 2012). However, the impact of certification is difficult to separate from other institutional supports or local conditions (Rueda et al. 2015). For example, Parrish et al. (2005) note that high input prices and low coffee prices were more likely to persuade farmers to stop using synthetic chemicals than certification. Rueda and Lambin (2013) noted little difference in chemical use between RA-certified and non-certified farmers.

8. Impact pathways for financial capital

Certification is expected to improve the financial capital of farmers as a result of: (i) higher incomes related to price premiums; (ii) higher incomes resulting from the adoption of more profitable agricultural practices (either higher yields or lower costs); (iii) improved access to financial credit; and (iv) a reduction in financial risk and price volatility, associated with longer term purchasing agreements and reliable supply chain relationships. The possible financial benefit of certification is a key producer consideration, and London (2012) notes the emphasis on economic evaluations in the literature.

8.1. Impacts on producer income

A consensus on the impacts of certification on coffee producer income has not been reached as it is complicated to assess. Rural livelihood strategies frequently encompass a variety of farm-based and off-farm income-generating activities, such that coffee income may be part of a much broader livelihood portfolio. As a result, increased income from certified coffee may not necessarily equate to increased income for the household (if, e.g. it requires reallocation of resources away from other more productive activities), and inversely a decrease in certified coffee income may not equate with declining welfare. Even coffee-specific income will be dependent on many factors, including farm-gate price, yield, and costs of production, such that increased farm-gate prices may not necessarily result in increased revenue if yields decline or production costs increase to a greater extent. Finally, effective ways to evaluate the cost of own or family labour remain elusive to many analyses. These confounding factors were rarely considered in the studies.

Some case studies found household revenue increasing between 12% and 20% as a result of certification (e.g. Bolwig et al. 2009; Ruben & Fort 2012), but this again depends on access to certified markets (Rijsbergen et al. 2015). The reported pathways for improved income are varied. In some cases, revenue increases were identified to be related to improved yields rather than price premiums (Barham & Weber 2012; Jena et al. 2012) and elsewhere due to lower input costs (Valkila 2009). Lyngbaek et al. (2001) estimated that a 38% increase in organic coffee prices was needed to offset the costs of certification, inspection, and registration in Costa Rica. Bacon (2005) found a majority of Fair trade and Organic farmers in Nicaragua reported a decline in their quality of life, and this was regardless of certification status, indicating that the premiums offered by alternative markets were insufficient to offset worsening economic conditions more broadly.

Despite this, price incentives are often an important catalyst to encourage investment from risk-averse farmers (Chiputwa et al. 2015). Many studies found a positive impact on farm-gate coffee prices (e.g. Kilian et al. 2006; Wollni & Zeller 2007; Bolwig et al. 2009; Mendez et al. 2010; Rueda & Lambin 2013). Chiputwa et al. (2015) noted that Fair trade growers received better prices over a period of 2 years relative to UTZ, organic and non-certified producers, primarily as a result of a value-adding process available to Fair trade processors only. However, premiums inevitably favour those producers with larger yields, who are often already more resilient to socio-economic shocks (Bolwig et al. 2009; Valkila & Nygren 2010; Valkila 2014). Weber (2011) emphasizes that somewhat complex financial calculations are required by farmers to assess the net benefits of certification. Fair trade remains the only scheme to offer a base price and is generally perceived to offer enhanced financial security as a result. However, there is no Fair trade premium at the farm level when the global coffee price is above the base price and producers have to rely on premiums associated with improved quality, with no guarantees that they will be able to sell produce on Fair trade markets, even when the floor price kicks in (Raynolds et al. 2004; Sick 2008; Valkila & Nygren 2010).

Premiums arising from certification are often paid at the cooperative level, rather than to individual

farmers (Ruben et al. 2009; Ruben & Zuniga 2011; Weber 2011), and producers who are active group participants are more likely to benefit from Fair Trade Certification since they may better understand their entitlements (Weber 2011; Jena et al. 2012).

Increased yields may also result in higher incomes, although there is also mixed evidence on this aspect. Beuchelt and Zeller (2011) found improved incomes existed for organic farmers through yield improvements, but not Fair trade-organic farmers. Ruben and Zuniga (2011) and Ruben and Fort (2012) found that Fair trade farmers produce yields inferior to those of conventional producers and thus Fair trade had a negative effect on household income. Both Gobbi (2000) and Kilian et al. (2006) found sustainable management practices, such as eliminating chemical fertilizers or increasing the number of shade trees negatively influence total yield per hectare. Lyngbaek et al. (2001) found the yield of organic farmers was 22% lower than that of comparable conventional farms, leaving Costa Rican organic producers worse off relative to their conventional-producer counterparts. Fair Trade Certification was reported by Valkila (2009) to improve low-intensity coffee production among Nicaraguan producers, but this was not enough to lift these producers out of poverty. Valkila (2009) also reported fewer inputs for organic production, but this was offset by increased labour costs, and tougher working conditions endured by producers. In contrast, Bolwig et al. (2009) found a 9% increase in coffee revenue among organic-certified producers in Uganda, which was attributed to higher yield from each tree.

8.2. Access to credit

It is possible that certification may enhance producer access to credit, as a result of provision by a strengthened producer organisation, directly by a downstream value chain actor, or by facilitating access to a third-party finance institution. However, surprisingly few studies reported on these potential impact pathways. An exception was Utting (2009) who reported that a Fair trade cooperative had allowed a majority of producers to access credit for the first time, and that the longer farmers had participated in Fair trade, the more likely they were to obtain credit. Little other evidence of this pathway was reported.

8.3. Resilience to risk

Risk management is a key concern for many farmers, giving rise to common presentations of the risk-adverse peasant (e.g. Henrich & McElreath 2002). In their Ethiopian study, El Ouaamari and Cochet (2014, p. 21) note that, 'farmers are indeed willing to grow coffee, as long as it does not put the rest of their production systems in danger'. A greater willingness to take risks is evident among more resilient farmers. The major certification schemes present a reduction in exposure to risk as a major benefit to producers. But the literature casts doubt on these assertions, with conflicting statements regarding the capacity of producers to tolerate risk prior to, and after, being enrolled in certification schemes.

Utting (2009) and Ruben and Fort (2012) report that Fair trade increases risk tolerance among farmers. Ruben and Fort (2012) found that while Fair trade -organic certification in Peru resulted in small increases in income only, there was an increased willingness to invest in land improvements, which they attributed to increased acceptance of risk.

Where farmers decide to increase their focus on coffee production as a result of certification, household livelihood specialization may reduce capacity to adapt to changing market conditions (Rijsbergen et al. 2015), especially if this is not offset by improved access to credit (Vellema et al. 2015). Utting-Chamorro (2005), Raynolds et al. (2004), and Barham and Weber (2012) all suggest that certification has the potential to expose producers to greater dependency on a specific trade channel, leading to a captive market relationship, thereby reducing their ability to endure value chain shocks. Such a situation is unlikely to deliver longer term livelihood improvements to farmers (Vellema et al. 2015). It was widely reported that certified supply chains were associated with unreliable or delayed payments (Utting 2009; Valkila 2009; Mendez et al. 2010; El Ouaamari & Cochet 2014; Chiputwa et al. 2015). Any delay will be particularly felt by poorer farmers, causing some to sell their coffee on conventional markets (Valkila 2009).

9. Conclusion

This review provides an update of the major reported findings concerning the impacts of certification on the livelihood assets of smallholder coffee producers around the world, and the pathways through which change is likely to occur. We have attempted to examine the various pathways through which certification is impacting farmer livelihood assets and to appraise our current understanding of these pathways. Overall, there were certainly more positive than negative impacts, although the studies were not as conclusive as might be expected, and the number of studies with neutral or mixed impacts was the greatest (refer to Appendix B for the quantitative breakdown of reported impacts upon the five livelihood capitals).

From the available body of evidence, we suggest the following propositions for understanding how certification affects each type of livelihood capital:

- Human capital, particularly agronomic knowledge, farm management, and health and safety measures, is frequently improved through the provision of training associated with

certification. Our posited pathway of a positive correlation between certification and education also has some support in the literature, but causation is difficult to establish.

- Social capital is frequently enhanced in terms of the strengthening of producer organizations as a direct result of certification, and it is assumed that this generates various benefits for individual members. However, the tendency for certification to be adopted by relatively better-resourced households within a community, who also assume leadership positions within organisations, suggests a link to rising inequality that may have both gendered and structural (in relation to labour) dimensions.
- Physical capital is being improved upon by farmer groups willing to invest certification premiums or additional income earned towards coffee-processing equipment, and by direct supports from buyers. However, the ability of certification schemes to facilitate larger investments in public infrastructure is limited, and a more realistic assessment of this impact pathway is necessary.
- The adoption of good agricultural practices following certification-related training is improving natural capital (especially soil and water resources) on a farm scale, and awareness of environmental problems is increased. Greater cooperation with local governments and NGOs is required, however, for landscape-level impacts (such as reduced deforestation) to be achieved.
- The impacts on the financial capital of producers are the most contested in the literature. However, it appears that any benefits are less likely to be a result of marginal price premiums than to other factors, such as improved yields, increased resilience, and enhanced access to credit.

Furthermore, impact assessment studies need to consider the unintended consequences of programmes, especially in relation to farm profitability, altered social institutions, and the reproduction of structural inequalities.

Positive impacts of certification are rarely attributable to certification alone, but operate in conjunction with other local factors, particularly education and skills levels, but also market structures, local infrastructure, and administrative capabilities. Thus, a consistent theme in the studies is the importance of contextual setting, particularly the role of coffee cooperatives and existing government institutions. For example, the experience of certification in Colombia appeared to be mostly positive, reflecting the particularly strong institutional supports in that country (Rueda & Lambin 2013; Rueda et al. 2015; Vellema et al. 2015). Certification schemes are not introduced upon a blank canvas. They overlay complex sets of social, economic, cultural, and political institutions, and the varied impacts reported in the literature primarily reflect these pre-existing institutional settings. It is the interaction between these settings and certification schemes that determine impacts upon individual households that may result in benefits in some communities and negative impacts elsewhere. It will also determine which households and individuals within a community benefit and which are excluded. These interactions require more systematic assessment in the literature.

These institutional settings should also be extended to the value chain structures through which certification programmes are implemented as a pivotal determinant of outcomes at the producer level, especially when certification is implemented as part of a broader corporate sustainability programme by lead firms. Coffee is traded along a global value chain governed by major coffee roasters as lead firms (Ponte 2002), such that the strategies enacted by these firms significantly affect producers, even when acting at a distance through trading companies. Understanding the interaction between these strategies and certification schemes requires greater attention. Benefits at the producer level are as much a result of how a particular lead firm within a value chain commits to certification as they are inherent to the certification programme itself.

Reflecting upon the impact pathways reported in the literature against expectations set out in the theory of change documents, the literature reported far less on the impact from farmer training than would otherwise have been expected. Social capital, particularly the strength and relationships of producer organisations was likely to increase as a result of certification, but subsequent impacts on gender and labour were generally neglected. The relationship between certification and higher farm-gate prices or reduced risk/increased resilience is overly simplified in the theories of change. Studies have found positive price and resilience impacts arising from certification, but there are often several other contributing factors, not least of which is global markets. The analysis presented here has begun to unpack and develop a more precise understanding of the causal linkages between sustainability programmes, impact pathways, and outcomes. In doing so, our review has led us to question some of the underlying assumptions articulated in the theory of change documents, and suggests a more realistic appraisal of the scope of livelihood impacts that can be expected through the certification programmes in coffee-growing communities.

Across the studies, it can be surmised that certification is generally more likely to generate positive rather than negative impacts, although the large number of neutral/mixed findings suggests that a

considerable degree of uncertainty persists. Our propositions aside, the research to date certainly does not provide an overwhelming endorsement of certification schemes and their impact on producer livelihoods.

There is a need for future research to both consolidate and extend our knowledge base. In furthering this agenda, additional research is required in Asia (e.g. in Vietnam and Indonesia) and extending the temporal scale of studies to ascertain the longer term impacts of certification would be helpful. It is suggested that future empirical case studies could productively build upon the livelihood framework presented by Chambers and Conway (1991) and Scoones (1998), which would necessitate moving the scope of analyses beyond the current focus on direct financial benefits to a broader range of potential outcomes. As shown in Appendix C, there is a preponderance of studies on Fair trade and organic, with the latter subject to more negative findings, while there is a need to address the considerably fewer studies of Rainforest Alliance and UTZ, which actually have a far greater reach.

Notes

1. Nelson and Pound (2009) was commissioned by the Fair trade Foundation; Blackmore and Keeley (2012) was funded by the Ford Foundation; KPMG (2013) was commissioned by SUSTAINEO; and UTZ Certified (2014) was self-funded.
2. IFOAM's theory of change for organic certification was in draft format only at the time of writing.
3. We used the following search terms in academic databases: coffee, certification; impacts; benefits; producer; farmer; smallholder; 4C Association; Fair trade; UTZ; Rainforest Alliance; CAFÉ practices; Nescafe AAA; livelihoods; revenue; poverty; sustainability; gender; and sustainable agriculture.
4. Blackman and Rivera (2011, p1177) define a 'counterfactual outcome' as 'an estimate of the certified producers' outcomes had they not been certified'.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Australian Centre for International Agricultural Research.

References

4C Association. 2013. For a better coffee world. Bonn, Germany: 4C Association.

Arnould EJ, Plastina A, Ball D. 2009. Does fair trade deliver on its core value proposition? effects on income, educational attainment, and health in three countries. J Pub Policy Marketing. 28:186–201.

Bacon C. 2005. Confronting the coffee crisis: can fair trade, organic, and specialty coffees reduce small-scale farmer vulnerability in northern nicaragua? World Dev. 33:497–511.

Bacon CM, Ernesto Méndez V, Gómez MEF, Stuart D, Flores SRD. 2008. Are sustainable coffee certifications enough to secure farmer livelihoods? Millenium Development Goals Nicaraguas Fair Trade Cooperatives Globalizations. 5:259–274.

Barham BL, Weber JG. 2012. The economic sustainability of certified coffee: recent evidence from Mexico and Peru. World Dev. 40:1269–1279.

Bebbington A. 1999. Capitals and capabilities: a framework for analyzing peasant viability, rural livelihoods and poverty. World Dev. 27:2021–2044.

Beuchelt TD, Zeller M. 2011. Profits and poverty: certifications troubled link for Nicaragua's organic and fairtrade coffee producers. Ecological Econ. 70:1316–1324.

Blackman A, Naranjo MA. 2012. Does eco-certification have environmental benefits? Organic coffee in Costa Rica. Ecological Econ. 83:58–66.

Blackman A, Rivera J. 2011. Producer-Level Benefits of Sustainability Certification. Conservation Biol. 25:1176–1185.

Blackmore E, Keeley J (2012) Pro-poor certification. Assessing the benefits of sustainability certification for small-scale farmers in Asia. Natural Resource Issues No. 25, International Institute for Environment and Development, London.

Bolwig S, Gibbon P, Jones S. 2009. The economics of smallholder organic contract farming in tropical Africa. World Dev. 37:1094–1104.

Bose A, Vira B, Garci C. 2016. Does environmental certification in coffee promote "business as usual"? A case study from the Western Ghats, India. Ambio. 45:946–955.

Chambers R, Conway GR (1991) Sustainable rural livelihoods: practical concepts for the 21st century. IDS Discussion Paper 296.

Chiputwa B, Qaim M. 2016. Sustainability standards, gender and nutrition among smallholder farmers in Uganda. J Dev Stud. 52:1241–1257.

Chiputwa B, Spielman DJ, Qaim M. 2015. Food standards, certification, and poverty among coffee farmers in Uganda. World Dev. 66:400–412.

DeFries RS, Fanzo J, Mondal P, Remans R, Wood SA. 2017. Is voluntary certification of tropical agricultural commodities achieving sustainability goals for small-scale producers? A review of the evidence. Environ Res Lett. 12:1–12.

El Ouaamari S, Cochet H. 2014. The role of coffee in the development of southwest ethiopia's forests: farmers' strategies, investor speculation, and certification projects. Soc Nat Resources; Int J. 27:200–214.

Elder SD, Zerriffi H, Billon P. 2012. Effects of fair trade certification on social capital: the case of rwandan coffee producers. World Dev. 40:2355–2367.

Fairtrade International. 2015. Fairtrade theory of change. New York: Fairtrade Labelling Organizations International; 2011.

Giovannucci D, Potts J. 2008. Seeking sustainability: COSA preliminary analysis of sustainability initiatives in the coffee sector. Canada: Committee on Sustainability Assessment: Winnipeg.

Gitter SR, Weber JG, Barham BL, Callenes M, Valentine JL. 2012. Fair trade-organic coffee cooperatives, migration

and secondary schooling in Southern Mexico. J Dev Stud. 48:445–463.
Gobbi JA. 2000. Is biodiversity-friendly coffee financially viable? An analysis of five different coffee production systems in western El Salvador. Ecological Econ. 33:267–281.
Haggar J, Asigbaase M, Bonilla G, Pico J, Quilo A. 2015. Tree diversity on sustainably certified and conventional coffee farms in central America. Biodiversity Conservation. 24:1175–1194.
Henrich J, McElreath R. 2002. Are peasants risk-averse decision makers? 1. Curr Anthropol. 43:172–181.
Ibanez M, Blackman A. 2016. Is eco-certification a win-win for developing country agriculture? organic coffee certification in Colombia. World Dev. 82:14–27.
Ibnu M, Glasbergen P, Offermans A, Arifin B. 2015. Farmer preferences for coffee certification: a conjoint analysis of the indonesian smallholders. J Agric Sci. 7:20–35.
International Trade Centre. 2011. The impacts of private standards on producers in developing countries. Geneva, Switzerland: International Trade Centre.
ISEAL. 2013. Conceptual framework for demonstrating and improving poverty impacts. London: ISEAL Alliance.
Jena P, Stellmacher T, Grote U. 2017. Can coffee certification schemes increase incomes of smallholder farmers? Evidence from Jinotega, Nicaragua. Env Dev Sustainability. 18:45–66.
Jena PR, Chichaibelu BB, Stellmacher T, Grote U. 2012. The impact of coffee certification on small-scale producers' livelihoods: a case study from the Jimma Zone, Ethiopia. Agric Econ. 43:429–440.
Jurjonas M, Crossman K, Solomon J, Baez WL. 2016. Potential links between certified organic coffee and deforestation in a protected area in Chiapas, Mexico. World Dev. 78:13–21.
Karki S, Jena P, Grote. 2016. Fair trade certification and livelihoods: a panel data analysis of coffee-growing households in India. Agric Resource Econ Rev. 45:436–458.
Kasente D. 2012. Fair trade and organic certification in value chains: lessons from a gender analysis from coffee exporting in Uganda. Gend Dev. 20:111–127.
Kilian B, Jones C, Pratt L, Villalobos A. 2006. Is sustainable agriculture a viable strategy to improve farm income in central America? A case study on coffee. J Bus Res. 59:322–330.
KPMG. 2013. Improving smallholder livelihoods: effectiveness of certification in coffee, cocoa and cotton. Nevada: KPMG Advisory.
Lazaro EA, Makindara J, Kilima FTM (2008) Sustainability standards and coffee exports from Tanzania. DIIS Working Paper No 2008/1. Danish Institute for International Studies.
Lipschutz RD. 2015. Environmental regulation, certification and corporate standards: a critique. In: Dauvergne P, Edited by. Handbook of global environmental politics. Gloucester, United Kingdom: Edward Elgar Publishing Limited.
London C. 2012. Coffee, certification, and the incorrigibility of capitalism. Soc Research: Int Q. 79:1045–1069.
Lyngbaek AE, Muschler RG, Sinclair FL. 2001. Productivity and profitability of multistrata organic versus conventional coffee farms in costa Rica. Agroforestry Syst. 53:205–213.
Lyon S, Bezaury JA, Mutersbaugh T. 2010. Gender equity in fairtrade-organic coffee producer organizations: cases from Mesoamerica. Geoforum. 41:93–103.
Mendez VE, Bacon CM, Olson M, Petchers S, Herrador D, Carranza C, Trujillo L, Guadarrama-Zugasti C, Cordon A, Mendoza A. 2010. Effects of fair trade and organic certifications on small-scale coffee farmer households in central America and Mexico. Renewable Agric Food Syst. 25:236–251.
Milder JC, Gross LH, Class AM. 2012. Assessing the ecological impacts of agricultural eco-certification and standards: A global review of the science and practice. Internal Report. Washington DC: EcoAgriculture Partners.
Millard E. 2011. Incorporating agroforestry approaches into commodity value Chains. Environ Manage. 48:365–377.
Nelson V, Pound B. 2009. The last ten years: a comprehensive review of the literature on the impact of fairtrade. Greenwich: Natural Resources Institute.
Parrish BD, Luzadis VA, Bentley WR. 2005. What tanzania's coffee farmers can teach the world: a performance-based lok at the fair trade-free trade debate. Sustainable Dev. 13:177–189.
Philpott SM, Bichier P, Rice R, Greenberg R. 2007. Field-testing ecological and economic benefits of coffee certification programs. Conservation Biol. 21:975–985.
Pinto LFG, Gardner T, McDermott CL, Ayub KOL. 2014. Group certification supports an increase in the diversity of sustainable agriculture network-rainforest alliance certified coffee producers in Brazil. Ecological Econ. 107:59–64.
Ponte S. 2002. The 'latte revolution'? Regulation, markets and consumption in the global coffee chain. World Dev. 30:1099–1122.
Raynolds LT, Murray D, Taylor PT. 2004. Fair trade coffee: building producer capacity via global networks. J Int Dev. 16:1109–2004.
Reinecke J, Manning S, Von Hagen O. 2012. The emergence of a standards market: multiplicity of sustainability standards in the global coffee industry. Organ Stud. 33:791–814.
Renard MC. 2005. Quality certification, regulation and power in fair trade. J Rural Stud. 21:419–431.
Rijsbergen BV, Elbers W, Ruben R, Njuguna SN. 2015. The ambivalent impact of coffee certification on farmers' welfare: a matched panel approach for cooperatives in central Kenya. World Dev. 77:277–292.
Ruben R, Fort R. 2012. The impact of fair trade certification for coffee farmers in Peru. World Dev. 40:570–582.
Ruben R, Fort R, Zuniga-Arias G. 2009. Measuring the impact of fair trade on development. Dev Pract. 19:777–788.
Ruben R, Zuniga G. 2011. How standards compete: comparative impact of coffee certification schemes in Northern Nicaragua. Supply Chain Man: An Inte J. 16:98–109.
Rueda X, Lambin EF. 2013. Responding to Globalization: impacts of certification on Colombian small-scale coffee growers. Ecol Soc. 18:21.
Rueda X, Thomas NE, Lambin EF. 2015. Eco-certification and coffee cultivation enhance tree cover and forest connectivity in the Colombian coffee landscapes. Regional Envl Change. 15:25–33.
Scoones I (1998) Sustainable rural livelihoods. A framework for analysis. IDS Working Paper 72. University of Sussex, Brighton.
Sick D. 2008. Coffee, farming families and fair trade in costa rica: new markets, same old problems? Lat Am Res Rev. 43:193–208.
Smith S. 2013. Assessing the gender impacts of fairtrade. Soc Enterprise J. 9:102–122.
Sustainable Agriculture Network (2016) Theory of change: SAN/Rainforest alliance certification system. http://san.ag/web/theory-of-change Accessed on 6/07/2016

Takahashi R, Todo Y. 2013. The impact of a shade coffee certification program on forest conservation: A case study from a wild coffee forest in Ethiopia. J Environ Manage. 130:48–54.

Takahashi R, Todo Y. 2017. Coffee certification and forest quality: evidence from a wild coffee forest in ethiopia. World Dev. 92:158–166.

Tovar LG, Martin L, Cruz MAG, Mutersbaugh T. 2005. Certified organic agriculture in Mexico: market connections and certification practices in large and small producers. J Rural Stud. 21:461–474.

Tscharntke T, Milder J, Schroth G, Clough Y, DeClerck F, Waldron A, Rice R, Ghazoul J. 2015. Conserving biodiversity through certification of tropical agroforestry crops at local and landscape scales. Conservation Lett. 8:14–23.

Utting K. 2009. Assessing the impact of fair trade coffee: towards an integrative framework. J of Business Ethics. 86:127–149.

Utting-Chamorro K. 2005. Does fair trade make a difference? The case of small coffee producers in Nicaragua. Dev Pract. 15:584–599.

UTZ. 2016. Theory of Change. Amsterdam: UTZ Certified The Netherlands.

UTZ Certified. 2014. UTZ Certified impact report, january 2014. Combining results from 24 external impact studies and data from UTZ certified. Amsterdam: UTZ Certified The Netherlands.

Valkila J. 2009. Fair trade organic coffee production in Nicaragua: sustainable development or a poverty trap? Ecological Econ. 68:3018–3025.

Valkila J. 2014. Do fair trade pricing policies reduce inequalities in coffee production and trade? Dev Policy Rev. 32:475–493.

Valkila J, Nygren A. 2010. Impacts of Fair Trade certification on coffee farmers, cooperatives, and laborers in Nicaragua. Agric Hum Values. 27:321–333.

Vellema W, Buritica Casanova A, Gonzalez C, D'Haese M. 2015. The effect of specialty coffee certification on household livelihood strategies and specialization. Food Policy. 57:13–25.

Weber JG. 2011. How much do growers receive for Fair Trade-organic coffee? Food Policy. 36:678–685.

Wilson B. 2010. Indebted to fair trade? coffee and crisis in Nicaragua. Geoforum. 41:84–92.

Wollni M, Zeller M. 2007. Do farmers benefit from participating in specialty markets and cooperatives? Agric Econ. 37:243–248.

Appendix A Summary of the 51 case studies examined in this review, listed chronologically

Author	Region/country	Intervention	Methods	Rigour in linking cause to effect[a]	Livelihood capital focus	Impact (positive/ negative/mixed)[b]
Gobbi 2000	El Salvador	"Biodiversity friendly"	Quantitative: benefit – cost analysis	No	Human	Positive
					Natural	Positive
					Financial	Positive
Lyngbaek et al. 2001	Costa Rica	Organic	Quantitative: semi-structured interviews and data review	Yes	Financial	Neutral/mixed
Raynolds et al. 2004	Mexico, Guatemala, El Salvador	Fair trade	Qualitative: review of available data	No	Human	Positive
					Financial	Positive
Bacon 2005	Nicaragua	Fair trade, organic	Quantitative: structured interviews	Yes (weak)	Human	Neutral/mixed
					Social	Neutral/mixed
					Financial	Neutral/mixed
Parrish et al. 2005	Tanzania	Fair trade, technoserve	Qualitative: household and group interviews, secondary quantitative data, key informant interviews and observation	No	Human	Neutral/mixed
					Social	Positive neutral/ mixed
					Natural	Neutral/mixed
					Physical	Positive
					Financial	
Tovar et al. 2005	Mexico	Organic	Mixed quantitative and qualitative through interviews	No	Social	Negative
					Financial	Negative
Utting-Chamorro 2005	Nicaragua	Fair trade	Qualitative: survey and participatory research methods	No	Human	Neutral/mixed
					Social	Neutral/mixed
					Natural	Neutral/mixed neutral/mixed
					Financial	
Kilian et al. 2006	Central America	Organic, fair trade	Quantitative: analysis of results from interviews and surveys	Yes	Financial	Neutral/mixed
Philpott et al. 2007	Mexico	Organic, fair trade	Quantitative: interviews and *in situ* field surveys	Yes (weak)	Natural	Neutral/mixed
					Financial	Neutral/mixed
Wollni and Zeller 2007	Costa Rica	Unspecified	Quantitative analysis using two stage model based on data collected from interviews	Yes (weak)	Financial	Positive
Bacon et al. 2008	Nicaragua	Fair trade	Participatory research, including *in situ* interviews	Yes (weak)	Human	Neutral/mixed
					Social	Neutral/mixed
					Financial	Neutral/mixed
Sick 2008	Costa Rica	Fair trade	Quantitative: formal/semi-formal interviews and perception survey	No	Human	Negative
					Natural	Positive
					Financial	Negative
Arnould et al. 2009	Nicaragua, Peru and Guatemala	Nescafe AAA	Quantitative: analysis of random sample of certified /non-certified farmers in each country, analysed with ANOVA	Yes	Human	Positive
					Social	Neutral/mixed
					Financial	Positive
Bolwig et al. 2009	Uganda	Organic	Quantitative: two stage random sampling of certified and non-certified producers, analysed with OLS regression and FIML estimates	Yes	Physical	Positive
					Financial	Positive
Ruben et al. 2009	Peru and Costa Rica	Fair trade	Quantitative: analysis with PSM	Yes	Social	Neutral/mixed
					Natural	Neutral/mixed
					Financial	Neutral/mixed
Utting 2009	Nicaragua	Fair trade	Quantitative and qualitative: assessment through open, structured, semi-structured, a focus group interviews	Yes	Human	Positive
					Social	Positive
					Natural	Positive
					Financial	Positive

(*Continued*)

Appendix A (Continued).

Author	Region/country	Intervention	Methods	Rigour in linking cause to effect[a]	Livelihood capital focus	Impact (positive/ negative/mixed)[b]
Valkila 2009	Nicaragua	Fair trade	Qualitative: analysis of semi structured interviews	Yes (weak)	Financial	Neutral/mixed
Lyon et al. 2010	Central America	Fair trade and Organic	Quantitative: ethnographic survey and archival data statistically compared	No	Social	Neutral/mixed
					Financial	Neutral/mixed
Mendez et al. 2010	Central America	Fair trade and organic	Quantitative: field survey data analysed by Kruskal-Wallis and Mann-Whitney no-parametric tests	Yes (weak)	Human	Neutral/mixed
					Social	Neutral/mixed
					Financial	Neutral/mixed
Valkila and Nygren 2010	Nicaragua	Fair trade	Quantitative and qualitative: survey data was collected and analysed	No	Social	Positive
					Human	Positive
					Financial	Positive
Wilson 2010	Nicaragua	Fair trade	Qualitative: key interviews with coded textual analysis	No	Financial	Neutral/mixed
Barham and Weber 2012	Mexico	Fair trade and organic	Qualitative and quantitative: analysis of survey data and cooperative records	No	Financial	Positive
Beuchelt and Zeller 2011	Nicaragua	Organic and fair trade	Quantitative: household data combine with qualitative interview data	Yes	Financial	Negative
Ruben and Zuniga 2011	Nicaragua	Fair trade, Rainforest Alliance, C.A.F.E. practices	Quantitative: cross-sectional impact assessment based on survey data from households using PSM.	Yes	Social	Positive
					Financial	Positive
Weber 2011	Mexico	Fair trade, organic	Quantitative: impact assessment at household level, based on survey data from households	No	Financial	Neutral/mixed
Barham and Weber 2012	Mexico and Peru	Fair trade, organic, Rainforest Alliance	Quantitative: analysis of random stratified sample of households and cooperative records/household survey data	No	Natural	Neutral/mixed
					Financial	Neutral/mixed
Blackman and Naranjo 2012	Costa Rica	Organic	Quantitative: PSM analysis based on national census of coffee growers and use of GIS data	Yes	Natural	Neutral/mixed
					Financial	Negative
Elder et al. 2012	Rwanda	Fair trade	Qualitative: analysis of open-ended and semi-structured interview data collected from randomly sampled farmers	Yes	Social	Neutral/mixed
Gitter et al. 2012	Mexico	Fair trade	Qualitative: analysis of survey collected from random stratified groups of certified and non-certified farmers	Yes (weak)	Human	Positive
					Social	Positive
Jena et al. 2012	Ethiopia	Fair trade, organic	Quantitative and qualitative: structured and semi-structured interviews and cooperative data, with PSM and OLS regression analysis	Yes	Human	Neutral/mixed
					Financial	Neutral/mixed
Kasente 2012	Uganda	Fair trade, organic	Qualitative: focus groups and interviews	No	Social	Neutral/mixed
Ruben and Fort 2012	Peru	Fair trade	Quantitative: PSM assessment	Yes	Human	Neutral/mixed
					Natural	Neutral/mixed
					Physical	Neutral/mixed
					Financial	Neutral/mixed
Rueda and Lambin 2013	Colombia	Rainforest Alliance	Quantitative and qualitative: Pair-matched household survey and key information interviews	Yes (weak)	Human	Positive
					Natural	Positive
					Physical	Positive
					Financial	Positive
Smith 2013	Global	Fair trade	Qualitative: meta-analysis of 20 case studies	No	Human	Positive
					Social	Neutral/mixed

(*Continued*)

Appendix A (Continued).

Author	Region/country	Intervention	Methods	Rigour in linking cause to effect[a]	Livelihood capital focus	Impact (positive/ negative/mixed)[b]
Takahashi and Todo 2013	Ethiopia	Rainforest Alliance	Quantitative: PSM analysis and estimations across historical GIS data	Yes	Human	Positive
					Natural	Positive
El Ouaamari and Cochet 2014	Ethiopia	UTZ, fair trade, organic	Qualitative: evaluation through semi structured interviews	Yes	Social	Negative
					Financial	Negative
Pinto et al. 2014	Brazil	Rainforest Alliance	Quantitative: analysis of historical SAN-RA data in Brazil	No	Human	Neutral/mixed
					Natural	Neutral/mixed
					Financial	Neutral/mixed
Valkila 2014	Nicaragua	Fair trade	Qualitative: analysis of semi-structured in situ interviews	No	Social	Neutral/mixed
					Financial	Positive
Chiputwa et al. 2015	Uganda	Organic, fair trade, UTZ	Quantitative: structured household survey data with PSM analysis and ATT analysis	Yes	Human	Positive
					Physical	Positive
					Financial	Neutral/mixed
Haggar et al. 2015	Central America	Organic	Quantitative: analysis of biodiversity with ANOVA	Yes	Natural	Positive
Ibnu et al. 2015	Indonesia	Rainforest Alliance, 4C, UTZ, Inofice	Quantitative: conjoint analysis of survey data	Yes (weak)	Natural	Positive
					Financial	Positive
Rijsbergen et al. 2015	Kenya	Fair trade, UTZ	Qualitative and quantitative: PSM analysis based on surveys	Yes	Social	Neutral/mixed
					Financial	Neutral/mixed
Rueda et al. 2015	Colombia	Rainforest Alliance	Quantitative: analysis of landsat imagery	Yes	Natural	Positive
Vellema et al. 2015	Colombia	CAFÉ practices Nespresso AAA	Quantitative: regression analysis of formal, structural questionnaire	No	Financial	Negative
Bose et al. 2016	India	Rainforest Alliance	Qualitative: semi-structured and open-ended interviews	Yes (weak)	Human	Positive
					Natural	Negative
					Financial	Positive
Chiputwa and Qaim 2016	Uganda	Organic, fair trade, UTZ	Quantitative: regression analysis of survey data	Yes	Human	Positive
					Social	Positive
					Financial	Positive
Ibanez and Blackman 2016	Colombia	Organic	Quantitative: PSM of formal survey	Yes	Natural	Positive
					Financial	Neutral/mixed
Jurjonas et al. 2016	Mexico	Organic	Quantitative: use of satellite imagery complemented with key interviews	Yes	Natural	Neutral/mixed
					Financial	Neutral/mixed
Karki et al. 2016	India	Fair trade	Quantitative: regression analysis of survey data	Yes (weak)	Social	Neutral/mixed
Jena et al. 2017	Nicaragua	Organic, fair trade	Quantitative: regression analysis of survey data	Yes	Financial	Neutral/mixed
					Financial	Positive
Takahashi and Todo 2017	Ethiopia	Rainforest Alliance	Quantitative: PSM analysis across historical GIS data	Yes	Natural	Positive

[a]No", 'Yes', and 'Yes (weak)' are derived from Blackman and Rivera (2011), who use the terms 'rigorous: Quantitative, credible counterfactual', 'Moderately rigorous: quantitative, no credible counterfactual' and 'Qualitative: no credible counterfactual'.

[b]Impact refers to how the authors have assessed the net impact of certification, including the wider implications for society where this has been considered. We have developed a traffic light system, as follows:

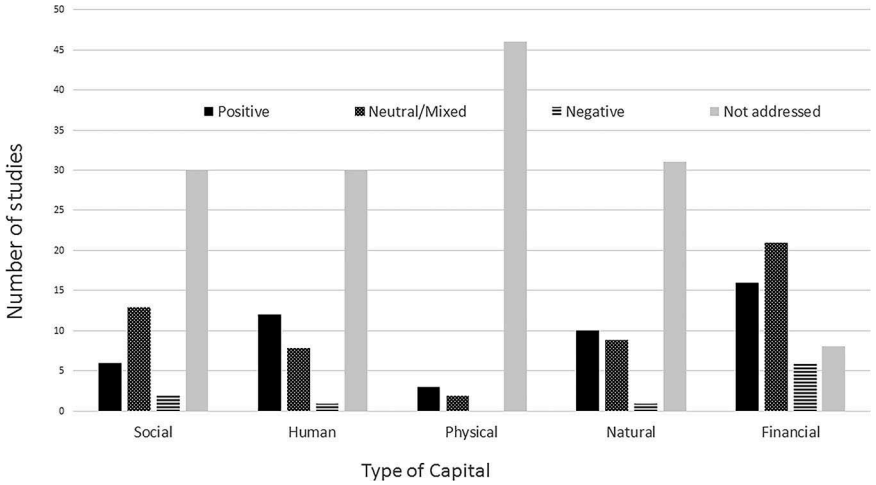
a. Positive impact implies the article presents a mostly positive impression of the net impact of certification;

b. Negative impact implies the article presents a mostly negative impression of the net impact of certification; and

Neutral/mixed impact refers to an article that considers certification to have no significant impact (positive or negative), or a generally positive impact on specific areas that may be offset by limited or negative impact in other areas.

Appendix B

Reported impacts of certification on smallholders from the 51 studies (by livelihood capital).



Appendix C

Reported impacts of certification on smallholders from the 51 studies (by certification type).