

Connecting global value chains to work organization in farms: theoretical insights and evidence from coffee farms in South Brazil

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Abstract: Farmers are investing in farms in order to last in a high competitive global agricultural market. The investments in capital, land and labor are impacting farming work through new technologies, increasing farming size and productivity, and increasing employment. In addition, global value chain stablishes parameters of agricultural production that also impact farming work. Understanding how work at farm level is linked to requirements from global value chain is important to ensure the good functioning of value chain, since working and employment conditions are considered essential to value chains sustainability. Based on the advances in the literature in work organization approach and global value chain governance, we provided a theoretical guideline linking work at farm level and labor issues at global value chain level through the key concept of standards. Evidence of the pertinence of the theoretical guideline was provided by the application in the case of small coffee farms in South Brazil. This is a new approach to analyze work organization in farms considering links between micro-level (farm) and macro-level (global value chain). The guidelines can be used principally by researchers to better understand changes in labor at farm level avalue chain level.

Keywords: labor, value chains, standard, coffee, Brazil

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Introduction

In order to maintain farms in a high competitive global market, in general, farmers worldwide developed two strategies. First strategy is increasing both agricultural and labor productivity to produce in a large scale, then agricultural products are traded in global commodity chains, such as milk in Europe and US (Bewley *et al.*, 2001; Castro *et al.*, 2015) and soy in Brazil (Calil and Ribera, 2019). Second strategy is aggregate value to agricultural products by producing according to a specific resources (*e.g.* local), a non-conventional process (*e.g.* agroecological), or processing, then trade agricultural products in global value chains, such as coffee in Costa Rica (Wollni and Zeller, 2007).

In both cases, farmers investing in capital, land or labor to adapt their farms to respond to the global market requirements. Several empirical studies performed in both OECD and non-OECD countries indicated that these three factors are drivers of change of work organization at farm level, such as investments in equipment and facilities (agricultural machinery, robots...) (Pezzuolo *et al.*; Lucas and Gasselin, 2018; Marinoudi *et al.*, 2019), increasing farm size and productivity capacity (Hostiou *et al.*, 2012; Harrison and Getz, 2015; Hu *et al.*, 2019), and increasing demand for hired labor (Kandel 2008; Blanc *et al.*, 2008; Klupšas and Serva, 2009; Nettle, 2018).

In addition, global value chains stablishes parameters to agricultural production, such as technological level, required equipment and facilities, technical management, product quality (Ponte, 2009; Bernal-



Hernández *et al.*, 2020). We understand that these parameters impact labor on farms. For example, in the horticultural global value chain, retailers in United Kingdom determine the type of vegetal production in African farms, the rhythms of work according to consumer demand, and flexible workforce organization (*e.g.* management of workforce recruitment to cope with high or low workforce demand according to agricultural production seasonality) (Freidberg, 2003; Kritzinger *et al.*, 2004).

Therefore, understanding how work at farm level is linked to requirements of global value chain is important to ensure the good functioning of the value chain, since working and employment conditions are considered essential to value chains sustainability (FAO, 2014). In this sense, scientific literature provide us two pertinent approaches to go further in our questioning.

On the one hand, work organization approach provides a useful framework to understand the changes in work. However, this approach is limited to the farm level, and doesn't consider elements beyond that have implications in farmers' work organization decisions (except climate conditions). On the other hand, global value chain approach provides a pertinent framework to understand how value chains agents addresses parameters to agricultural production and labor management. Nevertheless, this approach doesn't consider the implications of global value chain on work organization at farm level.

In order to better understand the articulation of two levels of labor management in agriculture, we posit that these two approaches complement each other by connecting the micro-level (*i.e.* farm) to the macro-level (*i.e.* global value chain). However, links between work organization at farm level and global value chains remains imprecise. To fill this gap, our aim was to propose theoretical guidelines connecting work organization in farms to global value chain.

Methodology design

In this section we describe the methodological design that provided a bibliographical base to our systematic review on both approaches work organization and global value chain. In addition, we present the case of small coffee farmers in South Brazil as our empirical background.

Selecting articles for systematic review of international literature

The systematic review was performed in three steps according to the PRISMA guidelines to systematic review (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Moher et al., 2009). The first step was identify the articles through an advanced search on Scopus bibliographical database. Since the article identification is keyword-oriented, the standard vocabulary related to "work" and "value chain" were identified in the Agrovoc Thesaurus, which is the reference thesaurus in agricultural sciences. The query used to identify the articles was (("value chain") AND ("work" AND "labour" OR "labor" OR "job" OR "occupation" OR "employment")). At least two of these keywords appeared in the title, abstract or keywords of articles published until December 2019. We selected only articles in English in order to limit the analysis to the recognized international scientific knowledge. Thus, 1952 articles were identified. The second step was the exclusion of articles related to non-agricultural sector (e.g. garment, fashion and automobile industry), and the inclusion of articles specifically related to the work organization approach that were not identified by the automatic research in Scopus. Finally, we select 216 articles related to work in agriculture and value chains. Third step was explore the articles' content according to two entry points related to the aim of this study: work analysis at farm level and labor governance in global value chains. Finally, the criteria to guide the literature review were: 1) identity main concepts and empirical advances of work organization and governance in global value chains; 2) identify their limitations and complementarities



to understand labor management in agriculture; 3) identify how to connect work organization and global value chains.

Empirical background: the case of small farmers in specialty coffee global value chain

Specialty coffee has several definitions, but a consensus is that that intrinsic aspects of coffee beans (*e.g.* coffee bean size and aspect, defects, humidity) and extrinsic aspects of production systems (*e.g.* geographical localization, non-conventional production, organic production) result in specialty coffees (Sepúlveda *et al.*, 2016). In order to standardize the classification of specialty coffees, sensorial attributes (*e.g.* flavor, aroma, acidity, sweetness, balance) are measured in cup tastings and only coffees with over 82 points in a 100-pointscale are classified as specialty coffees (SCA, 2013).

In this study, we present the case of small coffee farms in South Brazil accessing European markets through the specialty coffee global value chain. Based on a sample of 120 coffee farmers, in average, farmers ware 53 years old, farm workforce was composed by two family members, one permanent part-time employee, and 4 seasonal employees; they work in a small farm of 22 ha, in which 8ha were reserved to coffee.

Farmers trade green coffee beans with the exporter located in Brazil, which sales coffee to European importers. The exporter is the value chain agent that provide technical support to farmers to enhance coffee production according to international standards of coffee quality.

Data collection about specialty coffee production and marketing were based in several non-participant and participant observation in 2019 during field work situations: 1) training for farmers about practices of specialty coffee production and market characterization; 2) advisory services on specialty coffee management performed by the agronomist provided by the exporter.

Qualitative analysis of data were performed according to three categories identified in literature review: standards, its implementation in farms, and the consequences for work at farm level. The aim was to gather empirical evidences related to the links between work organization and global value chain governance.

Theoretical guidelines to link work organization in farms to global value chains: the key role of standards

In this session we provide a literature review of work organization in farms and global value chains. The aim is to show that these approaches developed concepts to understand work issues at different levels. In addition, we introduce the concept of standards as the key concept linking these two approaches, which allow us to propose a theoretical guideline that provides an overview about labor management in agriculture.

The work organization approach: principles to understand work in livestock farming systems

The work organization approach was developed by livestock farming systems scientists to better understand the relations between the technical management of herd and land and work organization (Dedieu *et al.*, 2006; Dedieu and Servière, 2016). The work organization is characterized by a system composed by livestock production tasks and others activities (*e.g.* crops or off-farm activities), different workforce (*e.g.* familiar and non-familiar workers), and equipment and buildings (Dedieu and Servière, 2016) (Figure 1).





Figure 1. Model of work organization in livestock farming systems. Source: Dedieu and Servière (2016).

The approach is based on three principles to analyze and understand work organization (Madelrieux and Dedieu, 2008; Hostiou and Dedieu, 2012; Dedieu and Servière, 2016; Cournut *et al.*, 2018). The first principle is that the farming work is composed by diverse tasks performed with different rhythms and the possibility to be postponed according to the productive cycle, agricultural seasonality, and farmers technical choices. Two concepts are used to classify the tasks: 1) routine tasks – defined as tasks performed regularly or everyday, such as milking, feeding, animal care; 2) seasonal tasks – defined as tasks performed according to a period, such as haymaking in summer. The second principle is that farmworkers are used to classify the farmworkers: 1) the basic group – composed by permanent workers responsible for the work organization, which almost all time working is used in the farm and revenue strongly depends on the farm (*e.g.* farmers); 2) the workers outside the basic group – composed by all the other farmworkers (*e.g.* employees, mutual assistance, contractors). The third principle is that work organization changes over time. The organizational characteristics of a period within a calendar year change due to cycle of agricultural production, workforce availability, or combination of activities.

Although the work organization approach was developed by farming systems scientists based on livestock and its technical management, we posit that the principles presented above provide a solid theoretical foundation to thinking about work in other productions. Agricultural production, regardless its type (vegetal or animal), depends on tasks performed by workers with less or more support of equipment and buildings. However, vegetable productions are characterized by biological cycles and technical practices that change according to the advancement of the vegetable production. This specificity have important implications on farming work that must be considered: 1) the performance of repetitive tasks during a short period according to the stage of vegetable development (*e.g.* laboring soil, seeding, observation of plant development and health conditions to growth, harvesting, stocking); 2) the importance of equipment to perform tasks in several steps of production process (*e.g.*, labor of soil, seeding, spraying, irrigation, harvest); 3) the predominance seasonal workforce to cope with periods with high demand for work, such as harvesting.

Despite the advances, the work organization approach is focused on the farm level and doesn't consider elements beyond that have implications for farmers' work organization decisions (except weather conditions). This is a limitation considering that farmers are integrated to value chains that stablish requirements for agricultural production, which influence farming work, such as the case of



smallholders under contracting farming that changed technical management practices of oil-palm to comply with requirements of industry (Bernal-Hernández *et al.*, 2020).

In this sense, we need to better understand how labor governance of agricultural value chains is connected to work organization at farm level.

The governance approach: labor management in global value chains

Value chain is defined as the full range of activities required to bring a value-added product from production to consumption, which include several steps, such as processing, logistics and marketing (Kaplinsky and Morris, 2000). Such activities are complex in global value chains, since the chain is composed by several agents localized in different regions in the world (Kaplinsky and Morris, 2000). In this sense, governance is a central concept for chain sustainability because the coordination of agents in the global value chain is essential to keep running those several activities (Humphrey and Schmitz, 2001; FAO, 2014).

Governance of global value chains is understand in this study as the coordination of the chain through the key role of a value chain agent who uses mechanisms of governance to define parameters and requirements (Kaplinsky and Morris, 2000; Humphrey and Schmitz, 2001) for production process (Bernal-Hernández *et al.* 2020), product characteristics and quality (Ponte, 2009), employment and working conditions (Riisgaard and Hammer, 2011; Barrientos *et al.*, 2019).

These norms and regulation have consequences for all agents in the value chain, since they agree to accomplish them in order to maintain the international trade, and other benefits of being part of a value chain, such as upgrading, value distribution, and employment creation (Kritzinger *et al.*, 2004; Pegler, 2015; Gereffi and Lee, 2016; Piao *et al.*, 2019). For example, several empirical studies indicates that leader chain agents in United Kingdom (*i.e.* retailers) are the responsible by the governance of horticultural global value chains in several African countries. In order to respond to consumers' demand for vegetables and product quality, retailers use requirements for producers to define rhythm of production and quality of vegetables (Freidberg, 2003; Barrientos *et al.*, 2003; Barrientos and Kritzinger, 2004; Kritzinger *et al.*, 2004; Tallontire *et al.*, 2005; Riisgaard, 2009).

Regarding labor issues, working and employment conditions are highlighted as important factors to be considered in governance in global value chains, since the development of agricultural value chains promotes employment creation and income generation, especially in low income and emerging economies (FAO, 2014). However, several studies indicated precariously employment and working conditions at the bottom of global value chains (*i.e.* farms). The precarious condition are related to job instability due to the increasing use of temporary workers, the decreasing social benefits for workers, and low-wages for the most socioeconomic vulnerable people to supply the workforce demand in farms, such as women and migrants (Barrientos *et al.*, 2003, 2019; Barrientos and Kritzinger, 2004; Dolan, 2004; Kritzinger *et al.*, 2004; Tallontire *et al.*, 2005; Raynolds, 2014).

On the one hand, global value chain agents are requiring and adopting mechanisms of governance against this critical situation, such as international agreements to ensure worker rights through collective bargaining in Latin America Banana industry (Riisgaard, 2005), codes of conduct for gender equity in African horticultural value chains (Barrientos *et al.*, 2003), fair trade label to improve well-being of smallholder farms and employees through better labor remuneration in the coffee value chain in Nicaragua (Valkila and Nygren, 2010), ethical trade label to address working conditions, wages level and child labor in African horticultural value chains (Freidberg, 2003), and certifications to improve job security of employees in fruit value chains in Dominican Republic (van Rijn *et al.*, 2019).



On the other hand, civil society and non-governmental organizations are pressuring value chain agents against poor working conditions and employment precarity (Riisgaard, 2005; Brown and Getz, 2008; Piao *et al.*, 2019), and consumers are attentive to certifications and labels when deciding to purchase an agricultural product (Janssen and Hamm, 2012; Grunert *et al.*, 2014; Sepúlveda *et al.*, 2016; Liu *et al.*, 2019).

Standards: the key concept connecting two poles of labor management in agriculture

In global value chains, standards are considered as a mechanism of governance that frame trade relationships between chain agents regarding implementation and compliance with norms (Nadvi, 2008). Standards are used by the chain coordinator to control the set of norms that regulate agricultural activities with heterogenous production systems and institutional contexts, especially in global value chain with suppliers (*e.g.* farmers) and buyers located in different countries.

Three types of standards are highlighted in the agricultural sector: 1) agricultural production process – requirements for technical management of production (*e.g.* agronomic practices, equipment), which is linked to agricultural and environmental issues (Grammont and Flores, 2010; Van Herck and Swinnen, 2015; Ding *et al.*, 2018; Bernal-Hernández *et al.*, 2020); 2) quality – requirements for characteristics of products, which is linked to demand of niche markets (*e.g.* hygiene, composition, size, weight, appearance, origin controlled) (Wollni and Zeller, 2007; Ponte 2009; Minten *et al.*, 2013); 3) labor – requirements for working conditions (*e.g.* safety, equipment, working time) and employment (*e.g.* wage, contract), including social protection and benefits for workers, which is linked to socioeconomic issues (Freidberg, 2003; Barrientos *et al.*, 2003; Dolan, 2004; Kritzinger *et al.*, 2004; Riisgaard, 2005, 2009; Riisgaard and Hammer, 2011).

The compliance with standards defined at global value chain level have several implications on work at farm level. Regarding work safety requirements, in large flower farm in Ecuador under fair trade certification, employees have to wear protective gear for spraying and follow scheduled re-entry intervals required after greenhouse spraying (Raynolds, 2014). Quality requirements for mango production in smallholder farms in Costa Rica are better achieved when labor is performed by family workers than employees (Zúñiga-Arias *et al.*, 2008). Quality and supply flexibility (*i.e.* according to demand) requirements for horticultural large farms in Kenya results in long working days varying between 8 and 16 hours per day in six days a week (Dolan, 2004). Small-scale producers of oil palm in Colombia adopted agronomic practices (*e.g.* soil analysis, soil protection) to comply with requirements for agricultural production process (Bernal-Hernández *et al.*, 2020).

Considering these empirical evidences, we argue that governance of global value chains has implications in work organization at farm-level through the adoption and compliance with standards. We understand that main labor issues are addressed by labor standards, but we posit that standards for production process and product quality can also impact labor, and these impacts are not necessarily addressed by labor standards. Production process and quality standards frame the conditions for agricultural production, which impact on technical management, practices, and rhythms to perform tasks. These factors are considered by work organization approach to understand who does what, when and how (Madelrieux and Dedieu, 2008; Hostiou and Dedieu, 2012; Dedieu and Servière, 2016; Cournut *et al.*, 2018).

Based on the conceptual background provided by both work organization and governance of global value chain approaches, we developed a theoretical guideline to better understand labor management



in agriculture, which is composed by two connected poles: the pole global value chain and the pole work organization in farms, they are connected by standards (Figure 2).

The pole global value chain is composed by mechanisms of governance used by value chain agents to manage labor issues through two group of standards: 1) product-oriented standards, which is defined by requirements that influence production process and characteristics (*e.g.* organic, quality), and farming work; 2) labor-oriented standards, which is defined by requirements that influences working and employment conditions. The pole work organization is composed by three main elements: 1) tasks to perform, which depends on the activities developed on farm (specialized/diversified farm) and off-farm activities; 2) equipment and building to perform tasks; and 3) farm workforce, composed by family and non-family workers. The standards connect these two poles, since they impact on: 1) tasks – through the inclusion or suppression of tasks according to technical requirements for agricultural production and quality; 2) equipment and buildings – through investments in required facilities or farm structure; 3) farm workforce – through team composition (family or no-family workers) and required technical skills to perform technical and quality requirements.

In the next session we present the case of small coffee farms in South Brazil to provide evidence on the application of our guideline.



Figure 2. Representation of the link between work organization at farm level and governance of global value chain through standards.

Small coffee farms in Brazil: quality standards driving changes on work organization

Coffee was the most important production in Parana, South Brazil. However, since 1970, the production strongly decreased due to severe climate episodes, decreasing public support through



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March 29th – April 1^{rst}, 2021 Clermont-Ferrand (France)

public policies and facilities to access credit, deregulation of market, and the development of concurrent regions in Brazil and abroad. Additional difficulties are faced by farmers in North Parana, where coffee production is characterized by small family farms with limited structural and technical capacity, and vulnerable socioeconomic conditions.

In order to face this critical situation, the coffee farmers decided to change their product profile and market target from regular coffee traded in global commodity chains to specialty coffee traded in global value chains. As a consequence, farmers had to change their work organization to comply with the standards of specialty coffee.

CATEGORY 1 DEFECTS				
DEFECT NAME	# OF BEANS EQUAL TO 1 FULL DEFECT	DESCRIPTION		
Full Black	1	Opaque in color.		
Full Sour	1	Yellowish or yellowish-brown to reddish-brown in color. The embryo inside the bean (see photo, pg. 37) typically is dark or black. If the bean is cut or scratched, a sour or vinegar-like smell is released.		
Dried Cherry/Pod	1	The dried pulp usually covers part or all of the parchment, sometimes with the presence of white spots or powdery residue.		
Fungus Damaged	1	Yellow to reddish-brown powdery spots (spores), which can cover part or all of the bean.		
Foreign Matter	1	All non-coffee items such as sticks, stones, nails, etc.		
Severe Insect Damage	5	Broca beans, as they are commonly called, are distinguished by small (0.3 to 1.5 millimeters in diameter), dark holes, often on opposite sides of the bean. Three or more perforations = severe damage; five or more severe damaged beans = one full category 1 defect.		
CATEGORY 2 DEFECTS				
DEFECT NAME	# OF BEANS EQUAL TO 1 FULL DEFECT	DESCRIPTION		
Partial Black	3	Less than half of the bean is opaque.		
Partial Sour	3	Less than half of the bean appears sour. (See "Full Sour" under category 1 for description.)		
Parchment/ Pergamino	5	Partially or fully enclosed in a thick, papery, white or tan husk.		
Floater	5	Distinctively white and faded, giving the sample a mottled appearance. Will float when placed in water.		
Immature/Unripe	5	Pallid, yellow-greenish color of the silver skin. The silver skin is tightly attached to the bean. Often smaller than normal beans, curved inward in a concave shape with sharp edges.		
Slight Insect Damage	10	See description under category 1, above. Fewer than three perforations = slight damage; 10 or more slight damaged beans = one full category 2 defect.		
Shell	5	Malformed beans consisting of an inner or outer part. One or both may be found; in some cases they will still be together. The outer section has a seashell shape. The inner section can be conical or cylindrical.		
Broken/Chipped/Cut	5	Usually dark reddish in color due to the oxidation of the area where the cut/chip took place during pulping.		
Hull/Husk	5	Shows fragments of dried pulp with a dark red color.		
Withered	5	Usually smaller than normal beans and malformed, with wrinkles that resemble those of a raisin.		

Figure 3. Quality standards for specialty coffees. List of defects and its description. Source: Caspersen (2016).

The quality standards required by the exporter were from Specialty Coffee Association, which defines the quality of coffee according to the absence of defect in coffee beans (green or roasted) in a sample (SCA 2013). Defects are classified into two categories: category 1 is the most restrictive, sample that contain one coffee bean with one defect is immediately excluded; category 2 is the most flexible, a



score of five full defects or more excludes the sample (Figure 3). Specialty Coffee Association indicates the impact of each defect on sensorial aspects of coffee (color, taste), defines their potential causes, and indicates requirements in production process and coffee processing to deal with each defect (Figure 4).

IMMATURE BEAN

Defect Name:	Immature bean	
Other Names:	Unripe, Quaker (when roasted)	
Spanish Name:	Inmaduro	
SCAA Classification:	Secondary Defect. 5 Immature beans = 1 full defect	
Effect on Cup Quality:	Varies. Generally imparts grassy, straw-like or greenish and is the main source of astringent flavors in coffee.	
Other issues:	Impacts the appearance of roasted beans.	
Cause(s):	Agricultural. The immature or unripe bean is not fully developed for several reasons, including improper picking of unripe cherries and uneven ripening on late ripening varieties growing at high altitude.	
Remedies:	 AGRICULTURAL. Immature beans can be avoided by harvesting only ripe cherries and by cultivating early to medium maturing varieties at medium to high altitudes. PROCESSING. Immature beans can be removed during both wet and dry processing. At the wet mill, many immature beans can be separated with screens immediately after the pulping process. Many immature beans can be removed during the density sorting process at the dry mill, but most color sorters are unable to remove this defect. 	

Figure 4. Requirements for production process and processing stages to cope with immature bean defect. Source: SCA (2013).

Compliance with standards had important impacts on pre-harvest, harvest and post-harvest practices. Farmers learned with the past generation the traditional practices of coffee production, which were characterized by minimal soil correction overtime, no soil protection between coffee lines, manual or automated harvesting of fruits with different maturation stage (*e.g.* green, semi-ripe, ripe, overripe), fruits are on the floor during harvesting and drying process in traditional patios (*e.g.* concrete board on the ground), fruits and coffee beans are mixed with impurities in harvesting, drying, and roasting process.

The main changes in practices performed by farmers for specialty coffee standards compliance were annual soil correction, soil protection between coffee lines, harvesting based on manual selective picking of cherry fruits (*i.e.* mature coffee), fruits cannot touch the ground during harvesting and drying process, homogenous drying of fruits in terrace, and coffee beans cannot be mixed with impurities in harvesting, drying, and roasting process.

Changes on work organization were due to changes on how tasks were performed, and conditions to perform them (e.g. farm structure and workforce), which were related to coffee quality (Table 1). Regarding the tasks, manual selective picking and regularly turn grains were classified as routine tasks during the harvest period, since they were performed daily, several times a day, and cannot be postponed once the harvest period started. These labor-intensive practices impact quality of coffee through: 1) the size of coffee beans - due to full grain development until the mature stage; 2) the controlled humidity rate of coffee beans - to avoid fermentation and fungus damage, which negatively modify coffee flavor; and 3) cherry fruits provides suitable coffee flavors. Regarding farm structure, appropriate buildings (e.g. elevated terraces) were required to dry the fruits according to the flow of



picked fruits during harvest period. The aim was to better control humidity of beans, avoid fermentation and fungus damage. Regarding workforce, specialty coffee production is a laborintensive activity characterized by high seasonal workforce demand for harvesting. Perform manual selective picking in a regular basis reinforced this pattern, and family farmers have to hire seasonal employees to cope with high workload. Despite that workforce availability was important to meet harvest in the suitable timing (*e.g.* maturation stage), skilled workforce was important to meet standards. Family and hired workers needed training to better perform harvesting and post-harvesting practices and ensure coffee quality.

Work organization	Description	Impacts on coffee quality
Tasks (harvest)	Routine task – selective picking during harvest period	Coffee bean characteristics (size, maturation) Coffee flavor
Tasks (post-harvest)	Routine task – regularly turn grains	Coffee bean characteristics (humidity rate) Coffee flavor
Equipment - building	Elevated terraces	Coffee bean characteristics (humidity rate) Coffee flavor
Workforce (familiar and no-familiar)	Skilled workforce – selective picking	Coffee bean characteristics (size, maturation) Coffee flavor

Table 1. Main changes on work organization to comply with standards of specialty coffee quality.

Discussion

We developed an original theoretical guideline to understand labor management in agriculture by bringing together two complementary approaches: work organization in farms and governance of global value chains. The articulation between then is supported by the key concept of standards, which is the way that requirements from downstream agents reach upstream agents. This is a new approach to analyze work organization in farms considering changes on work at micro-level (*i.e.* farm) linked to drivers at macro-level (*i.e.* global value chain).

Despite that work organization approach was developed by livestock farming scientists (Madelrieux and Dedieu 2008; Dedieu and Servière 2016), our results advanced that the principles structuring the approach are pertinent to capture the major changes on work in vegetal production. This was a first step to develop an adapted approach to understand wok organization in crop farms based on the technical management of crops responding for specific requirements. In this sense, we need to better characterize the routine and seasonal tasks in coffee production, and may develop other concepts that better represent empirical situations, since tasks and its characteristics (rhythm, capacity to be postponed) are strongly related to the development of vegetal production.

Based on the case of small coffee farmers, we showed that quality standards promotes changes on work. On the one hand, this result contributes to the large literature mapping the current drivers of changes on farming work, such as agroecological transition (Parodi, 2018; Delecourt *et al.*, 2019). On the other hand, this results demonstrated how mechanisms of governance of downstream agents operates at the bottom of the value chain by the perspective of work organization. Previous studies were focused on other labor issues, such as working conditions of farmworkers (Raynolds, 2014; van Rijn *et al.*, 2019), and employment strategies of farmers (Barrientos and Kritzinger 2004; Kritzinger *et al.*, 2004; Tallontire *et al.*, 2005; Riisgaard and Hammer, 2011; Barrientos *et al.*, 2019).

The focus of this study was the global value chain, and our results reinforced that labor issues are a governance matter (Tallontire *et al.*, 2011; Barrientos *et al.*, 2019). However, labor issues are also



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March 29th – April 1^{rst}, 2021 Clermont-Ferrand (France)

addressed in short chains, but other questions are considered, such as the assessment of labor productivity between production, processing and marketing and their associated labor remuneration in farms in Canada (Mundler and Jean-Gagnon, 2019), or the analysis of changes on tasks and skills of workers in horticultural farms in Argentine engaged in agroecological transition and integration to short food supply chains (Parodi, 2018).

Our theoretical guidelines can be used by researchers to better understand changes in labor at farm level related to the prescriptions decided at global value chain level, and address how farm-level labor issues are influencing the integration of farms to markets. Also, it could provide support to value chain agents and coordinators to improve global chain governance by better considering labor issues. Currently, labor governance is strongly focused on employment (*e.g.* wages) and work conditions (*e.g.* safety), and less attention is given on how product-oriented standards (*e.g.* organic, quality) are impacting farming labor. This could be useful in a process of certification and labelization of agricultural products. Regarding advisory services, whether private or public, the characterization of work organization in farms could provide useful information to improve its struggling points. For example, in our study case, farmers are getting old and physical-intensive tasks (*e.g.* harvesting) impact negatively their working conditions.

Finally, the contribution of global value chains to address labor issues goes far more than employment creation and income generation, since labor governance can improve living standards of farmworkers through better working and employment conditions. These are crucial conditions for sustainable development of global value chains (FAO, 2014).

Conclusion

We developed an original theoretical guideline to understand labor management in agriculture by integrating two approaches: work organization in farms and governance of global value chains. Evidence of the applications of this guidelines was provided through the case of small coffee farms in South Brazil trading in global value chains. This is a new approach to analyze work organization in farms considering changes on work at micro-level (*i.e.* farm) linked to drivers at macro-level (*i.e.* global value chain). In addition, we showed that the principles of work organization developed for livestock can be adapted to the vegetal production. However, further adaptations are necessary to better characterize routine and seasonal tasks considering that tasks are strongly related to the development of vegetal production.

The framework can be used by researchers to better understand changes in labor at farm level related to the prescriptions decided at global value chain level. Also, it could support value chain agents and coordinators in their strategies to improve global chain governance by better considering labor issues. Regarding advisory services, the characterization of work organization in farms could provide useful information to improve its struggling points.

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