



Creating more and better employment in agrifood systems

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Overview¹

The One CGIAR Research Initiative on “Rethinking Food Markets and Value Chains for Inclusion and Sustainability” commissioned a meta-study to review the available evidence and to identify knowledge gaps regarding the impacts on employment in agrifood value chains (AVC) integration and modernization processes in developing countries. This review included 290 texts, mostly journal articles, but also book chapters and reports.

The main messages of this report are as follows:

First, agrifood systems in much of the Global South have evolved within a structural transformation “lite.”

The classic narrative of the structural transformation is based on the European and U.S. experience in the 19th century and has been replicated to some degree in the 20th century in Japan, South Korea, and, more recently, China and Vietnam. Much of the Global South, including many middle- to high-income countries, have transited what we can call a structural transformation “lite.” It is “lite” because it is limited by the absence of a growing manufacturing sector (actually, most countries in the Global South are experiencing “premature deindustrialization”) and by severe constraints to large scale international migration. Recent research has found that the actual productivity gaps between agriculture and other sectors of the economy may be far smaller than previously thought, not so much because the agricultural side of the equation is terribly productive, but because the productivity levels in the rest of the economy are also very low; beyond some East Asian countries, there are not many present-day Manchesters in the Global South.

At the same time, the existence of a large pool of underemployed workers in agriculture confirms that there is an excess of labor that could be used more productively in other sectors of the economy. From a policy perspective, the problem is how to stimulate demand for labor in both the farm and non-farm sectors, that is, across the whole AVC. An opportunity is offered by the growth of the so-called “hidden middle,” that is, the midstream segments (processing, logistics and wholesale) of AVC, with large numbers of relatively labor-intensive small and medium-size enterprises (SME).

1 Many of the contents in this Overview come from the literature reviewed, as discussed in the main section of this report, where the appropriate citations can be found.

The options for large numbers of underemployed farmers do not frequently imply a large jump in productivity: wage employment in agriculture, “refuge” self- or wage rural non-farm employment, and informal wage- or self-employment in the post-farmgate segments (“hidden middle”) of agrifood systems (AFS) in rural areas and, to a greater extent, in towns and cities. The numbers of people who can enter or evolve into a livelihood based on highly productive jobs in manufacturing or services (even if informal), can be large in absolute terms, but still represent a small share of the AFS workforce.

To be clear, it is a fact that there is an ongoing structural transformation. It is also clear in the literature that there are many dynamic regions and value chains throughout the Global South where more productive agriculture and non-agriculture AFS and non-AFS employment opportunities are growing rapidly. Most of the literature identified for this review focuses on these bright dynamics. They coexist with situations in which, for millions, the options are to move from one low-productivity job to another; these transitions are understudied.

Second, AFS represents a substantial source of employment in low- and middle-income countries. Agriculture, although its share is diminishing, is the main AFS employer. Non-farm activities within AFS increase their share in total AFS employment.

Globally, 1.23 billion people work in AFS (as of 2019), representing 62% of total employment in Africa, 40% in Asia, 23% in the Americas, 17% in Oceania, and 13% in Europe. AFS employment represents a larger share of total employment in low-income countries (73%) than in lower-middle-income countries (53%). Most jobs, nearly 70% (857 million), are in primary agricultural production (83% in low-income countries; 71% in lower-middle-income countries). Non-agricultural employment represents 17% of total AFS employment in low-income countries, 30% in lower-middle-income and upper-middle-income countries, and 76% in high-income countries.

Globally, 1.23 billion people work in AFS (as of 2019)

If measured in full-time equivalents (FTE), the share of the non-AFS sector is 41%, followed by 29% for own-farm employment, 20% for post-farmgate AFS, and 9% for farm wage employment. In urban settings, 72% of FTE are in the non-AFS sector, followed by 25% in post-farmgate AFS, and 2% in on-farm and farm-wage employment. Over in the two types of areas, post-farmgate AFS employment, with 22%, is almost as important as the sum of own-farm (20%) and farm-wage (7%) employment.

Women account for 38% of all agricultural workers in primary production (crops, livestock, fisheries, forestry) and 41% of all workers in the off-farm segments of all agrifood systems globally. Self-employment in agriculture continues to be the principal work opportunity for rural youth. Employment in off-farm activities within AFS increases as young workers get older.



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Third, while there are general patterns towards better AFS employment conditions, particular situations vary greatly based on a number of determinants; policy options must be tailored to each context.

Compared to traditional subsistence smallholder agriculture particularly in poor rural areas of low- and middle-low countries, just about any employment alternative offers some degree of socioeconomic improvement. Underemployment of family labor is a characteristic of this type of agriculture. In certain settings, income from this agricultural self-employment is only a relatively small fraction of total household income, with social assistance, remittances, and seasonal agricultural and non-agricultural wages being part of diversified livelihood strategies.

Rural non-farm employment (RNFE) is an option for tens of millions of workers from rural farming households. Wage RNFE is the most common alternative in all regions. Many rural people engaged in RNFE, however, can only access low-productivity, low-income jobs, also called “*refuge RNFE*,” or even “*wage hunter/gatherer jobs*.” Determinants of access to higher-return, higher-productivity RNFE include land size and quality, proximity to urban centers and markets, the worker’s education and gender, family size, ethnicity, and access to capital.

Intensification and commercialization of smallholder agriculture is another avenue toward better AFS employment. Most smallholders engaged in this type of agriculture produce food staples for domestic markets, which they access through traditional or transitional value chains. Besides generating additional labor for family members, intensification/commercialization often also requires wage-earners. In addition, by definition, these AFS demand more goods and services that are inherent to agricultural intensification, as well as to commercialization.

In contract farming, labor market effects (both in agriculture and in post-farmgate activities) are much more important than direct farmer income effects. The general pattern is that agricultural and labor productivity, as well as wages and incomes, will tend to be higher than in the previously discussed situations. The number of farmers involved in contract farming, however, is small and they tend to be those with a better asset endowment. Not infrequently, contracting

smallholders are gradually replaced with medium-size ones. Also, the better (formal, permanent, better-paying) jobs downstream are mostly reserved for men and, to a lesser extent, for women who are better educated and more experienced. Overall, even in high-income countries in the North, the numbers employed on farm and off farm in contract farming are a small fraction of total AFS employees.

The share of AFS employment in the non-agricultural segments of the AFS is extremely important, particularly in upper-middle- and high-income countries, but it is still relatively less important in low-income countries. Where agriculture is based on smallholder producers, the expanding “*hidden middle*” largely serves “*partly modern*” farmers in transitional value chains. That is, the “*hidden middle*” emerges with the intensification and commercialization of food staples for domestic markets, much more than to support global value chains with high-value products. The hidden middle is a very broad concept, encompassing all types of wage- and self-employment jobs, many—if not most—of which are not necessarily formal, highly productive and well paid.

Fourth, the better employment options mainly benefit better off, middle-aged men.

The literature highlights several pathways to better AFS employment outcomes. The implementation of contract farming, high-value and export-led value chains, and the adoption of certain certifications and standards that include labor conditionalities sometimes do generate better jobs with higher incomes and better working conditions. These arrangements vary widely, but there is evidence of frequent positive effects on AFS employment, and that working conditions for certain workers in those AVCs are closer to decent working conditions than in average AFS jobs. Jobs and employment in these value chains, contractual arrangements, and certified value chains tend to be formal. Because of that, they also benefit from national laws and regulations related to labor markets, which could include minimum wages and obligations to provide complementary benefits, such as health coverage, transportation, compensation at termination, or pensions.



The positive employment outcomes of contract farming and the adoption of standards mainly benefit better-off, middle-aged men.



The positive employment outcomes of contract farming and the adoption of standards mainly benefit better-off, middle-aged men. Men with better asset endowments are overrepresented in higher-income wage jobs, employment with formal contracts, and jobs with health, pension, and other complementary benefits. On the contrary, women and younger men not only tend to have lower asset endowment, but also are overrepresented in more informal, flexible, seasonal, and unprotected jobs. Women, who represent 38% of workers in the AFS, face worse working conditions and have lower incomes than men.

The focus on decent employment has been called an “iceberg syndrome” and could be shifting needed attention away from the very large majority of people in inadequate working conditions in AFS.

The higher incomes and better working conditions for men could reflect the existence of productivity gaps between men and women. Nevertheless, the literature suggests that initial estimates could be overestimating such productivity gaps because of measurement problems and an inadequate selection of the measurement unit. In addition, when gender productivity gaps are decomposed, endowment effects explain a significant portion of such productivity gaps for agricultural plot managers, while structural effects—gender

biases, discrimination, cultural norms—explain a larger portion of the gender wage gap for farm and off farm agricultural wage-earners.

Within these more modern value chain arrangements, however, there are pending issues that must be addressed to ensure better employment conditions for all workers. For example, the common practice of working with subcontractors, which conceals informal contracts with workers, should be better understood.

Fifth and last, the bright spots of AFS employment are overrepresented in the 290 documents reviewed.²

These bright spots include, for example, high value export agriculture and non-agricultural AFS in dynamic regions or value chains. Unfortunately, the vast majority of producers, workers, and AFS firms are not part of these bright spots. This probably reflects data availability and research and publication opportunities, which in turn are influenced by donor priorities and academic advance criteria.

The following is a summary of the sections of the report:

Methodology and distribution of the literature reviewed

The meta-study was based on articles related to employment in agrifood systems and value chains, indexed in the Scopus database and published since 2000. Initially 139 highly cited texts were selected, and an additional 151 were added as the study progressed, mostly from references in the original set. Documents were reviewed using a standardized set of variables, and each was categorized in a matrix of drivers of changes by effects on agrifood systems. Synthesis notes were prepared for each column of the matrix (effects) from which the final document was written.

The literature reviewed is not representative of the literature on employment in agrifood systems and value chains since 2020. A decision was made to avoid two topics: (a) migration, which is only covered when it was discussed in papers that had a different focus, and (b) child labor in agriculture and agrifood systems. We also did not include articles on topics such as “employment in food services” that did not appear when we did the initial bibliographic search in Scopus. Finally, the compiled documents are published mostly in English, with some in Spanish and Portuguese.

Figure 1 in Section 2 shows how these documents are distributed in a matrix or “heat map” of 10 employment drivers and nine employment effects. It shows a significant concentration of the literature reviewed in three of the 10 drivers: (a) “Changes in the structure and organization of the value chain”, reflecting the importance of the literature on non-farm and off-farm employment, and, more recently, on employment in the intermediate segments of agrifood systems; (b) “Technological innovations in primary

2 Which, we acknowledge, responds to a specific methodology and selection criteria.

production," which includes texts on on-farm automation and digitalization; and (c) "Private institutional changes," which includes food standards, contracts, and contract farming.

There is also significant concentration of the literature in a few of the nine employment effects. Two in particular stand out: (a) "Changes in farmers' and workers' income and wages," and (b) "Changes in the quantity of jobs." A second tier of relatively well-studied topics consists of "Changes in labor productivity" and "Gender effects."

From the matrix, one can readily identify important gaps in the literature including "Technological innovations upstream and downstream," "Labor laws and regulations," "Organization in primary production" (including trade unions, producers' organizations and cooperatives), "Investments in public goods and services," "Rural-urban linkages," "Labor productivity," "Youth employment," and "Social protection."

The structural transformation revisited

A discussion of employment in agrifood value chains (AVC) must be framed in the context of the structural transformation. Nevertheless, some conditions of previous structural transformations in Europe and the United States in the late 19th and 20th centuries made them unique and cannot be repeated today in much of the Global South. Our view is that much of the Global South, including many middle- to high-income countries, are in a structural transformation "lite." It is "lite" because it is limited by the absence of a growing manufacturing sector; by severe constraints on international migration on the scale seen, for example, in the European experience; and because the productivity gap between agriculture and other sectors is smaller than previously thought, not so much because the agricultural side of the equation is terribly productive, but because the productivity levels in the rest of the economy are also very low. For millions, the options involve moving from one low-productivity job to another. These transitions are understudied.

Employment in agrifood systems

Recent studies estimate that around 857 million people are primarily employed (not necessarily full time or solely) in agriculture and another 375 million in non-agricultural AFS jobs. Another study based on household surveys calculates the share of full-time equivalents (FTEs) in own-farm, farm-wage, post-farmgate AFS, and non-AFS employment. In rural areas worldwide, 41% of FTEs are in the non-AFS sector, followed by 29% in own-farm employment, 20% in post-farmgate AFS, and 9% in farm wage employment. In urban settings, 72% of FTEs are in the non-AFS sector, followed by 25% in post-farm gate AFS, and 2% in on-farm and farm-wage employment. In the two types of areas, post-farmgate AFS employment, at 22%, is almost as important as the sum of own-farm (20%) and farm-wage (7%) employment.

Non-agricultural AFS employment is increasing worldwide and in every region, while agricultural employment as a share of total employment is following the opposite pattern,

although it is not yet decreasing in absolute numbers in Sub-Saharan Africa or even in South Asia and Latin America. As we move from low-income to high-income regions, AFS employment is less important in total employment, and non-agricultural AFS jobs grow in number and relative importance compared to agricultural employment.

The same pattern is observed in the trends in Gross Domestic Product (GDP) measured for agriculture alone (AgGDP), or the whole agrifood system (AgGDP+). Globally, AgGDP+ is 9.7%, more than double AgGDP which is 4%. AgGDP+ is 46.4% and AgGDP is 28% of total GDP in low-income countries, 29.1% and 17% in lower-middle-income countries, 13.9% and 7% in upper-middle-income countries, and 5.7% and 1% in high-income countries, showing that the post-farmgate component of agrifood system GDP increases with national per capita income.

Rural employment diversification

“Household diversification, not specialization, is the norm. ... Not only are most rural economies highly diversified, but rural households are as well.”

Around the turn of the 21st century, non-farm rural employment represented approximately 30% of full-time employment in Asia and Latin America, 20% in West and North Africa, and 10% in Asia. If we include small towns, non-farm employment would add another 10% to 15% or so. Based on data for 13 countries over a period of 10 to 20 years, rural employment in manufacturing grows by about 1% per year, while rural employment in commerce and services increases at about three times that rate. In all regions, the largest non-farm employment sectors are personal services, followed by trade and transport in all regions except West Asia and North Africa (manufacturing), and then by manufacturing.

The rural non-farm economy is recognized as one of the main pathways out of rural poverty. Studies have quite consistently reported that non-farm employment leads to higher household income, compared with households not engaged in these activities. However, there is much heterogeneity in the types of jobs included in the concept of non-farm rural employment, and not all of them have the same potential to lift people out of poverty. The decision of specific rural households to diversify is contingent on the characteristics of the functional territory in which they live and work, as well as on their assets and incomes. Because of this heterogeneity,

the literature recognizes two broad types of rural non-farm employment (RNFE): that in which households and individuals take advantage of opportunities in more productive jobs and sectors (“pull RNFE”), and another in which they are “pushed” by poverty, missing or incomplete factor markets, or high levels of vulnerability and risk into low-productivity “refuge non-farm rural employment.” Determinants of access to high-return, high-productivity RNFE include the degree of economic dynamism of the territory, land size and quality, proximity to urban centers and markets, education and gender of the worker, family size, ethnicity, and access to capital. Hence, authors have pointed out the paradox that those with the greatest need to increase their income through high-productivity, non-farm activities have the least capacity to gain access to them.

The “hidden middle”

The “hidden middle” refers to the segments of the agrifood system between the farm and retail—that is, to processing, logistics, and wholesale, as well as services to on-farm production. As discussed above, employment in this part of the AFS globally is already almost as important as on-farm employment, while the value added that it generates is almost twice as much as that derived from on-farm production.

Jobs and firms within the “hidden middle” are highly heterogeneous, from large, high-tech firms, to SME, to small-scale vendors selling fresh fruit on the street in any city in the world. Nevertheless, there is not enough detailed analysis of the composition of the “hidden middle.”

The expansion of the “hidden middle” puts pressure on agricultural and rural labor markets, driving labor-saving technologies, and often finances technological changes in agriculture. Some studies have found that while agriculture has higher poverty-growth elasticities than non-agriculture as a whole, in some cases the elasticities of agro-processing and trade and transport are as high as, or higher than, those of agriculture, highlighting the opportunities for poverty reduction that can be created by the expansion of the “hidden middle.”

“ Jobs and firms within the “hidden middle” are highly heterogeneous

The growth of the “hidden middle” is driven by private-sector investment by firms of all sizes and is facilitated by organizational and technological changes at the farm level, as well as in food retail. Market liberalization policy reforms

spur this process, which is characterized, at least initially, by rapid labor-intensive SME. However, capital/labor ratios tend to increase during the transformation of these intermediate segments of the AFS, as public and private standards become more important and growing private foreign and domestic investment drives consolidation and concentration, allowing investments in technologies that are out of reach for smaller firms. Public and private standards encourage the consolidation of SME, as many small firms are unable to meet them and are squeezed out.

A portion of jobs and SME in the “hidden middle” are located in peri-urban and urban centers and employ both urban residents and commuters from proximate rural localities. By definition, these jobs depend on primary production, hence the importance of rural-urban linkages, which can be improved through investment in infrastructure, including roads and communications, and services. Studies show the poverty-reducing effect of SME in towns and small and medium-size cities that interact closely with agricultural producers and households in their hinterland.

Intensification, automation, and digitalization

Agricultural intensification and commercialization, together, have been a core objective of development policies, and they are seen as one of the main pathways for lifting hundreds of millions of people out of poverty. While the structural transformation should reduce labor surplus in the agricultural sector, this is a process that can take considerable time, particularly in regions with high rates of population growth and limited options for employment outside of agriculture, most prominently in Sub-Saharan Africa. This delay explains why labor-intensive and more productive sectors can expand significantly, with slow increases in real wages. As long as there is a large labor surplus in rural areas, market mechanisms alone will not result in significantly higher wages and better working conditions in the early stages of the structural transformation.

As a general trend, and across widely different settings and circumstances, intensification increases agricultural and labor productivity. The Green Revolution transformed agriculture worldwide. We know that the rise in production per hectare since the 1960s was accompanied by fewer people working in agriculture in the world, while land used for crop production and pastures has remained nearly constant for the past 60 years.

This process has had unintended consequences. In high-income and upper-middle-income countries, many small-scale family farmers have been marginalized and millions of smallholder family farmers have not wanted and/or have not been able to adopt the agricultural intensification and modernization strategy of the Green Revolution.

The review identified five sets of agricultural intensification technologies that have been proven to increase labor productivity under certain circumstances: a) Mechanization; b) Chemical and/or mechanized weed control; c) Irrigation;



d) Conservation agriculture, with zero and minimum tillage; and e) Improved varieties, when their characteristics allow the introduction of labor-saving technologies. Changes in the management of farm workers can also drive increases in labor productivity, as with the introduction of piecework contracts both on the farm and in postharvest processing.

There are alternative agricultural development strategies that depart from the Green Revolution and its emphasis on intensification and modernization, such as agroecology. Largely because these systems are diversified, avoid monoculture, and reduce or exclude external synthetic inputs, they tend to be more labor intensive, to the extent that leading proponents of agroecology call for researchers and practitioners to give greater attention to developing agroecological technologies that can use labor more efficiently.

There is a lively and still-unresolved debate about the significance of automation and digitalization in relation to agrifood systems in the global South. The extent to which this revolution will penetrate agrifood systems in developing countries, and the potential impacts on employment, are two of the main issues in this debate.

There is large variation in estimates and no consensus on job impacts among the main published estimates and forecasts, but one pattern that emerges is that more jobs are likely to be replaced in agrarian economies. The more optimistic analyses point out that early stages of automation (e.g., tractors) did not lead to massive unemployment, while surplus labor in agriculture moved to more productive jobs in manufacturing and services. Some authors suggest that the farm sector will concentrate losses in job numbers, particularly among family labor, hired field workers, and labor supervisors and contractors. Displacement of farm workers will be greater in the commercial farm sector and in high-value value chains, where access to capital and technical support are not heavy constraints on automation. These analyses project that total farm employment could still expand if automation solves seasonal labor shortages, or in situations where two or more production cycles overlap in time, thus allowing production to grow. The impact on on-farm employment will also depend on the possibility of expanding cultivated area with increased automation and mechanization.

At the same time, there will be an increased demand for skilled on-farm and non-farm workers. Access to quality education and vocational training are necessary conditions for rural workers to have access to these new on- and off-farm jobs, and many of the newer, labor-saving technologies require large initial investments, access to reliable electricity and high-quality Internet. Such conditions are unlikely to be met in the near term, or even the medium term, for a large proportion of smallholders, not only in low- and lower-middle-income countries, but even in upper-middle- and high-income countries with high levels of inequality.

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There is also the question of increased automation in sectors that could otherwise absorb part of the labor force displaced from agriculture, such as agrifood logistics, agro-processing, food retail, and food services. Labor-intensive SME continue to occupy a large share of domestic agrifood markets but there seems to be a trend toward higher capital/labor ratios in the downstream segments of value chains, such as the larger rice mills in Bangladesh, China, and Vietnam. Unfortunately, the literature reviewed for this review contains very few studies of how automation and digitalization innovations are penetrating the “*hidden middle*.”

“ Labor-intensive SME continue to occupy a large share of domestic agrifood markets

Contract farming

The literature reports the increasing importance of vertical coordination in agrifood value chains, due to consumer demand for food quality and safety, and factor market imperfections on the production side. From the perspective of the lead firms in value chains, vertical coordination is driven by consolidation of the supermarket sector and increased market share and power of the resulting firms, the spread of own label products, efforts by retailers to attain greater organizational flexibility, and the proliferation of mandatory and voluntary standards and codes of conduct.

One form of vertical coordination, contract farming, can improve risk management for the producer and the buyer, reduce costs, reduce or resolve the effects of missing credit markets, and improve smallholders’ access to technical assistance and know-how, particularly when they are considering the production of higher value crops that are new to their region.

In countries in the Global South, participation in contracts varies widely, from less than 5% of smallholders to more than 80%. In the United States, only 5% of farms used marketing contracts in 2020 and the share of farmers with production contracts was even smaller, at 2%.

More formal types of contract farming have gained attention with the very fast growth of horticultural exports from countries in the Global South, with concomitant large increases in on- and off-farm employment in these value chains. Nevertheless, it is important to remember that even in high-value products like fruits and vegetables, contract farming continues to involve relatively small numbers of farmers and wage-earners, compared with traditional or transitional value chains with little to no vertical integration.

Regarding the characteristics of smallholders who participate in contract agriculture, the evidence tends to support the hypothesis that education; asset base; proximity to good roads, towns and cities; access to irrigation; land size; greater agricultural experience; experience in selling to wholesalers or processors; membership in producers' organizations; having off-farm income; and prior technical efficiency are all factors related to a higher probability of participation in contract farming. Female-headed households and female farmers are at a disadvantage in gaining access to contracts.

On the other hand, many of the new non-farm wage jobs in these value chains are taken by workers from relatively poor households, with less land and lower levels of education. Several studies found that rural women are also well represented in high-value export agro-processing jobs.

There is significant debate in the literature about the positive and negative effects of contract farming on the welfare of participating producers, as well as on on-farm and downstream wage-earners. Some propose that participation in contract farming has negative effects on the income and/or autonomy of participating farmers, as buyers can use their market power to impose unfavorable conditions on producers.

For salaried agricultural workers, the effects of contract farming on wages are mixed. In contract farming that is part of buyer-oriented value chains, there may be pressure to restructure the work force to meet the demands of the lead firms, reducing labor costs and decreasing or replacing permanent labor with flexible and subcontracted labor. This mainly affects vulnerable workers, such as women, youth, and migrants.

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Most of the studies reviewed, however, support the view that participating smallholder producers do tend to benefit directly from these schemes, because of increased prices and/or increased yield compared to non-contracting

smallholders of similar characteristics. Nevertheless, some of the most comprehensive reviews that seek to determine whether contract farming improves the welfare of participating households determine that no policy-relevant conclusions can be drawn and challenge the notion that contract farming unambiguously improves welfare.

Part of the problem in elucidating the welfare and distributional effects of contract farming is that there are different channels through which participation in value chains can impact directly and indirectly on the welfare of farmers and wage-earners. Many studies focus on the product market effects on contracting smallholder farmers and their households and tend to skip important labor market effects involving wage-earners both on farm and in agroindustrial firms. Some studies have found that a very large proportion of agroindustry employees are women, leading to development impacts such as a much-reduced gender wage gap (three to six times lower than in other employment sectors) and an increase in primary school enrollment of children of agroindustrial female employees.

Production contracts tend to have better effects than marketing contracts on the productivity of participating farmers. The effects are a response to the provision to the farmers of technical assistance, inputs, credit, and/or machinery services, supporting the hypothesis that contracting allows smallholder farmers to overcome market imperfections that limit their productivity and production potential. Some studies also report indirect benefits, such as those due to technological spillovers to products other than the one that was contracted.

Food standards that incorporate labor conditions, such as GLOBALG.A.P. and Fairtrade, also appear to have differing effects on farmers' and wage-earners' income. Some studies report slightly higher salaries paid by GLOBALG.A.P. agro-processors and by Fairtrade firms, compared to non-certified companies. According to some authors, Fairtrade improves wages and reduces poverty among workers in those certified cooperatives that are able and willing to comply with high labor standards, which increases wages and improves worker welfare. Other studies, however, found that cooperatives that obtained certification were able to increase their income only when international prices were low, while non-certified farmers could obtain higher prices if they timed their sales correctly. According to other studies, wages and working conditions of both non-certified cooperatives and certified and non-certified individual farms do not differ significantly, probably because labor standards are barely monitored during routine inspections. Several studies show that the costs associated with certification and compliance under the Fairtrade standard are often so high as to offset the favorable price differential. Other authors emphasize that ethical standards often fail to reach more vulnerable workers, such as casuals, migrants and/or women.

Working conditions and social protection

Most AFS workers work in primary agriculture, with 93.6% in the informal economy, with low incomes and limited social protection coverage. Some workers in specific AVC experience improved working conditions, but systematic reviews have found that economic success does not necessarily translate into better working conditions.

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Decent work in agriculture is crucial for improving conditions and ensuring fair income, security, and social protection. However, focusing solely on decent employment may overlook other critical issues, such as self-employment and labor productivity. Labor contracting in AVC can also be unscrupulous, causing vulnerable workers to be coerced and underprivileged, with women overrepresented in these types of undesirable situations. Literature shows poor working conditions in AFS countries in the Global South, because of informality, lack of oversight, and geographic dispersion, affecting women, youth, and migrants.

Inclusive agribusiness aims to improve working conditions and decent work for small-scale farmers. Instruments include national labor laws, sectoral regulations, agricultural interventions, and contractual arrangements. However, in low- and middle-income countries, labor regulations and social protection are limited. Inclusive business in Sub-Saharan countries involves a relatively small number of wage employees. Larger, buyer-driven value chains, such as coffee, cocoa, and palm oil, show success in improving working conditions for their (formal) workers.

Studies show that the adoption of certifications and standards can improve working conditions and inclusiveness in AVC, but have also found that their effects vary depending on the context, type, and initial conditions. Certifications tends to

improve working conditions for qualified male workers, but less for women or subcontracted workers. Power inequalities affect workers' benefits, and contexts, such as geography and institutions, also influence labor conditions. Agribusinesses with more resources tend to provide better protection for workers.

Labor unions improve agricultural workers' wages, workplace safety, and reduce workload. Farmers' organizations improve incomes, crop yields, and product quality. Collective action organizations increase participation in contract farming, reduce transaction costs, and mitigate power asymmetries. Organized farmers in contract farming schemes can increase profits, but scarce unions and worker associations hinder progress in rural Africa and in countries in other regions. Women's self-help groups have shown positive outcomes for women's empowerment and access to services.

Social protection interventions are essential for inclusive rural transformation and decent work. Social protection coverage benefits rural and poor households by enabling better decision making, risk management, and economic growth. Social protection includes protective, preventive, and promotional programs, with social assistance being the most common form in developing countries, while social insurance is more common in high-income countries. Social protection coverage varies among regions and country income levels, and between rural and urban settings. Increasingly, social protection is incorporating economic inclusion interventions that aim to improve livelihoods and agricultural productivity, benefiting rural incomes and employment.

Empirical literature the impacts of social protection on agricultural outcomes is limited.

“ Empirical literature the impacts of social protection on agricultural outcomes is limited

Female employment, gender and AVC

Gender issues in AVC have gained attention in recent literature, with 38% of working women employed in AFS in 2019, and with women accounting for 38% of primary production employment and 41% in off-farm segments. Female employment in agriculture is increasing, particularly in farm production and postharvest processes, but at a slower pace in transportation, commercial intermediation, and contract negotiation. Gender roles and stereotypes reinforce these differences. Most own-account agricultural production is based on self-employed family workers (paid or unpaid) and contributing family workers (mostly unpaid). Women are overrepresented in the latter: 49% of women in agriculture work as contributing family members, compared to 17% of men.

Studies of female employment in AVC show mixed impacts on gender inequality. Female employment in AVC is characterized by informality, inadequate working conditions, and concentration in lower-paid, less-skilled segments.

The literature highlights the income gap between women and men in agricultural and non-farm jobs, with women earning 82% of men's wages. Inadequate working conditions, seasonality, and weak institutions limit women's access to decent working conditions. The gender labor productivity gap is significant in agriculture. Female plot managers' productivity gaps are mostly explained by endowment effects, while for wage-earners, structural effects—gender biases and discrimination—are more important than endowments in explaining the productivity gap.

Globalization and contract farming could impact female employment, promoting economic independence and social connections. Large-scale and agroindustrial production may lower gender gaps, but the impact varies depending on the worker's initial situation, country, and existing regulations. While some literature highlights improvements in working conditions and wages for women, these effects are limited to certain value chains and contexts. The literature fails to determine whether entering global AVC is beneficial for women, as evidence varies across product lines, countries, and regions.

Digital technologies, including mechanization, are reconfiguring labor portfolios in the AVC, enabling women to access services and improve productivity. However, women face a significant lag in access and adoption, which could be widening existing employment and income gaps.

Understanding gender systems is crucial for understanding female employment trends and impacts. AVC show gender-asymmetrical power relations that reinforce unequal gender systems. Farmers' organizations in AFS are less effective in improving income, production quality, and yields for younger, less literate, and female farmers. Understanding gender systems is crucial for understanding female employment trends and impacts.

Youth

Around 1 billion youth ages 15 to 24 live in developing countries, with rural areas experiencing the fastest growth. They often engage in subsistence agriculture, but face limited access to resources and education. Their unemployment rate is three times that of adults. Underemployment among rural African youth is significant, with 7.5% of the youth labor force unemployed and another third working fewer than 20 hours per week.

Most young African rural workers are informally employed in agriculture, and own-account farming is higher in Africa. Younger youth are likelier to work in family farming and informal enterprises with low entry requirements and labor returns. This is due to a lack of skills, work experience, limited access to resources, poor infrastructure, and low economic dynamism in rural territories.

Land access for young rural Africans is influenced by landlessness, corporate concentration, and older generations controlling resources. This tension causes youth aversion to agriculture, because of issues related to vulnerability and village conditions. Latin America's demographic transition has improved employment opportunities, education, and access to health care, broadening rural youth's aspirations and lifestyles. However, poor economic dynamism and limited education limit rural youth's opportunities. AVC can help increase employment opportunities.

Small and medium-size enterprises (SME) in intermediate segments have proliferated rapidly in Africa, Asia, and Latin America, increasing youth labor market participation. The "hidden middle" contributes significantly to youth employment in AVC, with non-farm activities remaining the main source of off-farm employment. Rural youth in urban and peri-urban areas increase wage employment, diversifying into non-farm employment and relocating to less-consolidated economic niches. Increased domestic demand for diverse agricultural and food products and new technologies, such as ICT connectivity and agricultural automation, can attract rural youth. Digitalization and automation offer skilled jobs, but youth-focused human capital development and skills development programs are crucial for transitioning to complex technologies and addressing precarious working conditions in developing countries.

Innovations, interventions, and policies that support more and better employment in AFS

Based on the reviewed literature, 13 innovations, interventions, and policies were identified as promising to increase employment in AFS, improve AFS employment inclusivity, and/or generate better working conditions in AFS (see Annex 1 for a more detailed description).

These 13 innovations, interventions, and policies are well documented in the literature. Some have been evaluated in specific locations and are frequently mentioned as promising options that require more analysis to become sound recommendations on how to improve AFS employment in the Global South.

These 13 interventions clearly are not the only ones mentioned in the literature, and the selection is based on the authors' review of the literature, which, as discussed above, might be biased toward certain topics and positive examples..

The effects on employment presented for each innovation, intervention, or policy, represent a general indication of the type of effects documented in the literature, but as discussed in this document, these vary widely across locations; types of products and value chains; and economic, social, environmental, and cultural contexts, so generalizations must be taken with extreme caution.

These 13 identified innovations, interventions, and policies are promising, but still require more research and debate about how to obtain the identified positive effects in different contexts. The research challenge for most of them is to identify how to implement them effectively in different settings and get the same or better results.



Promising innovations, interventions, and policies identified in the reviewed literature

Innovations, interventions, and policies	Summary description	Employment effects (productivity, quantity of employment, and income and wages)	Inclusion effects (gender, youth, and poverty reduction)	Comments
Value chain innovations or interventions				
Mechanization	SME providing farm mechanization services (e.g., land preparation, harvesting), with or without use of mobile phone apps. Potential to reach millions of small-scale farmers.	Mostly positive (But because of the substitution effect, some employment reductions will occur and incomes will be lost).		The availability of mechanization solutions and the limited economic capacity of potential adopters could leave groups of producers/ regions lagging.
Digital innovations (on and off farm)	Digital services that allow better production and marketing of agrifood production (risk-management tools, weather monitoring, mobile payments, e-commerce, etc.).	Mostly positive	Mostly positive (Gender and poverty gaps could increase given lower access to and use of digital technologies).	Potential to reach many farmers, but primarily those with more assets and in better-endowed territories (connectivity, electrification)
Food standards that include labor provisions	Adoption of standards such as Fairtrade or GLOBALG.A.P.	Mixed results	Mixed results	Large impacts, but for small numbers of farmers and households. A niche innovation.
Modern contract farming and VC contracting	Contract farming for higher value products.	Mostly positive (For formal workers; smallholders tend to be replaced by larger ones as AVC grow).	Mixed results (Informal workers do not get benefits and income gaps for traditionally excluded groups tend to remain).	Large impacts, but for small numbers of farmers, mostly those with more assets. Labor market effects could reach many more households, including many with a lower asset endowment.
Small scale irrigation schemes	On-farm improved irrigation systems.	Mostly positive	Mostly positive	Potential to reach relatively large numbers of farmers and workers, with significant impacts, although investment in irrigation is slowing down.
Agroecology and other types of diversified agricultural systems	Adoption of agroecology and other diversified production systems.	Mostly positive	Mostly positive	Reaches relatively small numbers of farmers, with contested economic impacts (but with positive environmental effects).
Flexible labor contracts	Labor contracts adapted to production and marketing needs with no job stability.	Mostly positive (Part of the positive results are only effective during contracted time periods).	Mixed results	Reaches large numbers of on- and off-farm workers employed in global value chains.

Innovations, interventions, and policies	Summary description	Employment effects (productivity, quantity of employment, and income and wages)	Inclusion effects (gender, youth, and poverty reduction)	Comments
Policy innovations or interventions				
Investments in infrastructure that “pull” rural employment and income diversification (public and private)	Investments that improve connectivity, such as physical (roads) and digital (mobile internet), support to increase access and use of private and public services (financial, training).	Mostly positive	Mostly positive	Very large impacts, in many dimensions, potentially for large numbers of rural households and small-scale farmers. Subject to investment policies, fiscal space, and implementation capacity. Best results when investments simultaneously provide a bundle of basic infrastructure (electricity, roads, connectivity, water, etc.).
Modernization of wholesale markets	Better infrastructure and services at wholesale markets.	Mostly positive		Potentially very large impacts for most small-scale farmers and for rural households (as food consumers).
Social protection and agricultural development intervention	Social protection in conjunction with agricultural development interventions (services, assets, etc.). Agricultural development interventions increase agricultural productivity, and social protection helps access to these benefits for traditionally excluded groups.	Mostly positive	Mostly positive	Large impacts for large numbers of farmers and off-farm workers.
Social Protection with economic inclusion	Social protection that includes economic inclusion interventions increases rural income and supports livelihood diversification.	Mostly positive	Mostly positive	Large impacts for large numbers of farmers and off-farm workers.
Labor regulation	Adoption of minimum wages.	Mostly positive		Significant impacts, but for small numbers of workers (those with formal contracts).
Collective action organizations	Collective action organizations improve workers’ bargaining power, help obtain better contracts and improve opportunities and working conditions for their members.	Mostly positive	Mostly positive (Younger workers tend to be excluded from collective action organizations).	Complex to develop, requires long processes. Moderate to large impacts in low to moderate numbers of farmers.

Source: Authors calculations from the review

Knowledge gaps

Twelve knowledge gaps were identified:

- 1. There is insufficient understanding of the composition and dynamics of the non-agricultural AFS labor market.** The evidence shows that most jobs are being created in the non-agricultural AFS. Given the importance of non-agricultural AFS employment, there is a need for deeper understanding of the distribution of employment by levels of productivity and remuneration, the formality of labor relationships, determinants of better jobs, gender systems, and, very importantly, the capacity to pull large numbers of youth into productive employment.
- 2. There is a lack of research on the aggregate social and economic effects of AVC development and modernization policies.** There is a strong bias, in the literature and in policymaking, toward modern value chains that involve contracts, formal standards, certification, etc. Evidence is lacking that would compare the aggregate economic and social effects of policies that support the development of modern value chains, which have larger individual impacts on a smaller number of participants, to those of policies that improve traditional and transitional value chains, which have lower individual effects but are spread over a larger number of farmers, agrifood SME, and workers.
- 3. More studies from varied geographies are needed to understand Global South trends.** There is a substantive concentration of studies in a very limited number of low- and middle-income countries (including India, Ethiopia, Kenya, Nigeria, and Senegal).
- 4. Studies that better estimate and analyze productivity gaps are required.** Trends in labor productivity in AFS in the Global South are understudied.
- 5. Traditional and transitional AVC studies are needed to complement the abundance of studies of modern and more dynamic AVC.** In the literature, there is significant attention to modern export value chains and modern domestic markets (e.g., supermarkets). There are far fewer studies of traditional and transitional value chains in AFS, where most farmers, agrifood firms, and workers are concentrated.
- 6. There is a need to identify the conditions and complementary interventions required for ensuring that contract farming consistently delivers welfare improvements.** Contrary to a frequent assumption in policymaking, contract farming has been found to increase farmer income and wage employment in some contexts, but not in all circumstances. What the literature does not address are the conditions and complementary interventions needed to ensure more consistent welfare improvements, as well as a clear understanding of the situations in which contract farming will not deliver the desired outcomes.
- 7. There is a need for conclusive evidence about the impacts of standards that include commitments related to labor conditions** (such as GLOBALG.A.P. and Fairtrade).
- 8. In-depth studies are needed of promising innovations, interventions, and policies for improving AFS employment.** The challenge is to gain a deeper understanding of how these innovations, interventions, and policies can work better (with larger positive impacts and lower unintended negative effects) and can be implemented successfully in less-conducive or -favorable contexts without endangering their positive results.
- 9. More research analyzing the impacts of “bundles” of innovations, interventions, or policies is needed to better inform policymakers and development agencies.** There is an abundance of studies that look at individual innovations and their economic and distributional effects (e.g., agricultural technologies, types of contracts, etc.). When comparing many studies that examine similar innovations in different settings, results often are not conclusive. What is lacking are more studies that look at bundles of innovations, or minimum sets of concurrent interventions, that could consistently deliver positive impacts across a wider set of contexts.
- 10. There is an opportunity to contribute to the AFS decent work debates linking labor market analyses with the recent social protection debates** (universal coverage, economic inclusion, financial and digital interventions to enhance social protection). These two literature areas are *ships passing each other in the night*.
- 11. Gender systems approaches are required to address women’s inclusion in AFS employment.** There is little understanding of the endowment and structural determinants of different gender gaps and of the gender systems that determine agricultural and non-agricultural AFS employment opportunities for women, and which condition the impacts of this employment on women’s welfare, empowerment, and development.
- 12. There are several knowledge gaps in understanding how automation and digitalization can advance decent work in AFS:** a) the impact on employment; b) the role of labor standards; c) the impact on rural communities; d) the impact on smallholder farmers, and e) the impact on gender equity and women’s empowerment.

1. Introduction

The food sector constitutes about one fifth of the global economy and is arguably the world's largest source of income and employment. The livelihoods of most of the world's poor and vulnerable people depend on it. In recent decades, agricultural productivity has steadily grown, and technological and institutional innovations have proliferated within agrifood markets and value chains,³ helping reduce poverty and food insecurity around the world.

Despite these critical contributions, the ways in which food markets are structured and operate have negative impacts. Many failures are rooted in markets hindered by multiple deficiencies in infrastructure, equipment, and standards; incentives that do not foster sustainability, nutrition, or inclusiveness; concentrated market power; and weak value-chain integration. The key challenge is how to address these multiple constraints and develop value chains that efficiently deliver more nutritious and safe foods to retailers and consumers, while generating decent livelihoods for farmers and food-sector workers—including women and vulnerable groups—and reducing the carbon footprint of agriculture.

“ The food sector constitutes about one fifth of the global economy

This is a major challenge, but there are also enormous opportunities. Food markets and value chains are undergoing rapid changes, including in developing countries, as urbanization accelerates, technologies proliferate, policies aim to address market failures, and dietary patterns shift. New products, modern distribution systems, and digital technologies continue to transform supply chains. These changes represent unique and timely opportunities for more gainful employment and business activity for disadvantaged agrifood actors, including smallholders, traders, and workers in small and medium-sized enterprises (SME), especially women and youth. More appropriate incentive structures and repurposed agricultural policy support can encourage the adoption of sustainable practices at the farm level and across food value chains. Food standards for quality, safety, environmental sustainability, and fair trade can protect both consumers and the environment and make smallholders and agrifood SME more competitive.

However, no single approach, innovation, or policy will suffice. Improving the ability of food systems to reduce poverty, improve nutrition, promote gender equality, and use resources sustainably will involve combining technical and organizational innovations with enabling market incentives, institutional and regulatory frameworks, and public policy, all within specific value chains and food markets.

To address these challenges, the new One CGIAR Research Initiative on “*Rethinking Food Markets and Value Chains for Inclusion and Sustainability*” aims to provide evidence about what types of bundled innovations, incentive structures, and policies are most effective for creating more equitable sharing of income and employment opportunities in growing food markets, while reducing the food sector's environmental footprint.

The Initiative commissioned this meta-study to review the available evidence and to identify knowledge gaps regarding the impacts on employment and income sharing in Agrifood Value Chain (AVC) integration and modernization processes in developing countries. Since modernization processes typically involve productivity improvements in agriculture and postharvest processes, these may be detrimental to employment generation, though advantageous to the potential for income generation. At the same time, the lengthening of food value chains and expansion of cross-value chain support services may create new employment opportunities. In many contexts, however, these opportunities may not fully materialize because of the concentration of food business expansion in large and vertically integrated companies and/or employment may proliferate in low-productivity and informal-sector jobs.

The underlying hypothesis of the study is that food systems currently underperform in terms of their potential for generating decent jobs and income opportunities, and this gap is only growing with expanding food markets and existing agrifood supply chain business models skewing gains to the disadvantage of smallholders, agrifood SME, and food-sector workers. Since the agrifood sector is arguably the biggest single-sector employer, and also possibly the largest income generator in most developing countries, the meta-study is expected to review the available evidence about ways to enhance decent employment and income generation benefiting those actors and about the potential for more inclusive agrifood value chain development to provide a solution to the employment and poverty conundrums most developing countries face.

3 “An agricultural value chain is defined as the set of activities that take a basic agricultural product from the grower to the final consumer, adding value at each stage of the production process” (Bellemare & Lim, 2018, p. 381).

2. Methodology

The meta-study was based on articles indexed in the Scopus database. First, a search was conducted using the keywords (“value chains” OR “agriculture” OR “farm” OR “non-farm” OR “food systems” OR “rural”) AND (“labor” OR “labour” OR “work” OR “job” OR “occupation” OR “employment” OR “working conditions” OR “social protection”). The search included conference journal articles, working papers, reviews, reports, and book chapters, and was restricted to documents published between 2000 and 2023. This search listed 167,182 documents as of March 31, 2023.

The most-cited documents from that list were identified (300 entries) and were then reviewed for their relevance to our study, based on their title, abstract, and keywords; 139 texts were selected.⁴ An additional 151 documents were added as the analysis progressed, based on references in one or more of the texts in the original list, as were some articles recommended by experts with whom the team interacted.

Documents were reviewed using a standardized set of variables: General information; characteristics of employment in the agrifood value chain; employment effects in the agrifood value chain (quantity, diversification, productivity, income/wages, social protection, working conditions, gender effects, youth effects, and other types of effects); drivers of the effects (legal and regulatory changes that affect all or part of a value chain; technological changes in primary production, including automation; organizational changes in primary production; technological changes in downstream segments of the value chain, including automation; changes in the structure and/or organization of the value chain; private institutional changes in the value chain; rural-urban linkages; investments in public goods and services; other drivers); methodology; main findings; knowledge gaps; and conclusions.

Each article was categorized in a matrix of drivers by effects (Figure 1 in the following section). The next step was to write synthesis notes for each column of the matrix (effects) from which the final document was produced.

3. Distribution of the literature

As explained in the previous section, this review is based on 290 documents. Figure 1 shows how these documents are distributed in a matrix of 10 employment drivers and nine employment effects.

The resulting “heat map” is **not** representative of the literature on employment in agrifood value chains since 2020. For this review, we made the decision to avoid two topics: (a) migration, which is only covered when it was discussed in papers that had a different focus (e.g., rural-to-urban migration as a result of structural transformation), and (b) child labor in agriculture and agrifood systems. We also did not include articles on topics such as “employment in food services” that did not appear when we did a bibliographic search in Scopus with the criteria and keywords mentioned

above. However, if one searches the keyword “Food services” in Scopus with certain limitations, the result is a large list of entries. Finally, the compiled documents are published mostly in English, with some in Spanish and Portuguese.

With these caveats, Figure 1 shows a significant concentration of the literature reviewed. Looking first at the drivers (rows in Fig. 1) almost one-third of the documents reviewed discussed the driver “Changes in the structure and organization of the value chain,” reflecting the importance of the literature on non-farm and off-farm employment and, more recently, on employment in the intermediate segments of agrifood systems. The second most important driver of employment in the literature is “Technological innovations in primary production,” which includes texts on automation and digitalization if they discuss on-farm applications. The third driver in importance is “Private institutional changes,” which includes the literature on food standards, contracts, and contract farming; in this and other topics in our review, we have a distinct impression that there is a positive-results publication bias.

Turning now to employment effects (columns in Fig. 1), two are very well discussed in this set of papers. Changes in farmers’ and workers’ income and wages are covered in 43% of the documents, followed by changes in the quantity of jobs, present in 38% of the texts. A second tier of well-studied topics relates to changes in labor productivity and gender effects, each of them discussed in about one-fourth of the documents reviewed. A third tier of topics includes those covered in around 15% of the documents reviewed; they are diversification (i.e., farm and off-farm, agricultural and non-agricultural employment and incomes) and working conditions, which in this case refers mostly to wage farm and non-farm workers in post-farmgate segments of the value chains.

Looking at the drivers of employment (rows in Fig.1), we identify several areas with relatively less coverage in the literature (i.e., 15% or less of the documents reviewed). The first is “Technological innovations upstream and downstream;” the literature on the growth of non-farm employment and of the post-farmgate segments of the agrifood system generally do not discuss technological innovations, compared, for example, with the abundant discussion of on-farm technologies. This would include topics such as the supply of appropriate technologies for agrifood SME, determinants of adoption, and effects of technological innovation on productivity and on income and wages, which are issues that should be considered for a greater research effort.

The whole area of labor laws and regulations is another orphan topic. While one can understand why this isn’t researched in connection with smallholder agriculture in traditional value chains in low or middle-low-income countries, it is less evident why the subject is not more relevant in modern value chains and in middle-high income countries, or in many activities in the post-farmgate agrifood economy. Closely related to that is the issue of trade unions

4 From these 139 papers, 21 were read but not used as they were not relevant for this review and 118 were included in this review.

in agriculture and agrifood systems, which are almost totally ignored in the literature we reviewed, with the exception of two articles. Producers' organizations (cooperatives and other forms of association for economic objectives) are another area of opportunity; there seems to be an assumption that it is possible for small-scale farmers to upgrade their production and their well-being, acting as individuals. This contrasts with the emphasis many development projects place on promoting different forms of collective action organizations.

Interestingly, there are relatively few articles that look at investments in public goods and services (e.g., roads, irrigation, rural electrification, mobile connectivity, and education) as drivers of employment; related to that, rural-urban linkages also attract less attention in the literature.

Turning to employment effects (the columns in Figure 1), in our opinion, the most important gap is in the study of labor productivity. Four out of 10 papers that discuss labor

productivity do so in relation to technological innovation in primary production. The focus continues to be on agriculture, rather than on agrifood systems or even value chains. A surprising gap is that of youth employment. Although it is often mentioned as a critically important issue from different points of view, including the demographics of small-scale farming and rapid population growth in Sub-Saharan Africa and the Near East and North Africa, it is researched and discussed in depth in only 9% of the documents reviewed.

Social protection is understudied in our set of reviewed documents. Questions about cash transfers, social security, unemployment insurance, access to health systems, and the role they can play, for example, in increasing labor productivity, are not being studied by the authors represented in the literature we reviewed.

Distribution of documents consulted by value chain employment drivers and effects

Figure 1. Distribution of documents consulted by value chain employment drivers and effects

Drivers/Effects	Quantity of jobs	Labor productivity	Income and/or wages	Diversification	Social protection	Working conditions	Others effects	Gender effects	Youth effects	Total by driver
Legal and regulatory changes	14	3	8	0	3	7	3	1	4	30
Technological innovations in primary production	23	29	27	2	1	2	6	5	11	59
Organizational changes in primary production	18	9	16	2	0	3	4	2	10	36
Technological innovations upstream or downstream	9	6	4	0	0	1	2	3	9	20
Private institutional changes	12	4	21	2	6	17	7	16	6	46
Changes in the structure and organization of the value chain	40	17	43	28	4	11	3	23	14	89
Changes in rural-urban linkages	9	6	6	3	0	0	2	4	10	25
Investments in public goods and services	3	7	4	0	0	0	2	1	8	28
Other changes in governance	5	6	4	2	2	8	3	4	4	22
Others drivers	16	13	13	13	10	4	4	25	14	73
Total by effect	109	71	122	47	21	43	32	71	33	

Note: One document can be registered in two or more cells, in different rows and columns.

4. The structural transformation revisited

“ industrial and agrarian revolutions always go together, and ... economies in which agriculture is stagnant do not show industrial development.

Barrett et al., 2022, p. 1317 quote Lewis, 1954

A discussion of employment in agrifood value chains (AVC) must be framed in the context of the structural transformation (Hayami & Ruttan, 1989; IFAD, 2016; Johnston & Mellor, 1961; Losch et al., 2012; Timmer, 1988): rising agricultural productivity releases farm labor to work in other sectors of the economy and in cities. With rising income, demand for non-farm goods and services grows faster than demand for food. Local multipliers of non-tradable non-farm goods and services further stimulate economic growth, while the price of food drops and real incomes rise. Linkages between the farm and non-farm economies stimulate economic integration and a convergence in sectoral and spatial productivity and income gaps (Barrett et al., 2022, p. 1317 quote Lewis, 1954): *“industrial and agrarian revolutions always go together, and ... economies in which agriculture is stagnant do not show industrial development.”*

There are new ideas and findings in the literature that should lead to more nuanced expectations. Losch (2016, 2022) and Losch et al. (2012), for example, argue that three conditions of previous structural transformation processes made them unique and cannot be repeated today in Africa or much of Asia. First, the uncontested dominance of Europe and, later, the United States over global markets in the late 19th and early 20th centuries; second, the massive rates of migration from Europe to the New World in the same period, which would be inconceivable today; and; third, the fact that the Latin American and Asian transitions took place at a time when economic policy was characterized by protection, import substitution, and a very strong presence of the state in economic life.

According to national accounts, non-agricultural labor is more productive than agricultural labor by a factor of three, and this *“agricultural gap”* is larger in the Global South (Gollin et al., 2014). This large gap raises the question of why so many workers remain in agriculture, defying the predictions of neoclassical theory. The explanation is that controlling for human capital reduces the agricultural labor productivity gap by roughly one-third overall and by half in developing countries.

McCullough (2017) looks at the agricultural gap using micro-data from household surveys for Ethiopia, Malawi, Tanzania, and Uganda. *“I find that, in four Sub-Saharan African countries,*

the agricultural sector is not a bastion of low productivity but, rather, a large reservoir of underemployed workers” (McCullough, 2017, p. 134). Furthermore, she also finds a strong effect of human capital factors (education and gender of the work force in agriculture and in non-agriculture). Similarly, Hamory et al. (2021) find that in Indonesia and Kenya, the gap is reduced by 80% after accounting for individual fixed effects. Djido & Shiferaw (2018) conclude that the gap is largely reduced or almost disappears when the intensity of labor use is considered in comparing the per-hour productivity gap between farm and non-farm labor as well as between staples and high value crops in Uganda and Nigeria.

“ I find that, in four Sub-Saharan African countries, the agricultural sector is not a bastion of low productivity but, rather, a large reservoir of underemployed workers

McCullough, 2017, p. 134

As argued by Christiaensen & Maertens (2022, pp. 8-9), *“this suggests that differences in work opportunities between agricultural and non-agricultural workers, not intrinsic differences in productivity across sectors or places, explain much of the average agricultural labor productivity gap (consistent with the Lewis assumption of surplus labor) ... Given the seasonal nature of (rainfed) agriculture, most farmers do not work full-time year-round (De Janvry & Sadoulet, 2020). They are underemployed.”*

While there is some scope for achieving productivity gains through the transfer of labor from agriculture to non-agricultural sectors, the findings above question the magnitude of the benefits that workers can achieve in the process (Christiaensen & Maertens, 2022; McCullough, 2017). The gains (and the incentive) to the individual worker who makes the decision to move from one sector to the other may be less pronounced than the gains to the national economy from thousands of such individual decisions (Hamory et al., 2021). In the words of McCullough (2017, p. 149), *“small per-worker-per-year micro gaps also suggest that agriculture-sector workers do not feel as strong a ‘pull’ from industry and services as one might expect based on national accounts data.”*

Modeling a two-sector economy, Eberhardt & Vollrath (2018) look at the elasticity of output to labor for different sets of technologies. *“If the elasticity is low, then agricultural output is insensitive to the number of workers in that sector. A productivity increase makes it possible to release a large number of workers and still meet the demand for food ... In contrast, a large elasticity implies that agricultural output is very sensitive to the number of workers. Even with a productivity*

increase, few workers can leave agriculture without decreasing production below what is demanded. Hence high-elasticity economies do not shift as many workers out of agriculture and are able to produce fewer additional non-agricultural goods in response" (Eberhardt & Vollrath, 2018, p. 1). The authors find that agricultural technologies in temperate/cold zones, have low labor elasticities (on the order of 0.15), while those in use in equatorial and highland zones have much higher elasticities, from 0.35 to 0.55. Hence, as suggested by these authors, in the latter regions there is less room for structural change.

At the same time, the existence of a large pool of underemployed workers in agriculture, confirms that there is an excess of labor that could be used more productively in other sectors of the economy. From a policy perspective, the problem is how to stimulate demand for labor in both the farm and non-farm sectors, that is, across the whole agrifood system (AFS).

In summary, the classic narrative of the structural transformation is based on the European and U.S. experience in the 19th century and has been replicated, to some degree, in the 20th century in Japan, South Korea, and, more recently, in China and Vietnam.

Our view is that much of the Global South, including many middle- to high-income countries, are in a structural transformation "lite." It is "lite" because it is limited by the absence of a growing manufacturing sector (actually, most countries in the Global South are experiencing "premature deindustrialization" (Rodrik, 2016)) and by severe constraints on international migration on the scale seen, for example, in the European experience. The productivity gap between agriculture and other sectors is smaller than previously thought, not so much because the agricultural side of the equation is terribly productive, but because the productivity levels in the rest of the economy are also very low; beyond some East Asian countries, there are not many present-day Manchesters in the Global South.

The options for large numbers of underemployed farmers do not frequently imply a large jump in productivity: wage employment in agriculture, "refuge" self- or wage rural non-farm employment (see section 6), and informal wage- or self-employment in the post-farmgate segments ("hidden middle," section 7) of the AFS in rural areas and, to a greater extent, in towns and cities. The number of people who can enter or evolve into a livelihood based on highly productive jobs in manufacturing or services (even if informal) can be large in absolute terms but still represent a small share of the AFS workforce.

To be clear, it is a fact that there is an ongoing structural transformation; the aggregate numbers make that crystal clear (World Bank, 2008). It is also clear in the literature that there are many very dynamic regions and value chains throughout the Global South where more productive agriculture and non-agriculture AFS and non-AFS employment opportunities are growing rapidly. The pattern

is not uniform even within regions, as shown by Vos (2019) and Vos et al. (2021) in their discussion of the structural transformation across different Asian countries, which follow different pathways according to their particular initial conditions and political economies. Most of the literature identified for this review focuses on these bright dynamics. They coexist with situations in which, for millions, the options are to move from one low-productivity job to another, mostly within the AFS; these transitions are understudied.

5. Employment in AFS

Davis et al. (2023) estimate total employment in AFS and found that in 2019, 857 million people were employed (not necessarily full time or solely) in agriculture and another 208 million in non-agricultural AFS jobs, not including employment in AFS-related trade and transport. Asia represents 65% of these jobs, followed by Africa (23%), the Americas (8%), Europe (4%) and Oceania (0.1%). In Africa, there are nine times as many agricultural as non-agricultural jobs in the AFS, but the ratio is 4.7:1 in Asia, and around 1:1 in the Americas, Europe, and Oceania. AFS represents 53% of total employment in Africa, followed by Asia (40%), the Americas (18%), Oceania (13%), and Europe (11%).

The estimates by Davis et al. (2023), when including AFS-related trade and transport employment, add 167 millions workers to the non-agricultural jobs. Total AFS employment then jumps to 1.23 billion people. The regional distribution of this total of AFS jobs does not change significantly, but the ratios of agricultural to non-agricultural AFS employment do vary significantly when adding trade and transport: 3.4:1 in Africa, 2.6:1 in Asia, 0.7:1 in the Americas and Europe, and 0.5:1 in Oceania. AFS represents 62% of total employment in Africa, followed by Asia (40%), the Americas (23%), Oceania (17%), and Europe (13%).

Based on Davis et al. (2023), we see that as we move from low-income to high-income regions, AFS employment is less important in total employment, and non-agricultural AFS jobs grow in number and relative importance compared to agricultural employment. The first pattern is consistent with the theory of structural transformation (Timmer, 1988, 2009; World Bank, 2008), while the second reflects the importance of rural employment diversification and the growth of the non-agricultural AFS economy as countries develop (Barrett et al., 2022; Christiaensen et al., 2021; Haggblade et al., 2007; IFAD, 2016; Johnston & Mellor, 1961; Reardon, 2015).

Another analysis is that of Dolislager et al. (2020), who calculated the share of full-time equivalents (FTEs) in own-farm, farm-wage, post-farmgate AFS, and non-AFS employment, based on household surveys. In rural areas worldwide, 41% of FTEs are in the non-AFS sector, followed by 29% in own-farm employment, 20% in post-farmgate AFS, and 9% in farm wage employment. In urban settings, 72% of FTEs are in the non-AFS sector, followed by 25% in post-farmgate AFS, and 2% in on-farm and farm-wage employment. In the

two types of areas, post-farmgate AFS employment, at 22%, is almost as important as the sum of own-farm (20%) and farm-wage (7%) employment.

The share of post-farmgate employment increases and that of farm employment decreases as one moves from Africa to Asia to Latin America. In Africa, FTEs in agriculture (the sum of own-farm and farm wage FTEs) are 37%, while post-farmgate AFS FTEs are 25% of all FTEs. In Asia, the proportions are 28% and 21%, and in Latin America they are 14% and 22%, respectively. As expected, in all regions, post-farmgate AFS FTEs are more important in urban than rural areas, although in Latin America the difference is minimal, at 22% of urban FTEs and 21% of rural FTEs. Table 1 presents more detailed data from Dolislager et al. (2020).

A third analysis is that of Thurlow (2021), who has estimated the gross domestic product (GDP) and employment in the agrifood system, using data from national accounts and ILO employment statistics. Thurlow's analysis includes primary production (Agricultural GDP and employment), agrifood processing, trade and transport, food services and hotels, and input suppliers. He can compare agricultural GDP and employment with their agrifood system counterparts (which he calls AgGDP+ and AgEMP+). Globally, AgGDP+ is 9.7%, more than double AgGDP, which is 4%. AgGDP+ is 46.4% and AgGDP is 28% in low-income countries, 29.1% and 17% in lower-middle-income countries, 13.9% and 7% in upper-middle-income countries, and 5.7% and 1% in high-income countries. This shows that the post-farmgate component of agrifood system GDP increases with national per-capita income. The same pattern is confirmed in Thurlow's analysis

of employment: the share of post-farmgate (or non-agricultural) employment in the agrifood system increases with national per-capita income; for example, it is 10.8% in Ethiopia, 19.3% in Pakistan, 41.3% in Mexico, and 68.2% in France.

Consistently, as Table 2 shows, the share of the labor force employed in agriculture⁵ in the world fell 17 percentage points, to 26.8%, in a 28-year period up to 2019. All regions show a negative trend in the share of agricultural employment. This is more pronounced in OECD countries, followed by East Asia and the Pacific, the Middle East, and North Africa, low- and middle-income countries, and Europe and Central Asia, excluding high-income countries, in all of which agricultural jobs were lost at faster rates than the world average. Losing agricultural employment share at slower rates than the world average in the 1991-2019 period, we have Latin America and the Caribbean, followed by South Asia, and, slowest of all, Sub-Saharan Africa, which went from 64.5% to 52.9%.

However, the trends are not the same if one looks at the number of people employed in agriculture, as opposed to the share. According to Roser (2023), the number of people in the world employed in agriculture peaked in 2003 at 1.12 billion; since then, as seen in Table 3, the number has been falling, to 927.9 million in 2019. Between 1991 and 2019, East Asia and the Pacific led the world in reducing the number of agricultural jobs, followed by Europe and Central Asia (excluding high-income countries), OECD member countries, and the group of low- and middle-income countries. However,

Table 1. Shares of full time equivalents

		Total Sample			Africa			Asia			Latin America		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
All Working Age	Own-farm	2	29	20	6	39	34	2	27	19	0	16	8
	Farm wage	2	9	7	1	3	3	2	13	9	1	12	6
	AFS (post-farm)	25	20	22	31	24	25	27	18	21	22	21	22
	Non-AFS	71	41	51	62	34	39	68	43	51	77	50	64
Adults	Own-farm	2	29	20	5	36	31	3	2=	20	0	17	8
	Farm wage	2	9	7	1	3	3	2	13	9	1	11	6
	AFS (post-farm)	25	20	22	31	24	25	26	17	20	21	21	21
	Non-AFS	72	42	52	62	37	41	69	42	51	78	51	65
Youth	Own-farm	2	30	22	11	51	46	1	19	14	0	12	7
	Farm wage	1	10	7	1	4	3	2	13	9	1	16	9
	AFS (post-farm)	29	21	24	29	21	22	32	21	25	26	23	24
	Non-AFS	69	39	41	59	25	29	64	47	52	73	49	60

Source: Table 3 in Dolislager et al. (2020)

5 Here defined as all types of employment in crop and livestock production, forestry, hunting, and fishing. All data in this paragraph are from (Roser, 2023).

Table 2. Share of the labor force employed in agriculture, 1991-2019 (percentage of total employment)

Groups of countries	1991	2019	Difference (percentage points)
Sub-Saharan Africa	63.45	52.87	-10.6
South Asia	62.51	41.83	-20.7
Low and middle income	53.21	32.09	-21.1
World	43.70	26.76	-16.9
Middle East and North Africa	29.03	14.75	-14.3
Europe and Central Asia (excluding high-income countries)	23.85	14.21	-9.6
Latin America and the Caribbean	21.11	13.51	-7.6
OECD	8.60	4.80	-3.8

Source: The authors, with data from Roser (2023)

Table 3. Number of people employed in agriculture, 1991-2019

Groups of countries	1991 (Million)	2019 (Million)	Change (Million)	Change (%)
World	1003.00	927.92	-75.1	-7.5%
Low and middle income	996.87	910.99	-85.9	-8.6%
East Asia and the Pacific	512.63	310.21	-202.4	-39.5%
South Asia	257.36	282.55	25.2	9.8%
Sub-Saharan Africa	127.03	226.69	99.7	78.5%
OECD	44.97	32.66	-12.3	-27.4%
Europe and Central Asia (excluding high income)	42.16	27.16	-15.0	-35.6%
Latin America and the Caribbean	37.08	42.53	5.5	14.7%
Middle East and North Africa	20.76	22.48	1.7	8.3%

Source: The authors with data from Roser (2023)

there was impressive growth in agricultural employment in Sub-Saharan Africa, followed by Latin America and the Caribbean, South Asia, and the Middle East and North Africa.

As shown, the general trends are clear: AFS represent a significant and major employer in the world; on-farm work accounts for the larger share of AFS employment but with a downward trend, with large variations among regions and country income levels, while non-farm jobs are growing significantly in all regions.

6. Rural employment diversification

"Diversification is the norm" (Barrett, Reardon, et al., 2001, p. 315). Davis et al. (2010, p. 56) concur: *"household diversification, not specialization, is the norm. ... Not only are most rural economies highly diversified, but rural households are as well."*

According to Haggblade et al. (2010), at around the turn of the century, non-farm rural employment represented approximately 30% of full-time employment in Asia and Latin America, 20% in West and North Africa, and 10% in Asia. If one includes small towns, non-farm employment would add another 10% to 15% or so. Based on data for 13 countries over a period of 10 to 20 years, rural employment in manufacturing grows by about 1% per year, while rural employment in commerce and services increases at about three times that rate (Haggblade et al., 2007). In all regions, the largest non-farm employment sectors are personal services, followed by trade and transport in all regions except West Asia and North Africa (manufacturing), and then by manufacturing. Since wages and incomes are higher in the non-farm sector, these authors find that the non-farm share of rural income is 34% in Africa, 47% in Latin America and the Caribbean, and 51% in Asia.

Davis et al. (2010) published an analysis based on data for 16 countries across regions and per-capita GDP levels. They find a mean share of 40.3% of non-agricultural income over total rural income, ranging from 23% (Malawi, 2004) to 79.5% (Bulgaria, 2001); there is also a very clear positive correlation between this share and per-capita GDP in this group of countries. These authors report that most rural households diversify their sources of income. Off-farm income is particularly high in the Asian, Eastern European, and Latin American countries included in the data set, while the share of on-farm income in African countries ranges from 59% to 78% of total income. The share of agricultural income declines clearly with increasing GDP per capita, with the 50% threshold being found at per-capita GDP of around USD 2,500 to 4,000 in this limited set of countries.

Numerous country studies confirm the patterns described above. Special editions of leading journals have been published on rural non-farm employment and incomes in Latin America (Berdegúe et al., 2001; De Janvry & Sadoulet, 2001; Deininger & Olinto, 2001; Escobal, 2001; Ferreira & Lanjouw, 2001; Graziano da Silva & Del Grossi, 2001; Lanjouw, 2001; Ramirez, 2019.; Reardon et al., 2001; Yunez-Naude & Taylor, 2001) and in Africa (Abdulai & Crolerees, 2001; Barrett, Bezuneh, et al., 2001; Barrett, Reardon, et al., 2001; Block & Webb, 2001; Canagarajah et al., 2001; Lanjouw et al., 2001; Smith et al., 2001; Woldenhanna & Oskam, 2001).

There also are numerous⁶ stand-alone, country-specific articles, such as Paudel et al. (2022) for Myanmar, Van Hoyweghen et al. (2020) for Senegal, and Tabe-Ojong et al. (2023) for Cameroon, or Valdés & Foster (2010) for Latin America. A few examples from Asia, Latin America and the Caribbean are briefly discussed below.

The World Development Report 2008 recognizes the rural non-farm economy as one of the “*three pathways out of poverty*”⁷ (World Bank, 2008). Studies have quite consistently reported that non-farm employment leads to higher household income, compared with households not engaged in these activities. This has been found in countries and regions as diverse as Brazil (Graziano da Silva & Del Grossi, 2001; Lanjouw et al., 2001), Chile (Berdegúe et al., 2001), East Africa (Hammond et al., 2023), El Salvador (Lanjouw, 2001), Ethiopia (Woldenhanna & Oskam, 2001), Mexico (De Janvry & Sadoulet, 2001), Myanmar (Paudel et al., 2022), Nigeria (Haggblade et al., 2010) Peru (Escobal, 2001), Senegal (Van Hoyweghen et al., 2020), Tanzania (Lanjouw et al., 2001), Vietnam (Liu et al., 2020), and, more generally, in Africa (Barrett, Reardon, et al., 2001) and Latin America (Reardon et al., 2001).

“ The World Development Report 2008 recognizes the rural non-farm economy as one of the “*three pathways out of poverty*”

The article by Liu et al. (2020) on Vietnam is a particularly clear illustration of the very rapid dynamics of rural employment and income diversification as countries undergo a structural transformation. The following is from this article:

The share of households engaged in agriculture fell from 83.5% in 1992 to 62.9% in 2016. ... The share of individual workers employed in agriculture declined from 48.4% to 39.4% from 2007 to 2016. ... The fact that these shares are far less than the proportion of agricultural households signals that even agricultural households have long diversified their earnings portfolios across sectors ... The mean share of farming household members who are full-time farmers or farm workers, defined as 35 hours or more per week spent working in agriculture ... accounted for 16.7% of total household members in 2002, declining to 9.0% in 2016. ... Even among the members engaged in farming, full-time farmers only accounted for 31.2% in 2012 and 16.0% in 2016. ... In 1992, only 4.6% of farming household members had non-farm work paying a wage; by 2016, that number had climbed to 16.6%, surpassing the proportion employed in farming. ... The share of farming households with a member earning non-farm wages increased from 16.8% in 1992 to 44.4% by 2016. ... In 1992, 37.6% of farming households were also engaged in non-farm self-employment, but that share declined steadily over time to 26.9% in 2014–2016. ... The share of farming household members employed in (wage or self-employed) non-farm activities grew from 17.4% to 26.5% over the 1992–2016 period. ... [F]rom 2002 to 2016, the median share of rural households’ income from agriculture declined from 0.465 to 0.197; and the median share of wage income increased sharply from 0.076 to 0.345. Since 2010, wage income has represented a larger share of median rural household incomes than agricultural earnings do. This figure perhaps best represents the dramatic structural transformation of the rural Vietnamese economy over this period, as agriculture has become less important as an employer and as a source of income for households even as its productivity has increased sharply and the use of modern inputs that boost labor productivity—e.g., fertilizers, improved seeds, machinery, pesticides—has increased rapidly.

Paudel et al. (2022) surveyed Myanmar rural households and found that a majority participated in the rural non-farm economy, 45% of them in the trade sector (ranging from food wholesales to car dealerships). As in other regions, a large majority (67% in the Myanmar survey) of the non-farm businesses are microenterprises with only one worker, and 88% employ only family labor. In India, rural non-farm employment expanded rapidly along the transport corridors linking agricultural areas to urban centers (Haggblade et al., 2010), and many of the new SME providing those new jobs were in activities independent of agriculture. Also in India, Rajkhowa & Qaim (2022) found that mobile phone ownership

6 Scopus includes 1,125 articles with the keywords “non-farm” or “off-farm,” published since the year 2000.

7 Agriculture and migration are the other two.

is correlated with participation in different forms of off-farm employment, the association being stronger in female-headed than in male-headed households.

In Latin America and the Caribbean, an average of 36% (range from 18% to 57%) of rural men from 11 countries participated in rural non-farm employment, compared to an average 71% of rural women (range from 16% to 93%); in 10 of the 11 countries women were far more involved than men in the rural non-farm economy, in most cases by a factor of two, or even three (Reardon et al., 2001). Households in Mexican ejidos⁸ have on average one member employed in non-farm activities. Small-scale trade is found to be the main non-farm self-employment occupation (De Janvry & Sadoulet, 2001). In Chile, Berdegú et al. (2001) found a slightly higher percentage of “*multiactive*” households (i.e., those generating income from both agricultural and non-agricultural employment) in poorer rural areas than in richer ones. In Brazil, the diversification process is so advanced that Graziano da Silva & Del Grossi (2001) write about “*the urbanization of rural Brazil*,” the number of farm households deriving their income purely from agriculture dropped significantly, while their income became lower than that of “*multiactive households*.”

In a study of two districts in Uganda (Smith et al., 2001), the very poor households were unable to engage in non-farm employment, while those that were better off were active in different non-farm activities, from sales of alcohol and cooked food to carpentry and construction to fish trading. Households with the highest levels of income diversified into services such as lodging, restaurants, and bars, which required a certain level of capital investment and had some potential to offer employment beyond the individual owner. In contrast with what is observed in Latin America, men had greater participation in non-farm employment. In Tigray region in Ethiopia, 81% of the surveyed households participated in off-farm employment, with wage employment being far more frequent than self-employment (Woldenhanna & Oskam, 2001a).

There is much heterogeneity in the types of jobs included in the concept of non-farm rural employment, and not all of them have the same potential to lift people out of poverty, as shown by the fact that non-farm employment tends to be very high among the rural landless and smallholders living in poverty and in marginalized territories (Davis et al., 2010; Haggblade et al., 2007; Reardon, 1997; Reardon et al., 2001).

The decision of specific rural households to diversify is contingent on the characteristics of the functional territory in which they live and work, as well as on their assets and incomes (Barrett, Reardon, et al., 2001; Reardon et al., 2001), or the sets of household capacities and incentives (Reardon et al., 1999). These include agricultural growth, as modern agriculture typically requires additional inputs and services (and, thus, companies and workers providing them), and also

because higher agricultural labor productivity and rising incomes fuel demand for non-food goods and services (Fox & Signé, 2021; Haggblade et al., 2010). Haggblade et al. (2010) report that an increase of \$1 in agricultural value added generates between \$0.60 and \$0.80 of additional non-farm income in Asia and between \$0.30 and \$0.50 in Latin America. Urbanization and population and income growth also stimulate rural employment and income diversification, through the expansion of food demand and dietary change towards more nutrient-dense diets, which are associated with a rising demand for transport, logistics, agro-processing, and food retail (Barrett, Bezuneh, et al., 2001; Barrett et al., 2022; Fox & Signé, 2021; Haggblade et al., 2010; Reardon et al., 2001).

On the other hand, missing or incomplete factor markets and high levels of vulnerability and risk, reactions to crisis, and low levels of household income are also important drivers of diversification, which is why many studies coincide in finding that poor rural households, particularly when far from urban centers and in agriculturally depressed territories, often are more dependent on non-farm and non-agricultural income than their more affluent counterparts in more dynamic places proximate to towns and cities.

Incentives can be associated with “*pull factors*,” where non-farm employment is an attractive pathway for more rewarding activities and higher incomes, but also to “*push factors*,” where non-farm employment is a less bad option that may provide an important but not transformative livelihood improvement (Barrett, Reardon, et al., 2001; Djido & Shiferaw, 2018; Haggblade et al., 2010; Jayne et al., 2014; Reardon et al., 1999, 2001). The literature recognizes that these factors translate into two broad types of rural non-farm employment: one which is more productive and normally translates into higher income and improved welfare, and another that has been called “*refuge non-farm rural employment*” (Reardon et al., 2001), which is part of survival strategies of rural households who are trapped in a cycle of low-productivity jobs and low income. Examples⁹ of the former are formal employment for rural women in for food processing in Sub-Saharan Africa (Maertens & Fabry, 2019; Maertens & Swinnen, 2012), while the latter is exemplified by casual work as street vendors in poor municipalities of Chile (Berdegú et al., 2001). Jayne et al. (2014) argue that much RNFE in Africa is of the “*refuge*” type driven by “*push*” factors and characterize the expansion of this type of non-farm jobs as due to “*an agricultural involution*” leading to a “*bleak, downward spiral*” (Geertz, 1963, cited in Jayne et al., 2014a).

As Christiaensen & Maertens (2022) argue for Africa, though it is valid for other regions as well, an important share of non-farm employment is generated directly or indirectly by the expansion of post-farmgate economic activities in AFS. These authors give the example of Ethiopia, Malawi, Nigeria, Tanzania and Uganda, where around 40% of non-farm employment is found in food processing, food trade,

8 Institutions for agricultural production created by the Agrarian Reform.

9 The examples are chosen on purpose to clarify that these contrasting types of rural non-farm employment are not dependent on economic development at the country level, but much more on specific opportunities at the territorial level, as well as on the households’ assets.





and food services. These non-farm jobs, related to expanding agrifood systems, are mostly “pull non-farm employment,” and are of better quality and higher productivity than those found in areas with stagnant agrifood economies (Barrett, Reardon, et al., 2001; Reardon et al., 1999, 2001).

Determinants of access to high-return, high-productivity RNFE include land size and quality, proximity to urban centers and markets, education and gender of the worker, family size, ethnicity, and access to capital (Barrett, Reardon, et al., 2001; Davis et al., 2010; De Janvry & Sadoulet, 2001; Haggblade et al., 2007; Hammond et al., 2023; Paudel et al., 2022; Reardon et al., 2001). Jayne (2014) find that in Africa rural non-farm income shares are only marginally sensitive to population density. De Janvry & Sadoulet (2001) found that in Mexico indigenous adults had less access to off-farm non-agricultural employment than non-indigenous adults, controlling for education.

Several studies show that women participate more in non-farm employment (Barrett, Reardon, et al., 2001; Haggblade et al., 2007; Reardon et al., 2001), while at the same time being female has a negative effect on remuneration and working conditions (see section 10 of this report).

Proximity to an urban center (particularly to small and medium towns) and to the services and markets located in them, is a very important determinant of access to non-farm and non-agricultural employment opportunities (Berdegúe et al., 2014; Christiaensen & Maertens, 2022). As countries urbanize and rural roads improve and given the fact that most rural people in many regions of the developing world live close to at least one town or city, it will be increasingly frequent that rural people (defined by the place in which they live) hold formal or informal urban non-agricultural jobs (Berdegúe et al., 2014; Christiaensen & Maertens, 2022). Cazzuffi et al. (2017) have shown that the strong poverty-reducing effect of small and medium food processing firms located in decentralized small and medium cities, as centers of rural-urban functional territories.

Landless and near-landless households depend on non-farm income, often to a significantly higher extent than better endowed households (Haggblade et al., 2010). Households with less than 0.5 ha of land derive between 30% and 90% of their total income from non-farm activities¹⁰ (Hazell & Haggblade, 1993 cited in Haggblade et al., 2010). In both Latin America (Berdegúe et al., 2001) and Africa (Barrett, Reardon, et al., 2001), authors have reported the paradox that those with the greatest need to increase their income through high-productivity non-farm activities have the least capacity to gain access to them, driving a “vicious and self-reinforcing circle of unequal distribution of land and non-farm earnings” (Barrett, Reardon, et al., 2001, p. 324)

¹⁰In the case of poor and very poor households, however, one needs to be careful in interpreting high shares of non-farm income over total household income. The high share is frequently the result of a very low denominator rather than a large numerator (Berdegúe et al., 2001).

7. The “hidden middle”

The large pool of underemployed workers in agriculture, discussed in Section 6, represents an opportunity for the growth of the so-called “hidden middle,” that is, the midstream segments (processing, logistics, and wholesale) of AVC (Reardon, 2015). The expansion of the “hidden middle” is associated with a rise in employment in the services and manufacturing sectors (Barrett et al., 2022; Reardon et al., 2021). Large numbers of relatively labor-intensive SME operate in this part of the value chain (Reardon, 2015) and can play an important role in AFS transformation and development strategies (Christiaensen et al., 2021). This “hidden middle” expansion puts pressure on agricultural and rural labor markets, driving labor-saving technologies, such as mechanization and herbicides. In the context of incomplete capital markets, non-farm income can finance these technological changes in agriculture (Reardon et al., 2014).

The expansion of this “hidden middle” of AFS generates large numbers of more productive and better-paid jobs. As of 2019, an estimated 375 million people work in off-farm AFS around the world. Non-farm AFS workers represent around 9% to 10% of total employment in high-income and upper-middle-income countries, 16% in lower-middle-income countries, and 13% in low-income countries. Within AFS, non-farm employment represents a growing share of total employment at all country income levels. Between the years 2000 and 2019, the share of AFS non-farm employment grew from 12% to 17% in low-income countries, from 24% to 30% in lower-middle-income countries, from 16% to 30% (the larger increase) in upper-middle-income countries, and from 68% to 76% in high-income countries (Davis et al., 2023).

In 2019, there were more non-agricultural than agricultural AFS jobs in Europe and Oceania, while in the Americas, non-farm jobs account for nearly half of AFS jobs, even without considering trade and transportation.¹¹ These shares have grown steadily since the year 2000 (Davis et al., 2023).¹² When adding transportation and trade to non-agricultural AFS, by large these “hidden middle” activities employ more than half of the workers in AFS in Europe, Oceania, and the Americas. Women, which account for 38% of all agricultural workers in primary production, represent 41% of all workers in the off-farm segments of all agrifood systems globally (FAO, 2023) and youth employment in off-farm activities within AFS increases as young workers get older up to around the age of 30 (Abay et al., 2021; Christiaensen & Maertens, 2022).

The hidden middle jobs represent a relevant share of rural employment. For example, in Sub-Saharan Africa and low-income Asian countries, 25% of total rural employment is found in food wholesale, logistics, processing, and retail (FAO & ITU, 2021). Based on the estimates by Dolislager et al. (2020), non-agricultural FTE jobs in AFS represent 22% of total jobs, 25% of jobs in urban centers and 20% of jobs in rural settings.¹³

Consistently, Christiaensen et al. (2021) point out that off-farm work in total AVC employment, rises with income, from 9% in Eastern and Southern Africa to 52% in Brazil and 80% in the United States, while AVC employment as a share of total labor in the economy moves in the opposite direction.

Several studies show how dynamic and diverse the hidden middle is. According to Shukla (2019), in India the number of employees in registered food-processing firms grew 10% in one year, from 2014 to 2015; beyond that, the non-registered food processing sector employs 27 times more workers than the registered firms, accounting for almost 14% of total manufacturing employment in that country. In West Africa, two-thirds of the population is employed in the AFS, and while most jobs are still in agriculture, employment in food processing and food services is expanding, driven by urbanization and population and income growth (T. Allen et al., 2018). For Nigeria, the projection in 2012 was that employment in food processing would grow by 13% over five years (T. Allen et al., 2018; Tschirley et al., 2016). Much of this non-agricultural AFS employment is held by urban households; this is the case of 66% of food trade and away-from-home food consumption in Ghana, Senegal, and Côte d’Ivoire, and 52% in Malí, Níger, and Burkina Faso (T. Allen et al., 2018).

Dorosh & Thurlow (2018) confirm that, as a whole, poverty-growth elasticities are higher for agriculture than for non-agriculture in their models for five African countries. At the same time, they find that elasticities for agro-processing and trade and transport are often as high as, or higher than, those of agriculture, highlighting the opportunities for poverty reduction that can be created by the expansion of the “hidden middle.”

As stated by Reardon (2015), the growth of the “hidden middle” is driven by private sector investment (domestic, but increasingly also foreign) by firms of all sizes and is facilitated by organizational and technological changes at the farm level, as well as in food retail. Market liberalization policy reforms spur this process, which is characterized, at least initially, by rapid growth in SME in the midstream segments. Labor-intensive SME are dominant at least in the earlier stages of development of these midstream segments of AVC (Barrett et al., 2022), but capital/labor ratios tend to increase during transformation, as public and private standards become more important and growing private foreign and domestic investment drives consolidation and concentration, allowing investments in technologies that are out of reach for smaller firms (Hernandez et al., 2018; Reardon et al., 2014). Public and private standards (usually starting with food safety laws, but also including ethical and environmental standards) encourage the consolidation of SME, as many small firms are unable to meet them and are squeezed out.

11 The share of non-farm employment in total AFS employment for 2019 was 10% in Africa and 16% in Asia (Davis et al., 2023).

12 Between 2000 and 2019, non-farm employment as a share of total AFS employment grew from 6% to 10% in Africa, 42% to 48% in the Americas, 10% to 16% in Asia, 38% to 52% in Europe, and 45% to 51% in Oceania (Davis et al., 2023).

13 See Table 1 in Section 4.

While employment in non-farm segments of the AFS is expanding rapidly as a percentage, in absolute terms, non-farm activities remain the main source of off-farm employment in the African, Asian, and Latin American regions (Dolislager et al., 2020). In the case of Africa, Allen et al. (2016) note that non-farm employment in the agrifood system is growing much faster, in percentage terms, than employment in agriculture, but this growth starts from a lower base, and the contribution to new jobs in off-farm employment is therefore lower than that of agriculture, implying that non-farm employment in the agrifood system will not match agricultural employment in absolute terms for at least a decade.

As mentioned, the early stages in the development of the non-agricultural segments of AFS tend to involve a large number of labor-intensive SME (FAO & ITU, 2021; Reardon et al., 2021). The shares of SME in total AFS full-time equivalent rural employment are 24% in Sub-Saharan Africa, 21% in Asia, and 18% in Latin America (Reardon et al., 2021). The SME share over total full-time equivalent urban AFS employment is 31% in Sub-Saharan Africa, 27% in Asia, and 22% in Latin America (Reardon et al., 2021). However, in Asia and Latin America, there is a negative association between AFS employment and distance to urban centers (Reardon et al., 2021).

Because a portion of jobs and SME in the “hidden middle” operate in peri-urban and urban centers, and because some of them depend on, or are linked to, primary production, the more fluid rural-urban linkages are, the better. Infrastructure, including roads and communications, and service development are at the base of such linkages. The deterrence of distance outweighs the attraction of higher wages and income, mainly for the most vulnerable (De Weerd et al., 2021, cited by Christiaensen & Maertens, 2022). Because of their proximity and functional interactions with their rural hinterland, towns and small and medium cities are important sources of employment opportunities for rural people, especially those who lack the resources and skills to migrate to larger but more distant urban centers (Christiaensen & Maertens, 2022). As stated by (Christiaensen & Maertens, 2022): “On-site rural employment generation alone will not be sufficient to absorb all new labor market entrants and generate good jobs for all.” While migration is thus a necessary option, it is also one which is more available, and more rewarding, for youth with more assets and skills (Young, 2013, cited by Christiaensen & Maertens, 2022). Cazzuffi et al. (2017) have shown the poverty-reducing effect of SME actors in

decentralized towns and small and medium-size cities that interact closely with agricultural producers and households in their hinterland.

Jobs and SME within the “hidden middle” are highly heterogeneous, from large, high-tech firms, to SME, to small-scale vendors selling fresh fruit on the street in any city in the world. Nevertheless, there is not enough analysis of its composition. Because of this limited evidence, studies are still analyzing the hidden middle as a broader concept (a black box), rather than trying to study or discuss specific groups within the “hidden middle.”

Within this broad, heterogeneous, and expanding “hidden middle,” employment opportunities could be also varied, from high-paid formal jobs in large firms to informal, seasonal, precarious income-generating opportunities for low-skilled workers, such as street food vendors. Jobs in this “hidden middle” represent attractive opportunities for low-productivity agrifood producers and their families, sometimes as an upgrade option that offers more income, better working conditions, or a pathway to employment outside of agricultural primary production (or outside of non-paid work in family agricultural plots), but also as refugee employment when no other options are available. These different pathways for entry into the “hidden middle” demonstrate that both low-productivity can be and high-productivity jobs can be found. The “hidden middle” employs different types of rural and urban citizens.

8. Intensification, automation, and digitalization

Agricultural intensification and commercialization, together, have been a core objective of development policies, and they are seen as one of the main pathways for lifting hundreds of millions of people out of poverty.¹⁴

The Green Revolution transformed agriculture worldwide, through the policy-driven promotion of the high yielding cereal varieties by Norman Borlaug and Yuan Longping and their collaborators and followers, packaged with an intensive use of agricultural machinery, synthetic fertilizers and pesticides, particularly in irrigated environments. Between 1961 and 2020, global average maize yields went from 1.94 tons/ha to 5.75 tons/ha; wheat from 1.09 tons/ha to 3.47 tons/ha; and rice from 1.87 tons/ha to 4.61 tons/ha.¹⁵ Ritchie and Roser¹⁶ estimate that the area of arable land needed to produce a fixed quantity of food was cut off by 70% between 1961 and 2014. The number of victims of famines dropped from 16.6 million in the 1960s to 255,000 in 2010-16.¹⁷

14 At the same time, it must be remembered that agricultural intensification has been and continues to be a main driver of environmental degradation (including deforestation and biodiversity loss, soil degradation, and pollution of groundwater and rivers) and a major source of the greenhouse gases that cause climate change.

15 Data from Hannah Ritchie, Pablo Rosado, and Max Roser (2023), “Agricultural Production.” Published online at OurWorldInData.org. Retrieved from: “<https://ourworldindata.org/agricultural-production>”

16 Hannah Ritchie and Max Roser (2013), “Land Use.” Published online at OurWorldInData.org. Retrieved 11 March 2023 from: “<https://ourworldindata.org/land-use>”

17 Data from Joe Hasell and Max Roser (2013), “Famines.” Published online at OurWorldInData.org. Retrieved 11 March 2023 from: “<https://ourworldindata.org/famines>”

Dedieu et al. (2022) argue that OECD countries increased agricultural productivity through higher yields and larger areas farmed per worker (which require more capital-intensive forms of agriculture). On the other hand, as shown in Figure 2 (from Dorin, 2022, cited in Dedieu et al., 2022, p. 6), increases in yields between 1961 and 2007 in Asia, Sub-Saharan Africa, the Middle East and Northern Africa, and Latin America have not been accompanied by significant increases in land farmed per worker (Muyanga & Jayne, 2014). Nevertheless, Vos (2019) and Vos et al. (2021) show that within the broad regional pattern, there are country-specific variations, as when comparing, for example, India and Malaysia. The findings by Muyanga & Jayne (2014) for Kenya confirm that labor productivity increases with rising population density and decreasing amounts of land per person, at least up to a certain level of population density. Baležentis et al. (2021) confirm the same general pattern in China, where an impressive increase of 6.1% per year in agricultural labor productivity is largely explained by a decrease in the number of workers, made possible by an increase in labor-saving technologies such as mechanization, fertilizers, and pesticides (on top of improved varieties that are more responsive to these inputs, we would add).

Increased productivity from agricultural intensification should eventually lead to rising wages and income in agriculture and in the AFS, but only when there is no longer a labor surplus (Christiaensen & Maertens, 2022). While the structural transformation should reduce labor surplus in the agricultural sector, this is a process that can take considerable time, particularly in regions with high rates of population growth and limited options for employment outside agriculture, as observed most prominently in Sub-Saharan Africa. This delay explains why labor-intensive and more productive sectors can expand significantly, with slow increases in real wages, as in the export horticulture sector in Senegal or Kenya (Fibaek, 2021; Maertens & Fabry, 2019, cited by Christiaensen & Maertens, 2022). Hence, market mechanisms will not result in significantly higher wages and better working conditions in the early stages of the structural transformation as long as there is a large labor surplus in rural areas (Christiaensen & Maertens, 2022).

As a general trend, and across widely different settings and circumstances, intensification increases agricultural and labor productivity (Hunt, 2000). We know that the rise in production per hectare since the 1960s was accompanied by

fewer people working in agriculture in the world, although as discussed in Section 5 of this document, the number (but not the share) of agricultural producers and workers increased in Sub-Saharan Africa, Latin America, South Asia, and North Africa and the Middle East. Land used for crop production and pastures has remained nearly constant for the past 60 years (4.47 billion ha in 1961 to 4.71 billion ha in 2019, after a high of 4.88 billion ha between 1999 and 2001¹⁸).

While many studies have evaluated different impacts of the Green Revolution (among others, Evenson & Gollin, 2003; Graber et al., 2005; P.L. Pingali, 2012; P. Pingali & Rosegrant, 1994), to our knowledge the increase in agricultural labor productivity due specifically to adoption of improved varieties and synthetic inputs from the Green Revolution has not been estimated. Nevertheless, Cock et al. (2022) argue that “labor productivity has increased faster than yield in the Global North: from 1911 to 2000, yield in the USA increased fivefold while labor productivity increased fifteenfold” (Alston et al., 2009). “The pattern of greater increases in labor productivity than in yield has not occurred in the Global South” (Benin & Nin-Pratt, 2016).¹⁹

The data of Fuglie (2015) and Fuglie et al. (2019a Table 1.1 p.17) are perhaps the best estimates of increases in output per worker and the share of that change that is due to rising Total Factor Productivity.²⁰ According to these authors, between 2001 and 2015, average annual output per worker and the share of that due to Total Factor Productivity, for different regions, are as follows: Latin America: 3.67% and 52.3%; Asia (except West Asia): 4.23% and 61.6%; West Asia-North Africa: 2.39% and 80.0%; Sub-Saharan Africa: 0.74% and 53.4%, and all developing countries: 3.49% and 55.2%. Exceptional cases are those of China (7.14% and 48.6%) and Brazil (6.00% and 46.7%).

In high-income and upper-middle-income countries, this process has driven the marginalization of small-scale family farmers, as “the agricultural landscape in developed countries is dominated by agribusiness and large farming operations” (Bowman & Zilberman, 2013). In addition, millions of smallholder family farmers have not wanted and/or have not been able to adopt the agricultural intensification and modernization strategy of the Green Revolution.²¹ Some authors estimate that up to two-thirds of farms in the world depend on basic tools and about one-third have access only to animal traction (Losch, 2016, cited in Dedieu et al., 2022, p. 7)

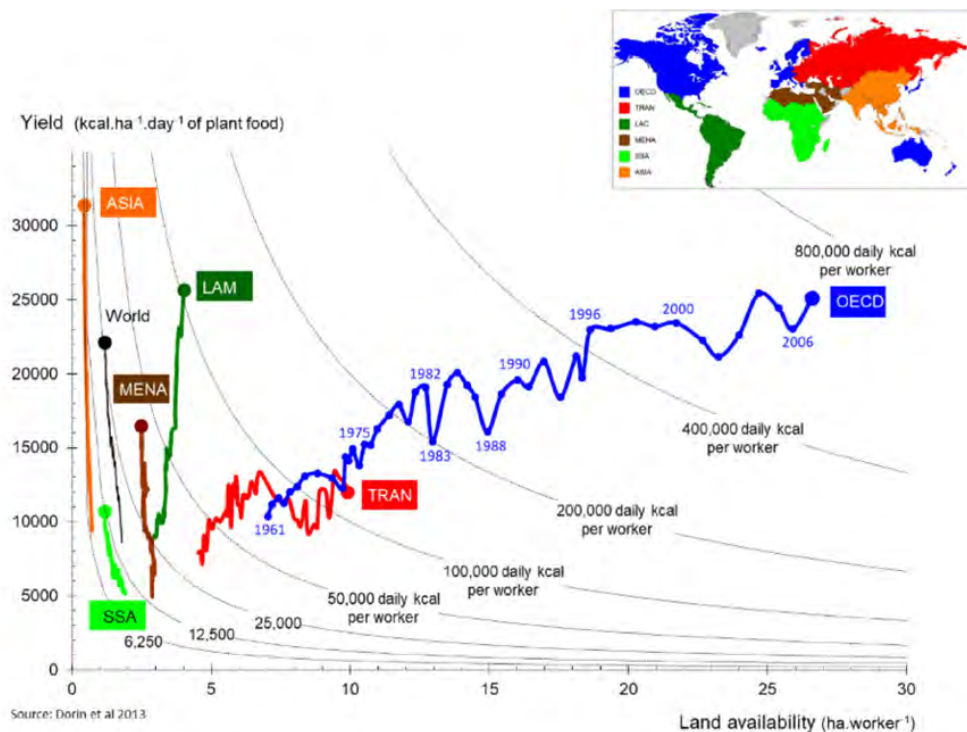
18 Data from Our World in Data, Land Use, <https://ourworldindata.org/land-use>; consulted on 11 March 2023.

19 A recent bibliometric review of 343 articles on value chain and employment, indexed in the Web of Science (Malanski et al., 2022), did not find labor productivity as one of the salient research domains. In general, labor productivity is not a commonly used outcome variable in analysis of household surveys in developing countries, as it is quite time-consuming to collect information on the allocation of labor across activities for different household members. There is also the question of whether respondents can recall the number of hours spent on each activity over the recall period. As a result, the shortcut approach is to measure overall income in each alternative (with vs. without contract farming or with vs. without another intervention), implicitly assuming that total labor input is the same between the two alternatives. The assumption of equal labor input is more reasonable when the crop being grown is the same; Nicolas Minot, personal communication, 7 March 2023.

20 The USDA Economic Research Service updates these data in their International Agricultural Productivity web page <https://www.ers.usda.gov/data-products/international-agricultural-productivity/>

21 Losch (2022), based on Mazoyer (2001), estimates that roughly 65% of farmers have adopted Green Revolution seeds and synthetic inputs to some degree. That would leave around 213 million farms bypassed by the Green Revolution.

Figure 2. Dynamics of growth in agricultural labor productivity, 1961-2007



Source: Figure 2 in (Dorin, 2022)

Agricultural intensification technologies and labor productivity

Our literature review allows us to identify five sets of agricultural intensification technologies that have been proven to increase labor productivity under certain circumstances:

1. Mechanization. Ibarrola-Rivas et al. (2016) estimate the amount of labor needed to produce the same amount of food, comparing mechanized and non-mechanized production systems. The differences range from 50 times in beef; to 100 times in fruits and vegetables and milk; to 800 times in potatoes and 1000 times in chicken and pork. Adu-Baffour et al. (2019) analyzed a private-sector initiative to provide mechanization services to smallholders in Zambia through contractors. The farmers who received these services increase their cultivated area (and hence the total amount of agricultural labor) and increased labor productivity, almost doubling their annual income. Despite the benefits of mechanization, access to capital, land size, services, and training are major limitations to adoption (Cock et al., 2022). In China, outsourced mechanization of the more labor-intensive tasks, combined with land rental, have increased average cultivated area and labor productivity by 46% (J. Zhang et al., 2020; X. Zhang et al., 2017). In Egypt, mechanization led to a reduction in agricultural labor, but also to an increase in off-farm employment (Christiaensen et al., 2021).

“ Despite the benefits of mechanization, access to capital, land size, services, and training are major limitations

2. Chemical and/or mechanized weed control. Tamru et al. (2017) demonstrated a 9% and 18% increase in labor productivity of producers of teff in Ethiopia due to the use of herbicides. They also concluded that adoption of this technology depends on proximity to urban centers, access to all-weather roads, and levels of local rural wages. Very importantly, they argue that the labor-saving effects of herbicides in teff production would benefit women, as traditionally their contribution to weeding is important. Cock et al. (2022) propose that the impact of herbicides on labor productivity increases in association with herbicide-resistant varieties.

“ There is no doubt that under most circumstances, irrigation increases agricultural productivity

3. Irrigation. There is no doubt that under most circumstances, irrigation increases agricultural productivity, but there is less published evidence of the contribution of labor productivity to that result. For example, Atake et al. (2020a) find that in Togo, access to irrigation increased land productivity of male farmers, but not of their female counterparts, and labor productivity did not increase with irrigation for either group.
4. Conservation agriculture, with zero and minimum tillage, increased labor productivity in traditional smallholder maize agriculture in rainfed and irrigated areas in Mexico and in rice-wheat systems in the Eastern Gangetic Plains of India, and reduced female labor in maize production in Kenya (Jena, 2019; Jourdain et al., 2001; Magar et al., 2022; World Bank, 2008). Adoption rates are quite low among smallholders, however, because of a number of factors, including capital requirements and the availability of adequate machinery and related support services.
5. Improved varieties can increase labor productivity when their characteristics allow the introduction of labor-saving technologies, such as herbicides in GMO soybeans or mechanization of labor-intensive agronomic practices, as in the cases of mechanical harvesting of long shelf-life tomatoes (Rasmussen, 1968) or avoiding thinning with monogerm sugar beets (Vetrova et al., 2019).
6. At a time when “disruptive innovations” capture the imagination of many policy makers and practitioners, it would be important to keep in mind the point made by Christiaensen & Maertens (2022, p. 18): *“the focus on labor productivity, wages, and job quality, ignores the size or quantity effect. Small labor productivity or wage increases benefiting a large share of the population may generate more better jobs in the aggregate than large productivity increases. In addition, such small productivity increases may create jobs that are more accessible for the poor and less educated than jobs in high productive sectors... To maximize more, good rural employment generation, ... policy choices should similarly be guided by the productivity gains they generate per worker as well as the number of workers gaining directly, together with the broader expected good job gains from spillover effects on the local economy.”*

Alternatives to agricultural intensification

There are alternative agricultural development strategies that depart from the Green Revolution and its emphasis on intensification and modernization, such as agroecology and other approaches (e.g., permaculture, diversified farming systems, organic agriculture), which are broadly based on the “application of ecological science to the study, design and management of sustainable agroecosystems” (Altieri & Toledo, 2011a, p. 588). Agroecological practitioners have focused on supporting and learning from traditional and often Indigenous farming systems, whose objectives may be resilient and stable food security and reduced dependency on external input and output markets.

Largely because these systems are diversified, avoid monoculture, and reduce or exclude external synthetic inputs, they tend to be more labor intensive (Bowman & Zilberman, 2013). Restoring traditional Andean terraces, for example, would require about 350 to 500 workers days per hectare (Altieri & Nicholls, 2008). However, Ferguson & Lovell (2019) have documented a positive relationship between diversified tree crop production and labor productivity in smallholder farms in the United States. Altieri & Toledo (2011a) explain that if measured in terms of calories produced in one hectare, a typical highland Mayan maize farm is highly labor productive, as one hour of work produces almost 11,000 calories of food, which is a level of efficiency sufficient to provide food security for a household of five or seven people. Another example given by Altieri & Toledo (2011) is the use of velvet bean (***Mucuna pruriens***), which cut labor for weeding by 75% while reducing herbicide use to zero, fixing 150 kg of nitrogen per ha, producing 35 tons of organic matter per year, and increasing maize yields by 300%, to 2.5 tons/ha. It is less clear if agroecology can systematically increase or at least maintain yields, compared to agricultural intensification technologies; proponents tend to argue that yield effects should be assessed over time, since agroecological practices build agricultural resilience while the intensive use of fertilizers, irrigation, and pesticides can degrade the natural resource base and have a negative effect on yields (Altieri & Toledo, 2011b).

Proponents of agroecology and related approaches argue that these practices can increase farmers’ incomes through product differentiation and value addition on the farm or at the local level, lower input costs, and greater participation in producers’ organizations (Sánchez et al., 2022; Van der Ploeg et al., 2019). Nevertheless, leading scientists in agroecology recognize that the expansion of viable farming systems based on ecological principles requires addressing the issue of their labor intensiveness, particularly when the opportunity cost of smallholder family labor is significant. This is why Altieri & Nicholls (2008) call for researchers and practitioners to give greater attention to developing agroecological technologies that can use labor more efficiently.



Changes in the management of farm workers can also drive increases in labor productivity, as in the case of fruit production in Chile, where the proportion of workers with permanent contracts has dropped substantially, while piecework contracts have become more important both on the farm and in postharvest processing (Anriquez et al., 2015). This is a good example of increasing labor productivity without much progress towards the objective of decent work as defined by (International Labour Organisation, 2023).

Automation and digitalization

Technological revolutions shape and are shaped by structural transformation, as seen in numerous examples in the 19th and 20th centuries, from steam power to cold storage (Christiaensen et al., 2021). The Third Industrial Revolution (based on electronics and digitalization) is well under way across the globe, and the Fourth Industrial Revolution (based on the integration of physical, digital, and biological technologies) is making its mark in the 21st century (Fox & Signé, 2021).

There is a lively and still-unresolved debate about the significance of automation and digitalization (which are not the same, but which are increasingly integrated, as new automation technologies tend to include digitalization components and vice versa) in relation to agrifood systems in the Global South. The extent to which this revolution will penetrate agrifood systems in developing countries, and the potential impacts on employment, are two of the main issues in this debate.

Following Lewis, Schlogl & Sumner (2020, p. 55-57) envision an economy with two sectors: an automation-prone sector (APS), where human labor can easily be replaced by machines, and an automation-resistant sector (ARS), consisting of jobs that are hard to perform by machines. They argue that automation creates “unlimited supplies of artificial labor” in the APS, and that the capacity to build and deploy robots creates a “robot reserve army” also in the APS. The labor force gradually shifts from the APS into the ARS, in what these authors call “automation-driven structural change,” which can result in a labor surplus if the unit cost of automated production falls below the reservation wage of workers. These surplus workers can either be absorbed by the ARS or join the ranks of the technologically unemployed. “Like in the Lewis model, the functional distribution of income changes in favor of capital owners” (p.57).

Where do agriculture and agrifood industry and services fit into this model? There is large variation in estimates and no consensus on job impacts among the main published estimates and forecasts, but one pattern that emerges is that, as noted by Schlogl & Sumner (2020, p. 67), “The more agrarian an economy is, the larger the population performing tasks that machines could theoretically perform. We can thus say, assuming the automatability estimates are reasonable, that the labor force of more service sector-based, richer economies tends to be less replaceable compared to more agriculture-based, poorer economies.”

Fox & Signé (2021, pp. 14–15) list many examples of these technologies already in use in Africa: **“Mobile phones are aiding in price discovery and helping to match farmers and wholesalers, reducing price dispersion and transaction costs (Fabregas et al., 2019). Ghana-based companies Farmerline and Agrocenta offer farmers mobile and web technology for agricultural advice, weather information, and financial tips. Zenvus, a Nigerian startup, measures and analyzes soil data to help farmers apply the right fertilizer and optimally irrigate farms (Signé, 2022). The African Soil Information Service uses remote sensing, providing soil data on an open-source basis, bringing down the cost of soil mapping by 97 percent (Pathways for Prosperity Commission, 2018). Hello Tractor, a start-up in Nigeria and Kenya allows farmers to hire affordable tractors via mobile phone (Theunissen, 2015). The Moroccan company Visio-Green Africa is partnering with the Moroccan Association of Producers and Exporters of Fruit and Vegetables to use IoT to bring smart irrigation techniques to Morocco’s farmers (Technopolis & Research ICT Africa & Tambourine Innovation Ventures, 2019)... GPS systems are already being used to register land, improving land tenure security and willingness to invest. ... [B]lockchain is beginning to be used to create a safe repository for land records and to reduce the transaction costs of land rentals and sales. ... Solar panels are starting to be used to power irrigation systems, reducing costs and eliminating the carbon-laden exhaust from gasoline-powered generators. ... Drones can spray crops about 40 times faster than humans, and help ensure that all farmers’ crops are sprayed so that pests cannot return (Technopolis & Research ICT Africa & Tambourine Innovation Ventures, 2019).”**

How far and how fast technologies such as these will be able to spread in agrifood systems will depend on a number of factors, including scale neutrality and cost of the technology, magnitude of upfront capital investments, degree of good-quality Internet connectivity, and electrification (FAO, 2022).

In a major publication on automation of agriculture, FAO (2022) is optimistic about its potential to advance the reduction of poverty, food insecurity, sustainability, and resilience, while higher agricultural and labor productivities and efficiencies are also achieved. This optimism is grounded in the fact that early stages of automation (e.g., tractors and other forms of motorized mechanization) did not lead to massive unemployment. FAO (2022) explains this outcome by referring to the structural transformation that allowed surplus labor in agriculture to move to more productive jobs in manufacturing and services, including the agrifood sector.

FAO’s optimism is contingent on two conditions. First, automation technologies must be accessible to smallholder farmers and marginalized groups, such as youth and women. This is a significant assumption, judging from the low adoption rate of earlier generations of automation technologies (Losch, 2016). Tractors and other motorized machines were essential for spurring agricultural transformation worldwide, but particularly in Europe, North

America, and other industrialized regions. However, there were wide disparities in adoption of those machines, and adoption was particularly low in in Sub-Saharan Africa (FAO, 2022). A majority of the 27 case studies included in FAO (2022) report significant barriers to adoption of automation technologies, not surprisingly in LMICs. As with earlier stages of mechanized automation, scale-neutrality of technologies again appears to be a significant factor in limiting adoption among smallholders.

The second condition is that automation must occur mostly as an endogenous process driven by rising wages and labor scarcity, in which case it could benefit both producers and wage-earners. If automation advances in contexts in which there is a surplus of unemployed and underemployed workers, however, as in Sub-Saharan Africa, then the risk is high that it will hurt workers, particularly those with low skills. On the other hand, based on the literature reviewed, there appears to be a significant knowledge gap about the effects that digital technologies could have on increasing market size through, for example, mobile finance or market intelligence, with an indirect effect on labor demand.

Charlton et al. (2022) suggest that the farm sector will concentrate losses in job numbers, particularly among family labor, hired field workers, and labor supervisors and contractors. Displacement of farm workers will be greater in the commercial farm sector and in high-value value chains, where access to capital and technical support are not heavy constraints to automation. They point out, however, that farm employment could expand if automation solves seasonal labor shortages, or in situations where two or more production cycles overlap in time, thus allowing production to grow (P. Pingali, 2007, cited in Charlton et al., 2022).

The effects of automation on labor demand will be different on small-scale than on large-scale farms; in the former, the total number of jobs will not necessarily be reduced if the production area can be expanded (FAO, 2022). In China, farm households that are able to rent additional land increase agricultural labor productivity by 43%, while each family worker in agriculture also increased average working time by 32% (J. Zhang et al., 2020). When family labor is scarce, including in regions with high rates of migration to urban areas (Malanski et al., 2021), these households hire agricultural workers and mechanization services.

A similar effect is described in Christiaensen et al. (2021) in Senegal and Zimbabwe, where mechanization was accompanied by land expansion and greater use of agricultural inputs, resulting in an increase in agricultural labor. In yet another example, a private sector-led program to increase the use of agricultural machinery among smallholders in Zambia led to a major expansion in cultivated land, a shift from family to wage labor, and an increase in overall employment; however, wage-earners complained of lack of jobs at the start of the season where much work is now mechanized, although this reversed later in the growing cycle (Adu-Baffour et al., 2019).

At the same time, there will be an increased demand for skilled on-farm workers, such as machine operators, mechanics, and technology specialists (Charlton et al., 2022), in addition to non-farm skilled workers (e.g., office workers and salespersons, and specialists in financial services, quality assurance, customer service, and technology). Access to quality education and vocational training are necessary conditions for rural workers to have access to these new on- and off-farm jobs (IFAD, 2016)

One example of this dynamic of losses of unskilled jobs and gains in skilled ones is the mechanization of sugarcane harvest in the state of São Paulo, Brazil. Mechanized harvesting rose from 6% in 1997 to 82% in 2012, resulting in the loss of 96,000 unqualified jobs but the creation of 105,000 new jobs, especially in the administration departments of sugar mills, which were also modernized (Baccarin, 2012). Of course, it is highly unlikely that many of the displaced agricultural workers were able to compete for one of the additional white-collar jobs.

An important argument is made by Rijnks et al. (2022) in their discussion of the spatial distribution of automation. Although their analysis is focused on Europe, they argue that agricultural employment is particularly threatened by automation because rural labor markets are thin and quite homogeneous in terms of the occupations to which displaced workers may transition. Rural-urban commuting, circular migration, and migration are important strategies in this context (Berdegué et al., 2014).

In any case, Charlton et al. (2019) recognize that many of the newer labor-saving technologies require large initial investments, access to reliable electricity and high-quality Internet, and a qualified workforce, which in turn requires good educational systems for all. Such conditions are unlikely to be met in the near or even the medium term for a large proportion of smallholders, not only in low- and lower-middle-income countries, but even in upper-middle- and high-income countries with high levels of inequality, such as South Africa or Namibia or many in Latin America. Fox & Signé (2021) recognize that many Fourth Industrial Revolution technologies will reduce overall employment in primary agriculture in Africa, but consider that this will be accompanied by the creation of non-agricultural jobs through the multiplier effects of higher agricultural productivity.

But what happens if agrifood services and manufacturing are also automated and labor-saving technologies become prevalent in such labor-intensive sectors as packing houses, food-processing industries, and food retail? Labor-intensive SME continue to occupy a large share of domestic food markets in LMIC (Barrett et al., 2022), but there seems to be a trend towards higher capital/labor ratios in the downstream segments of value chains, such as the larger rice mills in Bangladesh, China, and Vietnam, which have invested in machinery that gives them quality differentiation and cost advantages (Reardon et al., 2014).

As Barrett et al. (2022, p. 1361) argue, “the AVC revolution ultimately revolves around innovations in the products firms sell to consumers, the markets companies enter, the business practices they employ, and the biophysical, digital, mechanical, and other technologies they develop, adapt, and diffuse. Economists have paid considerable attention to farm-level adoption of production technologies, and for good reason. But the bulk of the welfare effects of revolutions within the agrifood system likely accrue to consumers through reduced quality-adjusted food costs, and a steadily rising share of consumer food expenditures go to value addition beyond the farmgate. Economists need to begin paying far more attention to the emergence and diffusion of innovations through the broader agrifood value chain, not just to changes taking place on farms, as important as those may be. One of the potentially most important questions concerns the relative importance—even to farmers and farmworkers—of innovations in the post-farmgate AVC as compared to on the farm.”

To face these challenging trends, FAO (2022) recommends avoiding policies that try to restrict the advance of automation and digitalization, as well as those that artificially incentivize these processes in contexts in which there is a large surplus of labor and wages are low. Instead, FAO (2022) argues, policies should focus on developing enabling conditions for automation and digitalization to evolve endogenously, and on improving access to rural services (e.g., finance, insurance, education) for small-scale agricultural producers and rural women and youth, to ensure access to these technologies.

From the examples above, it can be seen that much of the discussion so far is focused on automation and digitalization of agriculture, i.e., on-farm innovations. The literature reviewed for this study discussed far fewer cases of how these innovations are penetrating logistics, agro-processing, and the wholesale and retail trade.

9. Contract farming

The literature reports the increasing importance of vertical coordination in agrifood value chains (Bellemare & Bloem, 2018; IFAD, 2003; Maertens & Swinnen, 2007; E.-M. Meemken & Bellemare, 2020; J. Swinnen, 2006, 2007; World Bank, 2006).

The rise of vertical coordination is due to two forces: consumer demand for food quality and safety, and factor market imperfections on the production side (Barrett et al., 2022; J. F. M. Swinnen & Maertens, 2007). In theory, vertical coordination and, more precisely, contract farming, can improve risk management for the producer and the buyer, reduce costs, reduce or resolve the effects of missing credit markets, and improve smallholders’ access to technical assistance and know-how, particularly when they are considering the production of higher value crops that are new to their region (Bellemare, 2010; Bellemare & Lim, 2018). Dolan (2004) discusses the drivers on the side of lead firms, using the case of value chains connecting fresh vegetable producers with European supermarkets: consolidation of the

supermarket sector and increased market share and power of the resulting firms (Dolan & Humphrey, 2000, cited in Dolan, 2004); the spread of own label products; efforts by retailers to attain greater organizational flexibility (Gereffi, 1994) by outsourcing a number of functions to specialized exporters upstream while concentrating on their core competencies of marketing, branding and product design; and the proliferation of mandatory and voluntary standards and codes of conduct, including many that focus not only on the product, but also on production and process methods.

Beyond full vertical integration in which production is done by the agro-processors or exporters, there are two types of contracts, broadly speaking²² (Maertens & Swinnen, 2007; Otsuka et al., 2016). Marketing contracts simply define the quantity and quality of the product to be delivered by the producer to the buyer on a given date, leaving the former to make all production decisions according to his or her preferences and resources. Production contracts include but go beyond the provisions typical of marketing contracts, adding the provision of different forms of assistance by the buyer to the producer, such as technical assistance, inputs, credit, machinery services, and/or management support; the producer’s autonomy is thus significantly restricted. The economic impact of marketing contracts tends to be lower, according to Otsuka et al. (2016). Tables 2 and 3 in Maertens & Swinnen (2007) summarize almost 60 examples of marketing and production contracts and the farm assistance included in the latter.

The literature addresses four important questions in contract farming: first, the rise in employment generated by contract farming; second, whether contract farming tends to exclude smallholders; third, if participation in contract farming improves the welfare of smallholders (and, in fewer studies, of wage-earners on-farm and in agro-industries); and fourth, if new standards, including those that address ethical and environmental concerns, constrain the participation or and/or benefits to smallholder producers (or wage-earners).

In representative samples of smallholder households in six countries (Bangladesh, Côte d’Ivoire, Mozambique, Nigeria, Tanzania, and Uganda), 22.2% had some type of contract involving different contractual conditions, products, types of buyers, degrees of formality, and services provided by the buyer to the farmers, if any; participation in contracts ranged from 4.2% in Bangladesh to a surprising 80.8% in Tanzania. (E.-M. Meemken & Bellemare, 2020). On the other hand, in the United States, only 5% of farms used marketing contracts in 2020, down from 11% in 1996, and the share of farmers with production contracts was even smaller, at 2% (Whitt, 2022), perhaps reflecting the fact that in the U.S. agrifood system there are fewer or less-severe market imperfections, and contracts are therefore less necessary or attractive to farmers.

More formal types of contract farming have gained attention with the very fast growth of horticultural exports “in all developing regions—from less than 5 billion USD in 2000 to 16 billion USD in 2015 in Africa, from slightly over 10 billion

22 This dichotomous typology is an oversimplification, as shown by (Bellemare & Lim, 2018) in their study of contract farming in Madagascar.

to almost 40 billion USD in Latin America, and from about 15 billion to 66 billion USD in developing Asia” (Maertens & Fabry, 2019). In Senegal, high-value export agro-industries have created at least 30,000 direct formal jobs, an increase of 200% in 15 years (Fabry et al., 2022), while in Ethiopia, the flower industry employs 85,000 workers (Maertens & Fabry, 2019). In Kenya, horticultural farmers in the traditional marketing channel employ more labor in production than those who are direct suppliers to supermarkets, but the latter generate many more harvest and postharvest jobs to meet supermarket standards. A full conversion from traditional to vertically integrated channels would reduce labor in production by 50%, while increasing it for harvest and postharvest activities by 400% (but would also lead to a major displacement of small-scale farmers by middle-class commercial producers) (Neven et al., 2009). Employment in the pineapple export industry in Ghana grew by 80% in 12 years, while Peruvian asparagus and grape exporters employed 310,000 workers in 2013-2015 (Maertens & Fabry, 2019). In the Punjab in India, vegetable contract farmers significantly increased the number of wage-earners, particularly women (Singh, 2002).

It is relatively frequent that, when they can, export agro-industries gradually replace smaller contract farmers with fewer larger ones, and even transition to full vertical integration, with a concomitant rise in wage employment (Maertens & Fabry, 2019). In Senegal, French bean exports were based on contract farming in the 1990s but starting at around the turn of the century the number of contract farmers decreased from 23% to 10%, while the number of those with members working as estate wage-earners increased from 10% of households to 34% (World Bank, 2008). Estate workers did come from poorer rural households. In Peru, the share of medium and small asparagus producers halved in a little over a decade (Schuster & Maertens, 2013, cited in Maertens & Fabry, 2019). In Ghana, smallholders produced 95% of export pineapple until 2006, while today 15 firms produce and export more than 95% (Amanor, 2012 and Krumbiegel et al., 2018, cited in Maertens & Fabry, 2019).

Nevertheless, it is important to remember that even in high-value products like fruits and vegetables, contract farming continues to involve relatively small numbers of farmers and wage-earners, compared with traditional or transitional value chains with little to no vertical integration.²³ Parrot et al. (2022), for example, assessed five different mango value chains (domestic and export, fresh or processed into different products) in Burkina Faso for several economic, social, and environmental sustainability criteria, including male and female employment, and found that the traditional domestic fresh mango value chain led in employment creation and share of female workers. As a reference, in the United States, only 5% of farmers use marketing contracts and 2% use production contracts (Whitt, 2022).

Regarding the question about the characteristics of smallholders that participate in contract-agriculture, the evidence tends to support the hypothesis that education, asset base, proximity to good roads, towns and cities, access to irrigation, land size, greater agricultural experience, experience in selling to wholesalers or processors, membership in producers’ organizations, having off-farm income, and prior technical efficiency are all factors related to a higher probability of participation in contract farming (Bellemare, 2012; Bellemare & Bloem, 2018; Escobal & Cavero, 2012; Miyata et al., 2009; Otsuka et al., 2016; Reardon & Berdegue, 2002; Warsanga & Evans, 2018). Female-headed households and female farmers are at a disadvantage in gaining access to contracts (Bellemare & Bloem, 2018). Some of these studies conclude that there is a causal relationship between one or more of these factors and the probability of participation in contract-agriculture, while others simply confirm a correlation.

Some authors have found that smallholders who lack one or more of those characteristics will tend to be excluded from participating in contract farming or will have greater difficulty remaining in the scheme with the trends of downstream firm consolidation and more stringent quality, ethical, and environmental standards (Little & Watts, 1994; Reardon & Berdegue, 2002; Singh, 2002, cited in Miyata et al., 2009), (Maertens et al., 2007; J. Swinnen, 2006, 2007; Warsanga & Evans, 2018, cited in Maertens & Swinnen, 2007), (Bellemare, 2018).

More vulnerable farmers may choose not to participate in contract farming because of limited resources, but may also be ineligible because of business discrimination against smaller or less well-resourced producers (Bellemare, 2012, cited by Brandão & Schoneveld, 2021). Other studies do not find evidence of exclusion due to some of the factors mentioned above, although sometimes this is because only smallholders can supply the product in a given context (Miyata et al., 2009; Warsanga & Evans, 2018).

On the other hand, many of the new non-farm wage jobs in these value chains are taken by workers from relatively poor households, with less land and lower levels of education. Van den Broeck & Maertens (2017, cited in Maertens & Fabry, 2019) found that rural women are also well represented in high-value export agro-processing jobs; in Senegal, for example, 57% of employees in horticulture agro-processing are women, most of them without any formal education (Van den Broeck & Maertens, 2017, cited in Maertens & Fabry, 2019a). In Chile’s export-oriented fruit production, most women are seasonal wage-earners, and this type of employment has been growing steadily over several decades.²⁴

There is significant debate in the literature about the positive and negative effects of contract farming on the welfare of participating producers, as well as on on-farm and downstream wage-earners. Authors like (Dolan, 2004;

23 Global fruit and vegetable exports (fresh and processed) amounted to \$283 billion in 2020, 22% of total agricultural exports, excluding fish, compared with a gross production value (fresh only) of \$1,108 billion.

24 “Trabajo de temporada femenino,” *Revista Agronomía y Forestal*, Pontificia Universidad Católica de Chile, https://agronomia.uc.cl/component/com_sobipro/Itemid,232/pid,120/sid,721/ Consulted on 22 March, 2023.

Little & Watts, 1994; Singh, 2002, cited in Miyata et al., 2009), (Dolan, 2001; Eaton & Shepherd, 2013; Glover & Kusterer, 1990; Porter & Phillips-Howard, 1997; Wilson, 1986 all, cited in Dedehouanou et al., 2013) propose that participation in contract farming has negative effects on the income and/or autonomy of participating farmers. Buyers can use their market power to impose unfavorable conditions on producers, including informal contracts, overpriced delivery of inputs and services, arbitrary and unclear methods for establishing purchase prices, delays in payments, low prices, or failure to compensate for production losses in the event of natural disasters (Singh, 2002).

For salaried agricultural workers, the effects of contract farming on wages are mixed. In contract farming that is part of buyer-oriented value chains, there may be pressure to restructure the work force to meet the demands of the lead firms, reducing labor costs and decreasing or replacing permanent labor with flexible and subcontracted labor. This mainly affects vulnerable workers, such as women, youth, and migrants (Barrientos & Kritzing, 2004; De Grammont & Lara Flores, 2010).

German et al. (2020) discuss seven different types of value chains, ranging from staple crops for domestic markets to highly perishable, labor-intensive crops that can be fully mechanized. They find that in some types of value chains, such as those represented by sugarcane in Brazil, large gains in on-farm wage labor productivity have been well documented, but at the expense of workers' health and safety (Baccarin, 2012). De Grammont & Lara Flores (2010) document very large increases in labor productivity in tomato production for the U.S. market on medium and large farms in Mexico, accompanied by an equally large drop in real wages of 50% over a 10-year period. This drives home the point that it is important not to lose sight of the longer-term distributional consequences of contract farming.

Dolan (2004, pp. 111-112) argues that global value chains have driven new patterns of employment, which are consequences of the quest for more organizational flexibility by the leading firms in the value chains. These patterns include "*flexible work systems*," or functional flexibility (including performance incentives, multi-tasking, and self-managed teams, all of which increase labor productivity). Casual, seasonal, temporary, and contract labor are forms of "*informalized labor*," or numerical flexibility (Storper & Scott, 1990, cited in Dolan, 2004b). In the study by Dolan (2004b) of export agriculture value chains in Kenya, these flexible employment arrangements involved a significant majority of workers from packing houses.

Some argue that negative effects can also be perceived at scales beyond the direct participants, as in the case of increased social differentiation in rural communities and increased inequalities as contracting firms tend to exclude poor and vulnerable producers, as well as women (Korovkin, 1992).





Most of the studies reviewed, however, support the view that participating smallholder producers do tend to benefit directly from these schemes, because of increased prices and/or increased yield compared to non-contracting smallholders of similar characteristics (Barrett, Reardon, et al., 2001; Bellemare, 2012; Bellemare & Bloem, 2018; Dedehouanou et al., 2013; Maertens et al., 2012; Maertens & Swinnen, 2007, 2009; E.-M. Meemken & Bellemare, 2020; Minten et al., 2009; Miyata et al., 2009; Neven et al., 2009; Rao & Qaim, 2013; Reardon et al., 2009; Ruml & Qaim, 2021; Soullier & Moustier, 2018; J. Swinnen, 2016; Van Hoyweghen et al., 2020; Warsanga & Evans, 2018; World Bank, 2008). Maertens & Fabry (2019) argue that the expansion of high-value and for-export value chains is part of the broader agricultural and rural transformations, so there is gradual convergence in labor productivity and income between the farm sector and manufacturing and services in these agrifood systems, while more jobs are created, particularly in the non-farm economy. Based on a detailed review of 114 articles on contract farming to try to determine whether contract farming improves the welfare of participating households, Bellemare & Bloem (2018) conclude that they cannot draw any policy-relevant conclusions. Along the same lines, E.M. Meemken & Bellemare (2020) challenge the notion that contract farming unambiguously improves welfare.

To respond to the criticism that contract farming has negative non-economic effects on participating households, Dedehouanou et al. (2013) studied the impact of contracts on self-reported smallholder happiness in Senegal. The authors find that contracting improves farmers' happiness mainly (but not exclusively) because of the higher income that results from this arrangement. However, the same study recognized that the effect on happiness is seen in one of the two value chains studied (mango), but not so much, or not at all, in the second one (beans). Factors such as the levels of risk or the specifics of the design of contracts can affect their impact on farmers' welfare.

Part of the problem in elucidating the welfare and distributional effects of contract farming is that there are different channels through which participation in value chains can impact directly and indirectly on the welfare of farmers and wage-earners.

As shown in Table 4, taken from Maertens et al. (2012, p. 481), it is important to consider product-market effects on contracting smallholder farmers and their households, as well as labor-market effects involving wage-earners both on farm and in agro-industrial firms. Maertens et al. (2012) apply this framework to the analysis of horticultural exports in Senegal and Madagascar and find: (a) substantial direct product-market effects on household income; (b) indirect product-market effects on agricultural productivity of crops other than those contracted, which are reflected in higher household income; (c) direct labor-market effects on the household income of agro-industrial workers; and (d) indirect labor-market effects as agro-industrial workers invest some of their additional income in their own farm production. Very importantly, Maertens et al. (2012a) find that a very large proportion of the thousands of agro-industry employees are women, leading to development impacts such as a much-reduced gender wage gap (three to six times lower than in other employment sectors) and an increase in primary school enrollment of children of agro-industrial female employees.

Meemken & Bellemare (2020) find that smallholders with contracts are 10% more likely to increase hired labor for a relatively long period of time, but despite these labor effects, they cannot confirm that contract farming has an impact on the welfare of non-participating households in the same community.

While several of the studies of contract farming in value chains cited above report an increase in on-farm labor intensity from production to post-harvest, Ruml & Qaim (2021) find that contracts in Ghana's palm oil value chain led to the adoption of labor-saving technologies by participating smallholders. Marketing contracts that do not include any financing mechanism for the smallholder lead to reallocation of the saved household labor to off-farm employment. Production contracts in which resources are provided to the growers by the contracting firm allow the former to use the saved labor to expand activities on the farm.

Compared to marketing contracts, production contracts tend to have better effects on the productivity of participating farmers. The effects are a response to the provision to

Table 4. Product market and labor market effects of modern value chains

	Product-market effects	Labour-market effects
Participation	<ul style="list-style-type: none"> ○ Possibilities for rural households and smallholder farmers to supply MSC, e.g. through VC schemes ○ Type of farmers supplying MSC, type of farmers with access to VC schemes 	<ul style="list-style-type: none"> ○ Access to employment in MSC for rural households ○ Type of households with access to employment in MSC
Impact Direct effects	<ul style="list-style-type: none"> ○ Impact of smallholder participation in production for MSC on farm productivity, household income and poverty reduction ○ Spill-over effects from smallholder participation in production for MSC (technology & managerial spill-over effects, investment linkages, consumption linkages) 	<ul style="list-style-type: none"> ○ Impact of employment in MSC on household income and poverty reduction ○ Spill-over effects from employment in MSC (investment linkages, consumption linkages)

the farmers of technical assistance, inputs, credit, and/or machinery services, supporting the hypothesis that contracting (at least in the case of production contracts) allows smallholder farmers to overcome market imperfections that limit their productivity and production potential (Maertens & Swinnen, 2007; Minot & Sawyer, 2016; Minten et al., 2009). The study by Soullier & Moustier (2018) provides evidence in support of this argument, as it shows that farmers who sell rice in the Senegal valley in the spot market and have access to a loan from the national bank are better off than rice farmers who have a marketing contract, but that the advantage is lost in the case of non-contracting farmers with no access to credit.

Miyata et al. (2009) compare contracting in two value chains in China, showing that effects on income of the growers can be due to higher yields resulting from technical assistance and inputs provided through a production contract, while in the second case the yields of contracting and non-contracting producers are not different, but the higher price (which may reflect produce quality differences) received by the former leads to higher gross margins.

Some studies report indirect benefits, such as those due to technological spillovers to products other than the one that was contracted (MacDonald et al., 2012; Maertens & Swinnen, 2007; Minot & Sawyer, 2016; Minten et al., 2009). Reduced market risk for the producer is also cited by some authors, as contracts predefine the price or pricing formula, which can be very valuable to farmers in volatile markets (Berdegué, 2001; Reardon et al., 2009).

Some food standards can contribute to increasing producers' incomes and agricultural workers' wages. The implementation of these private standards has shown varying impacts on aspects such as working conditions, income and wages, job security, and gender issues, according to different studies (Ahsan et al., 2018; Barrientos et al., 2003; De Grammont & Lara Flores, 2010; Dolan, 2004b; Masamha et al., 2018; Murphy et al., 2020; Valkila & Nygren, 2010 all cited by Malanski et al., 2022)

Food standards that incorporate labor conditions, such as GLOBALG.A.P. and Fairtrade, also appear to have differing effects on farmers' and wage-earners' income. Maertens & Fabry (2019) report slightly higher salaries paid by Senegalese GLOBALG.A.P. agro-processors and by Fairtrade firms in Ghana, compared to non-certified companies. The study by Valkila & Nygren (2010) examined the implementation of Fairtrade certification in the coffee supply chain in Nicaragua. The farmer cooperatives that obtained certification were able to increase their income because of the guaranteed price premium, especially when international coffee prices were low. But certification did not guarantee the sale of all coffee produced, and cooperatives had difficulty establishing long-term contracts with certified buyers. In addition, non-certified farmers could obtain higher prices in the main market if they timed their sales correctly. Large coffee exporters also paid farmers immediately, while certified cooperatives received payments in stages. The price premium depended on the

volume of production, which benefited large producers compared to small producers and landless day laborers. In summary, under conditions of relatively high market prices for coffee, Fairtrade certification does not have strong bargaining power, as many certified producers and cooperatives can obtain similar prices in certain sectors of the mainstream market.

A more recent study by Meemken et al. (2019) in the cocoa sector in Côte d'Ivoire found that Fairtrade improves wages and reduces poverty among workers in certified cooperatives. According to the authors, large, certified companies and cooperatives are able and willing to comply with high Fairtrade labor standards, which increases wages and improves worker welfare. Fairtrade inspections closely monitor cooperatives' compliance with labor standards, which prevents them from ignoring them. Certification also helps cooperatives attract members, sell more cocoa, and offer a wide range of services, which translates into more jobs and higher wages for workers in certified cooperatives. Estimates suggest that Fairtrade certification increases annual wages for cooperative workers by approximately 160%, increases the probability of receiving at least minimum wage by 59%, and reduces the probability of living below the poverty line by 35%.

Nevertheless, wages and working conditions of both non-certified cooperatives and certified and non-certified individual farms do not differ significantly (E.M. Meemken et al., 2019). The authors highlight that Fairtrade certification does not improve the wages and working conditions of farm workers on certified individual farms. This may be because labor standards are barely monitored during routine inspections. In addition, implementing and monitoring standards on a large number of farms is costly and presents several practical challenges. It is also questionable whether smallholder farmers can afford to pay higher wages, especially in situations where the financial benefits of certification are low. Cocoa farmers with relatively large landholdings should be able to increase workers' wages, but traditional payment arrangements make it easy for farmers to keep wages low (E.M. Meemken et al., 2019). A similar conclusion is reached by Bolwig et al. (2008), who find that ethical standards seek to address social protection and working condition concerns in global value chains, *"but often fail to reach more vulnerable workers like casuals, migrants and/or women"*.

Ahsan et al. (2018) assessed the effects on wages of agricultural workers in the mango value chain on GLOBALG.A.P. certified and non-certified farms in Pakistan. The authors observed that certification has a favorable impact on agricultural wages, which can be explained by factors such as experience and age of workers, compensatory payments (e.g., leave and medical benefits), availability of occupational safety facilities, and training of skilled workers. All of these had a positive and statistically significant impact on wage growth. In the case of non-certified farms, the age of workers and access to financial services had a positive and significant impact on wages. In both groups, union participation meant

an increase in wages. Only class discrimination had a negative and significant impact, but less on certified farms. Mehdi et al. (2020) found similar results in this value chain associated with factors such as age, compensatory payments, availability of job security facilities, access to financial services, and union participation.

In 2021 there were around 1.95 million farmers and workers, 90% of whom were small-scale producers and the remaining 10% were workers on Fairtrade plantations, with production concentrated in seven products: bananas, coffee, cocoa, cotton, flowers and plants, sugar, and tea.²⁵ By design, this standard aims at transferring a greater share of the total value added from consumers to farmers through price premiums. Several studies show that the costs associated with certification and compliance under the Fairtrade standard are often large enough to offset the favorable price differential. De Janvry et al. (2015) show that in the case of Nicaragua, Fairtrade coffee price premiums are largely captured by certification firms rather than by Nicaraguan farmers. Valkila (2009) and Valkila & Nygren (2010) find that Fairtrade organic coffee production can increase farmer income for low-intensity coffee production, but that the increment is so small that it does not allow producers to escape poverty. In the case of more intensive Fairtrade organic coffee, the effects of the price premium net of the costs associated with meeting the standard depend on the international prices of conventional coffee: if these prices are very low, then specialized farmers do make a significant gain. Beuchelt and Zeller (2011, cited in IFAD, 2016) conclude that organic and Fairtrade coffee farmers in Nicaragua became poorer than conventional coffee producers in one decade. The findings of Weber (2011) for Fairtrade and organic indigenous coffee small growers in Mexico, are very similar to those reported above for Nicaraguan Fairtrade producers. Ruben (2008) and Ruben & Hoebink (2015) are somewhat more optimistic about the actual and potential impacts of Fairtrade and similar certification schemes, although the many case studies that they report from Sub-Saharan Africa and Latin America suggest that results and impacts are quite diverse and strongly dependent on local context.

10. Working conditions and social protection: far from decent work

As discussed in Section 4, most AFS workers are involved in primary agriculture. According to the ILO, 93.6% of agricultural workers work in the informal economy, with low and variable income and with limited social protection coverage. Thives (2022) reports that 76.8% of rural workers in Latin America and the Caribbean are informal, do not access decent working conditions, and face high risk at work. Perin et al. (2022) report that the vast majority of agrifood workers

in West Africa work in traditional agrifood production (with high levels of informality and no social protection). For MENA countries, Sato (2022) reports similar figures of high informality in the agrifood sector.²⁶

These hundreds of millions of rural workers mostly fit into the following categories: are self-employed, have no formal contract, have seasonal jobs, have no benefits (health, pension, vacations, childcare, etc.) on top of their portion of the production or their salary, work long hours, do not receive enough income (to make a decent living), are unemployed or underemployed for weeks or even months, etc. Agricultural workers represent a large share of workers in the segments of the population with lower development indexes.²⁷ A significant portion of such workers live in poverty conditions, while poverty rates among non-agricultural workers in AVC are substantially lower.²⁸

The ILO recognizes five major barriers to improving working conditions and coverage of social protection for agricultural workers: legal exclusions (different legal status for agricultural workers with lower protection levels); administrative barriers (not enough presence of administrative office, expensive and complex registry systems in rural/dispersed areas, high mobility of rural labor force, etc.); low and fluctuating income (which limits agricultural workers' ability to contribute to social protection); lack of enforcement and control (inadequate labor administration capacities); and lack of information and organization (due to remoteness, language barriers, etc.).²⁹

The literature concludes that working conditions faced by AFS workers are far from decent, even far from the acceptable minimum. Nevertheless, there is (some, limited) evidence of improved working conditions for certain workers in some AVC, mostly in non-agricultural activities, and only for certain groups of workers and in certain, quite specific, AVC. Only specific subsets of AVC workers—formal, highly skilled, managers, among others—face decent working conditions and get social protection benefits.

Based on their bibliometric review of the Web of Science, Malanski et al. (2022) state that international scientific research on labor in agrifood value chains is concentrated in four research domains. Two of them—labor and upgrading in value chains, and labor governance in global value chains through standards—include analyses regarding actual or potential improvements in working conditions for AVC workers. They conclude that economic success in AVC does not necessarily translate into better working conditions for employees. On the contrary, there is sound evidence of precarious, flexible, and informal jobs in the sector, and changes to comply with certifications and standards negatively affect firms, workers, and producers who are

25 <https://www.fairtrade.net/impact/fairtrade-producers-overview> (consulted April 21, 2023).

26 <https://www.social-protection.org/gimi/Emodule.action?id=63>

27 There is an inverse relationship between the share of agricultural workers and the level of human development, with larger shares of agricultural workers at the lower levels of the Human Development Index. In contrast, there is a positive relationship between the share of workers in non-agricultural agrifood jobs and the Human Development Index (see Figure 6, panels B and C in Davis et al. (2023)).

28 In 11 of the 18 countries analyzed, more than 20% of agricultural workers live in poverty (1.9 dollars per day poverty line), and in six of them, workers in poverty represent more than 40% (Davis et al., 2023).

29 <https://www.social-protection.org/gimi/Emodule.action?id=63>. (consulted April 15, 2023).

not able to meet such standards. In sum, they found that there are plenty of controversial issues in the scientific literature on labor outcomes in AVC, such as the quality of jobs and working conditions, and on the impact of specific instruments, such as the adoption of labor norms and regulations or certifications and standards.

Woodhill (2016, p. 20) summarizes the state of play around 2016, referring to *“plenty of anecdotal evidence of successful examples which keeps driving faith in the inclusive agribusiness effort. There are a limited number of collations of case studies that reinforce this view. However, from all quarters of the inclusive agribusiness field, there are calls for a much greater focus on scaling up inclusive agribusiness efforts. This widespread demand from involved businesses and practitioners in itself suggests that at this stage the impacts are more limited than might be hoped for.”*

Decent work, working conditions, and inclusive business

The concept of decent work involves *“opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for all, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men”* (International Labour Organisation, 2023).

Losch (2022) states that attaining better working conditions and decent work in AVC is a relevant challenge within the rural structural transformation agenda and has a high priority in the policy discussion. Nevertheless, he also recognizes that such high attention could be leading to a misplaced focus on the main challenges related to improving conditions for AFS workers: *“A major concern is that this emphasis on decent employment contribute to sideline other critical issues characterizing agriculture globally, which are decisive of the patterns of working agriculture. It corresponds to what can be named the iceberg syndrome, where the focus on decent employment is the tip of the iceberg while the root causes are massively under the waterline”* (Losch, 2022). *“This meta-positioning of decent employment also contributes to the blurring of what the main challenges are.”* (Losch, 2022, p. 2). Christiaensen & Maertens (2022) emphasize that often *“decent work”* discussions relate only to wage work in AFS, leaving self-employment out of the discussion and then limiting its scope.

According to the International Labor Organization (2019), a very large proportion of jobs in agriculture do not meet the basic standards of decent employment, in terms of levels of income, health and safety conditions, access to social security and protection, or participation in trade unions and other forms of workers' and producers' organizations.

30 Several case studies are available that describe working conditions in different agrifood production and value chains. The case of horticulture in Kenya illustrates the poor working conditions in this AVC: long work hours; health problems derived from unsuitable working postures, pesticides, and mismanagement of chemical inputs; lack of equipment for working in low-temperature packing environments; no compensation for or advance notice of contract termination; etc. Some benefits, such as transportation assistance or food, are provided to workers in sorting and packing, but less to producers (Dolan, 2004b)

Davis et al. (2022), among others, have called attention to the possibility that the transformation of AFS could reproduce or even worsen this status quo unless inclusion is brought to the center of analyses and policy design. Surely, progress towards decent employment in AFS is correlated with increases in the labor productivity of smallholder producers and wage-earners in AVC.

For example, the literature documents that many agricultural workers work as subcontractors in AVC, including global and export value chains. Barrientos (2013) finds that labor contracting in these AVC is managed as in any commercial outsourcing business that allows unscrupulous contractors to coerce vulnerable workers and avoid providing adequate working conditions for subcontractors (absence of secure working conditions, abusive working and negotiation practices, no social protection, etc.). Women are overrepresented in unfree or forced labor situations (new or modern slavery forms, exploitative contracts, etc.). Also, subcontracted women with seasonal contracts in AVC are the lower-paid workers (Barrientos & Kritzing, 2004).

In high-income countries, decent work in AFS is more related to the adequacy of income for agricultural workers, given that they represent a relatively small share of the work force, and most workers are protected (by social insurance and other well-enforced labor regulations). In contrast, in low- and middle-income countries, where AFS workers are a large proportion of the work force and most workers lack adequate protection and decent working conditions, along with income-related concerns the agenda also includes challenges related to the working conditions required to qualify for decent work. In low- and middle-income countries, even when laws and regulations aimed at creating decent working conditions do exist, AFS workers, most of whom are informal, are far from facing decent conditions (Losch, 2022).

The literature documents that working conditions in AFS of countries in the Global South tend to be far from desirable.³⁰ This is partly because of the characteristics of such jobs, as we discuss further, but also because of general labor and working conditions in those countries. In most low- and middle-income countries, working conditions are far from the ideal of decent work in both AFS and non-AFS sectors, and only a small proportion of the work force benefits from formal, socially protected, and well-regulated job opportunities.

Informality, lack of oversight, and geographic dispersion are core characteristics of AFS employment that sustain inadequate working conditions. The literature concludes that small-scale food producers and small-scale firms tend to offer worse working conditions than agribusinesses, contract farming, etc., or jobs in other sectors of the economy. Agribusiness, firms related to global AVC, export-led value chains, and other certified value chains tend to offer better working conditions, but with high variability within

and among them (Christiaensen & Maertens, 2022).³¹ In agriculture, working conditions are mostly characterized by informal contracts, instability, long hours, low wages (and substantial unpaid work), no safety measures for hazardous activities, no health coverage in case of accidents or sickness, no social protection, etc. (Christiaensen & Maertens, 2022; Fabry et al., 2022; Losch, 2022).³² Women, youth and migrants are among the groups that face the worst working conditions (Fabry et al., 2022).³³

Instruments for improving working conditions for AVC vary widely, and include national labor laws and regulations; sectoral regulations for agrifood production; agricultural interventions aimed at increasing agricultural production and/or productivity (subsidies, infrastructure, technology, technical assistance, etc.) driven by the public or private sector; and the use of contractual arrangements that, besides improving production, productivity, inclusivity, sustainability, or other goals, could also support better working conditions and the achievement of decent work in the AVC. In low- and middle-income countries, labor regulations are hardly enforced in rural settings and the provision of social protection for agricultural workers is limited (with some exceptions in the case of social assistance programs in some countries, mostly through cash transfer programs).³⁴ In the second set of policies mentioned, those devoted to increasing production and productivity have not included decent work results among their objectives. Only the use of specific contractual arrangements—contract farming, use of certifications, etc.—has been seen to also (together with other objectives) improve working conditions (Losch, 2022).³⁵ These contractual arrangements that could support better working conditions are at the core of the concept of inclusive business.

The concept of “*inclusive business*” or, by extension, inclusive value chains is prominent in the literature. Broadly defined, the concept implies “*vulnerable, small-scale actors benefitting through their integration into (agri)business value chains*” (German et al., 2020, p. 2). Vos & Cattaneo (2021) discuss the potential of such integration in creating job and income opportunities for small-scale producers and other rural (and poor) workers. However, they also recognize the need for policies to help small-scale farmers connect to these other activities within the AVC in a more gainful way.

IFAD (2016) estimated that likely less than 2% of smallholder producers involved worldwide in different forms of agribusiness could be considered part of, or close to, the concept of inclusive agribusiness. Losch (2022) reports that only 1% to 5% of farm households are involved in contract farming, and in Africa most farm production is sold through traditional marketing channels through informal arrangements with intermediaries. An analysis by Maertens et al. (2012) of seven Sub-Saharan countries (Ghana, Côte d’Ivoire, Senegal, Kenya, Madagascar, Zambia, and Zimbabwe) identifies close to 100,000 smallholder producers participating in modern supply chains, which may or may not fit the concept of inclusive agribusiness. The number of wage employees in these types of value chains is around 500,000 workers in eight Sub-Saharan countries (Ghana, Cameroon, Côte d’Ivoire, Kenya, Senegal, Ethiopia, Zambia, South Africa).

Analysis of inclusive business and decent work is largely focused on these types of modern, for-export value chains, despite the limited number of smallholder producers and agrifood workers they involve.³⁶ Extensive evidence of such AVC also shows that women workers are more likely to lack decent work conditions (Barrientos et al., 2003a; Kritzinger et al., 2004; Tallontire et al., 2005). Based on evidence from Senegal, Fabry et al. (2022) demonstrate that in the horticulture sector, agro-industrial firms offer better working conditions and more inclusive jobs for women, youth, and migrants than small-scale farms, but those better and more inclusive working conditions vary within and across firms.³⁷

The largest and most successful examples of inclusive agribusiness, in terms of number of smallholders involved, are in buyer-driven value chains such as coffee, cocoa, tea, and palm oil, where global supply depends largely on smallholders, and where the lead firms that control value chain governance are large multinationals that seek to reduce reputational risk and hold dominant positions in world markets (Bolwig et al., 2008; Woodhill, 2016).

Overall, German et al. (2020, p. 1) conclude that “*while the characteristics of specific crops and supply chains exert a strong influence on opportunities and constraints to inclusion, the overall trend is towards more exclusive agribusiness as governments scale back support to smallholders, more*

31 Based on analysis of the fruit export sector in South Africa, Barrientos & Kritzinger (2004) show that as consumers increase pressure for better working conditions and/or the government creates more regulations to ensure better working conditions for agrifood workers, the number of permanent, formal, workers (those who receive some legal and social protection) is reduced, while subcontracted workers (with less legal and social protection) increase. Integration into global value chains opens new governance options, but these depend on local conditions and on the precariousness of the workers’ situation (Alford et al., 2017).

32 Ahsan et al. (2018) state that producers tend to see improved working conditions only as increasing costs, rather than as a way to make their production more competitive or sustainable.

33 In some cases, however, women are more satisfied with their jobs and working conditions (income, other benefits, and hours worked) than other workers with better working conditions, because of self-selection and their lower expectations about working conditions (Fabry et al., 2022).

34 Legal and regulatory protection measures apply only to formal workers, who already are more privileged, leaving unprotected the majority and more vulnerable of agrifood sector workers (Dolan, 2004b).

35 Christiaensen & Maertens (2022) review several studies that evaluate these different types of policy interventions in terms of production increases, productivity gains, and improved working conditions.

36 Formal workers tend to capture the benefits in such global value chains, while informal or primary producers do not (Maertens et al., 2012; Maertens & Fabry, 2019).

37 Fabry (2022) reveals that non-wage working conditions are better in agroindustry firms than in small-scale firms in horticulture in Senegal. 85% of agroindustry workers are classified as having decent working conditions, while across the small-scale firms, the figure is only 62%.

stringent standards raise barriers to entry, and firms streamline operations to enhance competitiveness. This raises questions about the feasibility of this goal” (i.e., inclusive business).

Several studies discuss whether working conditions and inclusiveness in AVC improve when the value chain adopts certifications, standards, or an explicit inclusive business model. Most of the literature concludes that the impact of these certifications and business models on working conditions and inclusiveness vary widely depending on the context, type of AVC, and on the initial conditions of the AVC employment.

Malanski et al. (2022), based on their scientometric review, find that private regulations and the adoption of standards and certifications could affect working conditions, security at work and gender issues. However, they conclude that such regulations and/or certifications have different effects on working conditions depending on the context, type of value chain, and characteristics of workers.³⁸ They recall several studies that document how these private regulations and/or certifications improve working conditions for qualified male workers, with no effect on working conditions for women or subcontracted workers.³⁹

Oberlack et al. (2023) state that the use of certification to improve worker well-being can have positive results for some farmers under certain conditions, but insignificant or even adverse results under others. By identifying several barriers that could explain these diverse results, they propose the use of an “*instrument portfolio*” that includes inclusive business and solidarity economy strategies and instruments, together with certification to address such barriers.

The impacts of certification on agricultural producers and wage-earners in low- and middle-income countries are heterogeneous, and for the more vulnerable workers and producers, such as women, the impacts are few or inexistent (Christian et al., 2013). Standards and certifications are relevant instruments for improving working conditions, but only for a relatively small group of specific AVC and their workers. They thus could affect the working conditions of only a subset of agrifood workers, mainly male workers in agro-industry and export-led value chains, rather than domestic value chains.⁴⁰ Women are less likely than men to work in such certified AVC, and when they do, they tend to receive lower wages than men (FAO, 2023).

Another group of AVC that tend to offer better working conditions are those related to Fairtrade. As discussed in the previous section, however, these reach only a small number of

AFS workers. Fairtrade, by design, aims to increase the share of total value added from consumers to farmers through price premiums, but the literature finds that these premiums usually are more than offset by the higher costs of participating, including the cost of certifications. Meemken (2019) found positive impacts of Fairtrade for AVC workers, but no impact on agricultural producers.

Bain (2010), analyzing GLOBALG.A.P. adoption in the Chilean fresh fruit export value chain, found that power inequalities within the value chain affect the benefits that such certification could have for workers. In AVC, where some groups, such as retailers, have more power, they build institutional arrangements to protect their interests, negatively affecting the potential benefits that this type of certification could have for workers (mostly women workers with flexible contracts).

In the cases of Pakistan and India, Ghori et al. (2022) find no impacts on labor conditions derived from implementation of the Better Cotton Initiative, a key example of a “*cooperation-compliance*” model for sustainable cotton production. The Better Cotton Initiative achieved higher incomes and lower input costs for adopters, but no positive impacts on labor conditions. As other studies conclude, context–geography and institutions—is relevant for explaining differences in impacts across settings.

Van Herck & Swinnen (2015) question whether in Bulgaria standards are responsible for the decrease of 50% in the number of households supplying milk to a dairy company in only six years. They find that the main reasons include aging and health of the household and an increase in off-farm employment alternatives, rather than supply chain modernization or more stringent milk quality standards.

In addition to contextual characteristics and types of AVC, the type, and scale of the firm are factors that partly determine the provision of complementary services to workers. Reviewing the resilience of value chains under Covid-19, the literature indicates that agribusinesses with more resources were able to provide better protection for their workers than small-scale firms or firms integrated with more local value chains. The former were more resilient than smaller or more local AFS firms. For example, workers in global vegetable value chains in Senegal received face masks, gloves, and information about how to protect themselves against Covid-19, together with better transportation facilities and rules to ensure social distancing (Van Hoyweghen et al., 2021).

38 There are cases in which the adoption of standards may not work. See, for example, Freidberg (2010) for the case of ethical trade standards for selling Zambian horticulture products to supermarkets.

39 Barrientos & Kritzinger, 2004; De Grammont & Lara Flores, 2010; Kritzinger et al., 2004; Riisgaard, 2009; Riisgaard & Hammer, 2011; Tallontire et al., 2005

40 For an analysis of the effects of global value chains on workers’ health, see Cross et al. (2009).

Collective action, unions, and improved working conditions

Labor unions can contribute to higher wages for agricultural workers. By organizing in unions, workers can bargain collectively with employers to improve their working conditions, such as higher wages, improve workplace safety, and reduced workload (Riisgaard & Hammer, 2011). Labor unions can also play a significant role in price negotiations; with higher prices, improvements in unionized workers' incomes can be achieved.⁴¹

Participating in farmers' organizations tends to improve incomes, and in some cases also crop yields and product quality. Collective action organizations also empower rural participants and help achieve positive development results, but they are complex to develop and take a long time to consolidate as organizations (Bosc, 2018). Based on a review of 239 studies of seven types of farmers' organizations from 24 countries (23 countries in Africa plus India), Bizikova et al. (2020) find positive impacts on income in 58% of the cases and no impact on income in 15% of the cases; less than 5% of the analyzed cases showed an impact on access to employment. For women, self-help groups were relevant for increasing empowerment and access to credit.⁴² For men, who benefit most from participating in farmers' organizations, benefits also include access to assets, information, and better marketing opportunities. Rural youth have very limited opportunities to participate in collective action organizations (Trivelli & Morel, 2019).

There are studies that look at the effect of farmers' collective action on the probability that they will participate in contract farming and obtain positive economic and social results from such participation. Some studies have confirmed that belonging to an organization increases the probability of participating in a contracting scheme (Berdegué, 2001; Escobal & Caverro, 2012; Otsuka et al., 2016), in some instances by up to 50% (Bellemare, 2012).

Producer organizations can reduce transaction costs by actions such as helping to ensure the required production and product standards, or bulking produce from many smallholders before delivery to the buyer. They can provide technical assistance and training to producers and facilitate access to credit. They also can mitigate power asymmetries between buyers and producers when negotiating and enforcing contracts (Berdegué, 2001). Participating in communal, collective organizations reduces risk perception, improves access to information, improves social learning, and strengthens workers' participation in negotiations with contractors (Brandão & Schoneveld, 2021). All of this can result in significantly higher profits for organized farmers in contract farming schemes, compared to those who participate as individuals (Warsanga & Evans, 2018).

In rural Africa, where most agricultural workers are not part of unions. Unions and worker associations are scarce, and agricultural unions are even scarcer. Dolan (2004b) states

that in Kenya, agricultural workers' unions are weak and most Kenyan workers in the horticulture value chain cannot join the agricultural workers' union because of their types of working contracts. In South Africa, which has a relatively high unionization rate, 28% of workers participate in unions, but the figure is only 6% for agricultural workers' unions (Christiaensen & Maertens, 2022).

Ahsan et al. (2018) found that labor unions had a significant positive impact on mango producer incomes in Pakistan, with a larger effect found in certified than non-certified orchards.

An illustrative example comes from Selwyn (2013), who found that, thanks to the actions of the Rural Workers Union (STR), some companies in Brazil's fruit agribusiness committed to increasing workers' wages above the national minimum wage and increasing overtime pay, among other improvements in working conditions. These benefits, however, did not include all workers. To cushion the rise in labor costs, companies may restructure toward more flexible labor contracting models, reducing the number of permanent workers and replacing them with temporary, subcontracted workers. The latter tend to have less individual bargaining power, and it is more difficult for them to unionize, as they lack robust legal protections and are more exposed to job instability, because they are engaged in less essential and lower-skilled productive work (Dolan, 2004b; Riisgaard & Hammer, 2011; Selwyn, 2013).

Social protection for agrifood value chain workers

Social protection interventions are necessary, but not sufficient, to support inclusive rural transformation (Trivelli et al., 2017) and constitute a key component of decent work. FAO (2023) summarizes well the role of social protection for rural women and men: *"Social protection is a key risk management tool for rural women and men. Social protection programmes are highly effective in enhancing household welfare across a number of dimensions, including providing relief from deprivation, helping avert deprivation, enhancing livelihoods and productive capabilities, and fostering socioeconomic inclusion and equality"* (p.99).

Social protection can be seen as three major sets of interventions: protective or social assistance (cash transfers or social pensions, for example), preventive or social insurance, and labor market programs (unemployment insurance, pensions, or access to health benefits for example), and promotional or economic inclusion programs (graduation programs, productive social protection interventions, financial inclusion, and training, among others). The so called *"double inclusion"* occurs when social protection combines at least social assistance with promotional/economic inclusion interventions. Adequate social protection linked with agricultural and other sectoral policies is a necessary condition for achieving economic and social inclusion (Rolon et al., 2022).

41 See the case of the National Union of Cotton and Food Producers in Mali during the 1990s, discussed in (Bosc, 2018).

42 As also documented by Saha (2020) and Desai & Joshi (2014) for the case of India.

Social assistance interventions are by far the most common form of social protection in the developing world, while in higher-income countries, social insurance is the more common form of social protection (Lowder et al., 2017). Social insurance interventions are associated with decent work conditions and are mostly financed by contributions from employers and employees, while social assistance is financed by taxes.

Social protection spending represents 36% of total government expenditures globally, covering around one-third of the population with some form of social protection. About 90% of the amount spent on social protection is attributable to social insurance in high-income countries. In low- and middle-income countries, social protection coverage varies among regions. Social protection coverage is not proportional to poverty (Lowder et al., 2017a).

Social protection coverage varies among regions and between urban and rural settings. In low- and middle-income regions and in the rural sector, social assistance interventions are more common than social insurance (Figure 3 based on ASPIRE, World Bank, and Figure 4 for rural/urban data based on Annex 1 from Lowder et al. (2017), also with data from ASPIRE). As Lowder et al. (2017) report, the predominance of social assistance translates into modest social protection for the targeted poor in the developing world.⁴³ On average, social assistance interventions provide daily per-capita benefits that represent only around 11% of the amount of social insurance benefits.

While there is growing attention to economic inclusion programs and other “*promotion*” types of social protection, they are still far from being institutionalized and scaled. Andrews et al. (2021) report more than 200 economic inclusion programs implemented in 75 countries that reach more than 90 million users. They are intersectoral in nature and have the potential to scale and improve the livelihoods of the poor in a sustained manner. Nevertheless, this set of (varied) economic inclusion interventions is not always considered part of social protection.

Social protection could enhance agricultural production, while more productive agriculture jobs and better agrifood production could help reduce poverty and vulnerability among agricultural workers and their households. Despite the potential benefits of social protection for enhancing agricultural outcomes, and even though agrifood workers are overrepresented in rural areas and among the poor and vulnerable, there is no social protection strategy or set of social protection interventions adapted or responsive to rural or agricultural contexts (Trivelli et al., 2017).

Using data from 38 African countries, Osabohein et al. (2020) show that social protection has a positive impact on agricultural employment.⁴⁴ Social protection coverage allows rural and poor households to make better decisions

43 In low- and middle-income countries (around 2015), 26% of the extreme poor received social assistance programs and 3% received social insurance programs (Lowder et al., 2017).

44 Osabohein et al. (2020) find that all else being equal, a 1% increase in overall social protection can potentially increase agriculture employment by approximately 0.22%.

Figure 3. Coverage (%) 2010-2019W

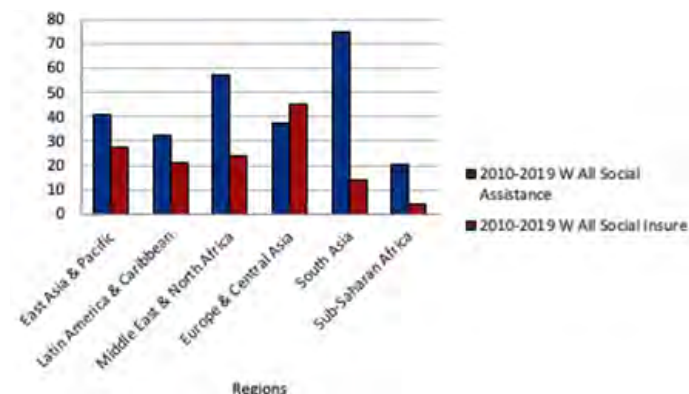
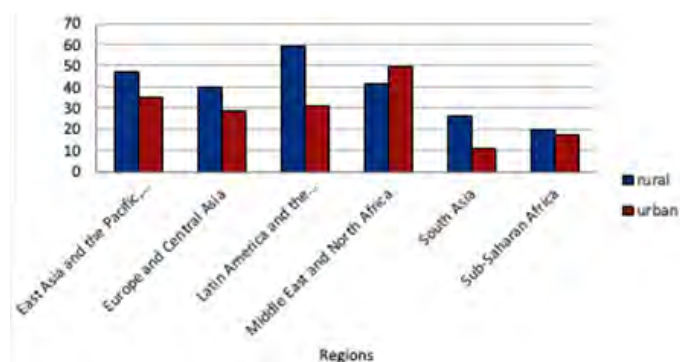


Figure 4. Share of population covered by social assistance



Source: Data reported by Lowder et al 2017 on Annex 1

and invest in more profitable activities by allowing them to better manage risks, relaxing their budgetary constraints, and improving the local economy and communities (Vos & Cattaneo, 2021).

Based on a review of around 160 social protection impact evaluations and 140 evaluations of agricultural programs, Tirivayi et al. (2016) found that there is substantial evidence of the benefits of linking agricultural and social protection interventions. Nevertheless, they find that “*the empirical literature on the agricultural outcomes of social protections is neither extensive nor well established*” (p. 58). They found that social protection instruments, mainly social assistance interventions, increase input use, farm output, and agricultural assets. They also indirectly support investments in human capital, increase off-farm activities, and prevent risk-coping strategies that could deplete household assets, among other positive outcomes. The authors also found that interventions to support smallholders increase their assets, productivity, income, consumption, and food security, and they therefore can become social protection interventions if targeted to the poorest and more vulnerable households (p. 59). Social protection has been successful in increasing women’s resilience (FAO, 2023).

Contract farming, agribusiness, and global agrifood and export-led value chains tend to offer better social protection coverage to their direct wage-earners. However, this positive situation for those workers could be widening inequalities among workers in the agricultural sector (Brandão & Schoneveld, 2021). To be effective in a particular location, social protection must cover the needs of all people, especially the most vulnerable.

Perin et al. (2022) conclude, in the case of West Africa, that AVC workers are in a complex position: they are not among the poorest, but they are mostly excluded from social protection. Because there is limited access to basic services, the impact of social assistance and social insurance is also limited. There are no specific social protection programs to enhance the rural livelihoods of agrifood workers' households. For Near East and North Africa, Sato (2021) finds that agricultural workers are often excluded from social protections, especially contributory schemes. In addition, given the regional context, the author finds that social protection has a great potential to respond to risks (climate risk and armed conflict), reduce poverty, and promote agricultural development.

In both studies, when reviewing the coverage of existing social protection instruments and programs, Perin et al. (2022) and Sato (2021) conclude that relevant groups of agrifood workers are systematically excluded from such services. Self-employed women are the key example of a group that lacks access and faces barriers in access to such social protection programs. As we have discussed, they are a group that needs such services.

Rolon et al (2022) review the case of Latin America and the Caribbean and find that more than 45% of the rural population lives in poverty conditions, based on ECLAC estimates for 2019, and most of the poor rely mainly on agriculture for their livelihood, as family farmers, agricultural workers, or family members contributing to agricultural production. But only 21% are covered by any form of pension because of barriers to access social protection, such as population dispersion, legal obstacles, and lack of access to services (Winder Rossi & Faret, 2019) and because the benefits are not adequately adapted to rural realities (seasonality, diverse livelihoods, among others).

Social protection, mainly when providing simultaneously multiple types of support to promote double inclusion (social and productive), has been shown to positively impact agrifood workers' well-being (Rolon et al., 2022; Tirivayi et al., 2013, 2016; Winder Rossi & Faret, 2019). These wider social protection interventions, combined with better targeting and delivery mechanisms, are key to improving AVC working conditions. Digital technologies play a role in facilitating these improved impacts, as was shown during the Covid-19 pandemic.⁴⁵

45 Recent literature reviews the role of digital innovations in improving social protection in rural areas; see, for example, Burattini et al. (2022) and Rolon et al. (2022).

46 Figure 2.6 in FAO (2023) presents overall data and regional breakdowns, showing that this trend holds in all regions except for Africa, where the share of contributing women family workers is larger in off-farm AFS.

11. Female employment, gender, and agrifood value chains.

Gender issues are among the topics receiving the most attention in the recent literature on labor markets and employment in agrifood chains. This is a conclusion common to reviews by Schumacher (2014); Malanski et al. (2021, 2022), and Christiaensen & Maertens (2022). According to Malanski et al. (2022), in the last 20 years, research on gender issues linked to rural employment in agrifood value chains has grown steadily. These analyses refer to changes in the quantity, quality, and characteristics of female employment in the agrifood sector, and to some extent to changes in gender relations in the domestic environments, community settings, and the public sphere (empowerment, cultural norms, restrictions to mobility, changes in power relations, etc.), as well as women's economic, political, and social relations.

A recent study by FAO shows that in 2019, 38% of working women globally were employed in AFS (8 percentage points less than in 2005) while 38% of working men worked in these AFS (9 percentage points less than in 2005). Most of these workers, both men and women, work in primary agricultural production. Women represent 38% of total AFS employment worldwide, but—as we discuss further, and the literature shows—with high variations among regions and countries. Thus, women do not constitute most workers in AFS. Globally, women account for 38% of all agricultural workers in primary production (crops, livestock, fisheries, forestry) and 41% of all workers in off-farm segments of all AFS (FAO, 2023a).

Most own-account agricultural production is based on self-employed family workers (paid or unpaid) and contributing family workers (mostly unpaid), and women are overrepresented in the latter: 49% of women in agriculture work as contributing family members, compared to 17% of men. Own-account work and contributing family members' work represent lower shares of workers in off-farm segments of AVC, reducing the share of women in the more vulnerable jobs as they move out of primary agricultural production (FAO, 2023).⁴⁶

The proportion of female workers tends to be larger in food processing and services activities—accounting for more than 60% of workers in 12 out of 18 countries analyzed—than in agricultural production, but with significant variations among the countries studied. In seven of the 18 countries analyzed, women account for 80% or more of the workers in AFS food processing and service activities, while in one country, Malawi, women represent less than 30% of all workers in these activities.

The literature shows important participation and significant increases in female employment, especially at the farm production level and in postharvest processes (sorting, packaging, etc.), and less in transportation tasks, commercial intermediation, and contract negotiation. The former

are areas in which gender roles (and stereotypes)—being careful, patient, self-sacrificing, having suitable physical characteristics, such as smaller hands, etc.—are reinforced.⁴⁷

Women represent 51% of workers in food processing and service, 50% in trade (35% in wholesale and 53% in trade), and only 15% of workers in transportation (FAO, 2023). Studies also show that in postharvest activities, especially sorting and packing, there is a clear gender differentiation that is reproduced over time and is reinforced by surrounding social and cultural norms. An illustration of this can be found in De Castro et al. (2020), in the case of fruit-packing plants in Spain; in the work of Bullock et al. (2018) on value chains in Tanzania; and in Adam et al. (2019) for the corn chain in Mozambique.

Several studies have illustrated the heterogeneity of women's participation in AFS employment. Using data from six African countries, Palacios-Lopez et al. (2017) estimate that women on average account for 40% of total agricultural self- and wage employment.⁴⁸ Allen et al. (2018) find that in West Africa, most of the workers in food sales are women (72%). McCullough (2017) reports that the percentage of female rural workers in agriculture varies between 52% and 57% in self-employment production in Ethiopia, Malawi, Tanzania, and Uganda, and between 38% and 54% in wage agricultural work. Mukasa & Salami (2015) show that the gap between men and women working for a wage could be around 50% in Tanzania and 66% in Uganda (around the year 2013), and that rural women are more likely to be engaged in part-time and low-paid jobs when working for a wage, and are also overrepresented among unpaid workers in the agricultural sector.

Haggblade et al. (2010) find that women account for around 25% of full-time rural non-farm employment in the developing world. For the case of 11 Latin American and Caribbean countries, Reardon et al. (2001) found that between 65% and 93% of employed women worked in the non-agricultural sector, while men were primarily employed in the agricultural sector, except in Costa Rica and the Dominican Republic. McCullough (2017) reports that the share of self-employed female rural workers in the industry and service sectors varies among the four countries she analyzes (Ethiopia, Malawi, Tanzania, and Uganda), but in a range that is quite close to the share women represent in the agricultural sector. That similarity does not hold for wage work, however. In the industry and service sector, the share of female wage-earners varies in a range, with substantially lower levels of female participation than in the agricultural sector. In the four countries, self-employed women represent between 52% and 57% of workers in agriculture, as noted above, while they represent between 52% and 66% in industry and between

40% and 56% in the service sector. In wage jobs, women represent between 38% and 49% in agriculture, 10% and 34% in industry, and 21% and 36% in services.⁴⁹

An issue of growing interest in the literature is the study of the effects on female employment (quantity, quality, and working conditions) of the globalization of AVC, the transition to contract farming, and the adoption of different standards and certifications in AVC. This growing interest rests on the assumption that *“working in value chains provides millions of women with jobs and incomes – which can bring greater economic independence, social connections and voice. With higher incomes, women are more likely than men to support household welfare and children's education”* (Christian et al., 2013, p. 6)

Despite the number of studies of changes in gender systems related to female employment in value chains, the literature fails to conclude whether the jobs that women access in agrifood value chains are beneficial for them or if they manage to reduce the inequality of gender systems (Schumacher, 2014). Maertens & Swinnen (2012) conclude that women benefit from working in large-scale and agro-industrial production as workers (gender gaps are lower as women work more in these types of employment), and that their benefits are larger than those obtained when they work in smallholder contract farming. However, Barrientos' work emphasizes that working in AVC does not necessarily improve employment and working conditions.⁵⁰ There is mixed evidence in this regard. Evidence about the impacts of AVC work on female employment varies according to the worker's initial situation (asset endowments, knowledge, voice, empowerment, etc.), country, existence of effective regulations, type of product, destination market, the link of the chain in which they work, etc.

Several studies with evidence from different AVC show mixed impacts for women. For example, studies with evidence from the horticultural chain in Africa, particularly Kenya, show that in this value chain, labor conditions improve for men and not for women (Riisgaard, 2009; Riisgaard & Hammer, 2011; Tallontire et al., 2005); (Barrientos et al., 2003a; Kritzinger et al., 2004), (Barrientos et al., 2003; Tallontire et al., 2005). The same is true for fruit export value chains in Africa (Barrientos, 2014a; Barrientos & Kritzinger, 2004; Kritzinger et al., 2004). Studies of jobs in short chains or chains linked to supermarkets, and studies that evaluate the effect of certification mechanisms and adoption of private standards on men's and women's employment, find different effects in different chains, places, and workers. In contrast, studies like Maertens et al. (2012) find that higher female employment

47 Despite this, Kramer & Lambrecht (2019) found that women and men show similar preferences (no gender gap) for on-farm and off-farm work.

48 The percentage of female agricultural employment ranges from 24% in Niger to 56% in Uganda (Palacios-Lopez et al., 2017). In chains such as beans and tomatoes in Senegal, female employment represents 90% and 60% respectively (Maertens et al., 2012). Allen et al. (2018) find that in West Africa, 51% of total employment in the food system is female, and that between 37% (Nigeria) and 54% (Burkina Faso) of agricultural food employment is female; in rural areas, therefore, three-quarters of female employment is related to the food sector.

49 Because of social and cultural norms and their role in the care economy, many women can only participate in part-time rural non-agricultural work or in activities that can be carried out in their homes.

50 Barrientos, Gereffi, et al. (2011); Barrientos, Mayer, et al. (2011); Barrientos, (2008b); Barrientos et al. (2003a); Barrientos & Kritzinger (2004); and Tallontire et al. (2005), among others.

in bean and tomato chains in Senegal reduces gender discrimination and the wage gap between men and women, compared in relative terms to other sectors and jobs.

Where there is agreement, as Malanski et al. (2022) point out in their review, is that women are among the most vulnerable workers in the sector, and female employment in AVC is characterized by being informal and precarious, having inadequate working conditions, and being concentrated in lower-paid and less-skilled segments.

Although there is literature that highlights improvements in working conditions and increasing wages (Maertens et al., 2012; Maertens & Swinnen, 2009; Singh, 2002), the positive cases are limited to certain types of value chains (with consumers involved from northern countries and/or value chains adopting decent labor standards and regulations which there is compliance, such as several fruit value chains or some AVC that operate with global rules). Positive effects for women can also be found in value chains operating in environments that have managed to introduce, apply, and enforce legal and regulatory changes, such as adoption of minimum wage schemes in South Africa.⁵¹

Little evidence was found of positive impacts of specific regulatory and legal measures aimed at improving women's working conditions. The limited evidence probably has to do with the informality of most women's jobs in AVC. It could also be that because of new regulations, employers were incentivized to avoid formal contracts with women, as described by Selwyn (2013) in the case of Brazil.

Overall, however, the literature fails to conclude whether entering global AVC is beneficial for women (Schumacher, 2014). The evidence varies from chain to chain and between product lines, countries, regions, etc. There are successful fruit value chains in Kenya and Uganda (Ampofo et al., 2004) and agribusinesses in Senegal (Fabry et al., 2022). There also are examples of the opposite results in the same environments, such as the horticulture value chain in Kenya (Dolan, 2001; Dolan & Sorby, 2003; Tallontire et al., 2005) and the cocoa value chain in Ghana (Barrientos, 2014b). Singh (2002) concludes that contract farming creates and/or enlarges gender inequalities as female employment grows (in absolute numbers or in relative terms to male workers) because women are seen as good workers who cost less than men because they receive lower pay.⁵² Global chains, with certifications and pressure from final consumers that generate regulations to influence better working conditions, have different—and sometimes contradictory—effects in different chains (Malanski et al., 2022, p. 461).⁵³ Bolwig et al.

(2008) point out that few studies have documented the impact of these global value chains on poverty, gender systems, and the environment. De Grammont & Lara Flores (2010) find that consumer pressure makes global chains adopt standards and improve quality, but this is often achieved at the cost of wages and working conditions. Barrientos et al. (2003b) conclude that codes of conduct covering employment conditions for Southern firms (mostly in Africa) exporting fresh vegetables to Europe and the United Kingdom are not gender sensitive, and Barrientos (2008a) showed that corporate contract labor codes do not reduce inequalities for subcontracted workers. For this reason, it is not clear whether studying the global AVC is useful for analyzing changing gender relations (Schumacher, 2014).

Authors such as Maertens et al. (2012) concluded that supply chains for food exports led to the feminization of the rural labor market. Dolan (2004b) states that work in the global horticulture value chain can be considered a case of feminization (60% of farm workers and 66% of packhouse workers are women, substantially more than women in wage employment in Kenya). Recognizing the increasing presence of women workers in AFS, Christiaensen & Maertens (2022) say it is important not to generalize conclusions referring to the fact that these increases in female employment imply a feminization of AVC, as several studies propose. In the African region, they report differentiated trends within and between subregions in particular AVC. For example, women have entered wage jobs in agriculture in North and South Africa, while in West Africa there is a faster exit of women than men from agricultural wage employment and a strong permanence of self-employed women in agriculture. The literature also highlights that women face barriers (beyond their control) to holding different jobs in AVC—their insufficient time available lack of assets and skills, especially for primary production,⁵⁴ limited access to services, limiting cultural norms, mobility restrictions, etc., there are limits to the growth of female employment in AFS. The literature also shows that male out-migration from rural and agricultural activities creates a de-masculinization process that is compensated by more women entering such activities.⁵⁵

In addition to a growing trend in the number of female jobs, the literature has paid particular attention to the income gap between women and men in the same activities, as well as the gap in earnings in other non-agricultural or non-rural jobs. There is a consensus that women earn less than men in jobs in the AFS.⁵⁶ Based on microdata from 10 countries, FAO (2023) estimates that women earn 82% of male wages in AFS and concludes that wage gaps in agriculture and

51 Bhorat et al. (2014)

52 Singh (2002) even points out that contract farming leads to processes of self-exploitation of workers, and Dolan (2004) concludes that the increasing demand for employment in global agrifood value chains benefits from the “comparative advantage of women’s disadvantage” (p. 124).

53 Female employment tends to be limited in high-value agro-export chains, although in some cases there is a “feminization” of certain value chains, including beans and tomatoes in Senegal (Maertens et al., 2012) and the horticulture value chain in Kenya (Dolan, 2004). Dolan & Sorby (2003) document the feminization and flexibilization of high-value agrifood chains.

54 Limitations well documented in the literature; see, for example, Adam et al. (2019); Barrientos et al. (2003); Barrientos & Kritzing (2004); De Grammont & Lara Flores (2010); Kritzing et al. (2004); Riisgaard (2009).

55 See Box 2.3 in FAO (2023) for further discussion of male out-migration and the feminization of AFS.

56 However, it is recognized that in the case of some highly seasonal tasks, the hourly income paid to women may be even higher than men's wages in their permanent jobs in these same value chains. One example is the case of Chilean fruit (Jarvis & Vera-Toscano, 2004).

off-farm employment are mainly explained by the structural effect (biases against women, discrimination, etc.).⁵⁷ Atake et al. (2020b) find a 44% gender income gap in on-farm work in Togo. Singh (2002) estimates that in contract farming in India, a female worker's wage is 50% to 60% of a male worker's wage. Despite this gap, however, there is agreement on the importance of this income from women's agricultural employment for women and their households. Nevertheless, although female employment outside agricultural production is more limited, earnings from non-farm employment are most strongly associated with development improvements (empowerment, schooling, nutrition) for women and their families (Maertens & Swinnen, 2012; Maertens & Verhofstadt, 2011; Njuki et al., 2021).

Besides the persistence of gender income gaps, the literature explores the greater likelihood that women will in AFS will labor in inadequate working conditions. Women work mostly in informal jobs, face high seasonality in employment opportunities, and work mainly in the Global South, where institutions responsible for protecting women workers' rights are weak. Women are more likely than men to hold informal and unpaid jobs (Mukasa & Salami, 2015). These female job characteristics, although varying significantly between value chains, regions, and products, tend to limit women's access to decent working conditions. Most female workers in AFS do not get benefits such as health care, maternity leave, daycare, etc. There is no assurance that contracts—if any—will be renewed, and women face abusive hiring practices and/or harassment. These inadequate working conditions for women therefore end up reinforcing gender schemes that limit women's development.⁵⁸

An issue of interest in literature relates to the productivity of women's work. Several studies analyze women's productivity, its differentials with respect to men, and how relevant productivity is in explaining gender income gaps. The main conclusion is that the productivity of female work (not only wage work) is mainly explained by factors related to the initial conditions (endowment effect) they face, such as lower educational level, limited alternative employment opportunities, and restricted access to agricultural services. Based on data from five countries, FAO (2023) estimates a gender labor productivity gap among plot managers of 35%, of which 28 percentage points correspond to endowment effect and seven percentage points to structural effect. This shows that endowments, mainly land plot size, are a relevant explanatory factor for productivity differentials, but that that the structural effect is also relevant, as addressed by the literature. This means that cultural and social norms that translate into mobility restrictions and less time available to work outside their homes, because of women's reproductive and care responsibilities, are also crucial for understanding this productivity gap. Manda (2022) finds that even in cases where efforts are made to include women in AVC, differential access to land and other productive resources ends up

limiting their participation.⁵⁹ Fabry et al. (2022) find a wage gap of 24% in horticulture in Senegal and that women have less access to contracts but do better in dimensions such as having acceptable working hours and a safe working environment. They find that 97% of the wage gap is explained by the endowment effect (initial conditions).

Along with income analyses, the gender productivity gap also needs to be re-examined. The productivity gap between men and women is significant in AFS. Women's lower labor productivity in food production depends on their initial asset endowment and their access to opportunities for complementary productive resources (land, tools, technology, advisory services, credit), but also on existing social and cultural norms.

Mukasa & Salami (2015) show that on average, female-managed agricultural plots are 19%, 27%, and 31% less productive than those of their male counterparts in Nigeria, Tanzania, and Uganda, respectively, and that the endowment and structural disadvantages of female agricultural producers are the main drivers of such gender gaps. Palacios-López & López (2015) found a 44% gender productivity difference between male and female-headed plots, of which 34% was explained by labor market imperfections. However, when controlling for external conditions affecting women, the results show smaller or no differences in productivity between men and women. As stated before, Fabry et al. (2022) found that in Senegal's horticulture, 97% of the wage gap between male and female workers was explained by the initial endowment.

The literature identifies productivity gaps between men and women, but also proposes that the productivity of female employees must be re-examined and analyzed in terms of effective hours worked at the different jobs within each AVC and during the different seasons. McCullough (2017) finds that productivity gaps between the agricultural sector and other economic sectors are halved when controlling for hours worked. For this reason, she proposes that the four African countries that she analyzes are more a reserve of underemployed workers than a bastion of low productivity. Jarvis & Vera-Toscano (2004) add that there is a need to consider the importance of seasonal employment and analyze in depth its role in gender dynamics and productivity analyses.

FAO (2023) discusses the relative importance of endowment and structural effects on women's labor productivity gap in wage employment based on microdata from 10 countries. It concludes that structural effects, particularly gender biases and discrimination, are more important than the endowment effect in explaining this gap. The structural effect is more relevant in agricultural wage activities than in off-farm wage activities.

57 The wage gap in agriculture is estimated to be 18.4% (6.4 attributed to endowment effect and 11.9% to structural effect) and 15.8% in off farm wage employment (6.1% attributed to endowment effect and 9.7% to structural effect)

58 See for example Bullock et al. (2018) and Jacobs et al. (2015)

59 Analysis in the case of sugarcane in Zambia.

An emerging topic in the literature on women's employment in AFS is the role of new technologies in generating opportunities for women. Several papers discuss whether these new technologies and their unequal levels of adoption will open more and better job opportunities for women in AVC and increase women's bargaining power, or whether, on the contrary, they will further relegate women to poor-quality, informal, precarious, and low-paid jobs. Understanding the potential of these technologies to impact gender systems is something that needs further analysis.⁶⁰

Digital and new technologies, including mechanization, are recomposing labor portfolios in the AVC in ways that are still little known. Digitalization and automation open up opportunities for women to access services and improve their productivity and opportunities (see the MPESA case documented by Suri & Jack (2016) or the work of Rajkhowa & Qaim (2022) that shows that having a mobile phone increases the chances of having a job outside the farm to a greater extent for female-headed households). At the same time, however, since women (particularly in the informal sector and within the poor) are the ones who face the greatest lag in access, adoption, and use of new technologies, they may widen already existing employment, income, and productivity gaps. Worse yet, the lag in use could end displacing women from their present jobs (for example, through mechanization of tasks such as weeding or the introduction of tractors that reduce the need for manual weeding) (FAO, 2022; Fox & Signé, 2021). Charlton et al. (2022) conclude that the adoption of new technologies and automation, contrary to what is usually thought, can stimulate employment (expand productive opportunities, expand the agricultural frontier, generate new jobs with greater added value, etc.), while also recognizing that there will be distributive problems in this process, which must be monitored and addressed.

To help close gender gaps in food production, AVC, and rural areas, women's access to productive technologies (seeds, fertilizers, conservation practices) and quality public and private services and infrastructure (for production and marketing, such as financial services, advisory services, etc., and to telecommunications, energy, roads, and safe transport services), must remain high on the rural development agenda. Accordingly, access policies to these technologies, services, and basic infrastructure, as well as educational schemes that promote and facilitate their adoption by women, must be implemented (T. Allen et al., 2018).

One final issue highlighted in the literature is that studies of gender and women's employment in AFS give substantive attention to analysis of changes in the amount and characteristics of female employment and focus less on changes in power relations between men and women, and between women workers and their employers. Gender systems in women's employment in AFS must become a central issue.

60 Schumacher (2014) proposes the need to study the impact of supermarkets and mobile phones on gender roles and gender relations, to understand changes in the production and consumption of food.

61 With the notable exception of the work by Barrientos (Barrientos et al., 2001, 2003a) on gender pyramids.

62 Desai & Joshi (2014) reported that women participating in SEWA (Self Employment Womens Association) in India increase their incomes, but also that this income increase was larger (up to a 35% increase) for the more disadvantaged women.

Bolwig et al. (2008) conclude that AVC are characterized by asymmetrical power relations in which women tend to have less power than men, and that women's power diminishes even further in the downstream links of the value chain. Dolan (2004b) states, for example, that agricultural and postharvest jobs in AVC are segregated by gender, and that the more flexible jobs (done mostly by women workers), without social protection or other benefits, serve as a buffer that allows firms to offer such protection to permanent employees (mostly men), reinforcing unequal gender systems. Likewise, there are limited works with conceptual contributions about how to incorporate gender analysis in the study of value chains (Schumacher, 2014).⁶¹

Christiaensen & Maertens (2022) point out the need to recognize that because of their care and reproductive obligations, women face cultural norms and gender stereotypes that are central to understanding why they are often overrepresented among underemployed workers (as defined by time or income). Women are less likely than men to be working for wages or to be full-time employees (FAO, 2023). In addition, as Malapit et al. (2020) note, these gender system characteristics are important for understanding women's employment in agrifood value chains, as well as the benefits they obtain from such jobs. Based on a review of 239 studies of farmers' organizations, Bizikova et al. (2020) conclude that they are less effective at improving income, production quality, and better yields for younger, less literate, and female farmers. Evidence mainly from India shows that belonging to women's cooperatives or self-help groups has a positive impact on empowerment and access to credit.⁶²

Dolan (2004b) discusses how employers show gender biases when contracting, such as offering only certain jobs to women, but notes that women also have gender-based incentives when choosing employment options in AVC. For example, women opt for flexible work that allows them to attend to their household care responsibilities, even though such jobs may be informal and precarious. Christian et al. (2013) show that women are often invisible workers in AVC. Women represent 75% to 80% of the floriculture value chain, for example, but those jobs are concentrated in the lower-status tiers, are unpaid, or represent production on plots with no formal land titling, and thus are less visible for data collection and national statistics.

Without understanding gender systems, it is almost impossible to understand the trends, characteristics, and dynamics of female employment in AFS. But there is also a need to understand the impacts of female employment in gender systems that affect women workers. Gender systems must be analyzed as part of the determinants of female employment in AFS, as well as being considered a result of such employment. Such analysis requires new—and ample—data, analytical tools, and evidence. Malapit et al. (2023) call attention to the need to keep improving methodological

tools and analytical strategies to ensure that they capture the diversity and complexities of gender systems and their impacts.

12. Youth

Around 1 billion of the world's 1.2 billion youth aged 15 to 24 reside in developing countries. Their population is growing fastest in low-income countries, especially in rural areas. Currently, half of all youth in developing countries are rural (IFAD, 2019).

In many developing countries, rural youth engage in subsistence agriculture (OECD, 2021). But restrictions in access to land, natural resources, finance, technology, knowledge, information, and education prevent young people from taking advantage of opportunities to improve their quality of life and contribute to the rural economy (Asensio, 2019; IFAD, 2019; White, 2012). In this scenario, rural youth struggle to find better-paying jobs to escape poverty. Despite this, their unemployment rate is three times that of adults. In addition, an estimated 150 million young workers are poor (IFAD, 2019).

The better the employment prospects, the greater the chances that young people can improve their living conditions and boost agricultural and rural development (IFAD, 2016). The main question is whether AVC helps promote the inclusion of rural youth in employment opportunities.

Rural youth employment

While studies on rural youth employment are distributed around the world, Africa concentrates the greater academic interest due to the rapid growth in population and importance of agriculture in rural employment (A. Allen et al., 2016; Christiaensen & Maertens, 2022; Dolislager et al., 2020; Fox et al., 2016; Fox & Signé, 2021; IFAD, 2019; OECD, 2021; Yeboah & Jayne, 2018). Young Africans in the age of 15 to 24 account for 35% to 40% of the labor force, while an additional quarter of the labor force is in the 25 to 34 age group⁶³ (Yeboah & Jayne, 2018). Meanwhile, 14 million young Africans are expected to enter the labor market each year (IFAD, 2019a).

Although there are a large number of youth in the total population, the labor force participation rates of youths in Africa (61%) are high compared to Asia (39%) and Latin America (48%) (Dolislager et al., 2020). However, some countries in southern and northern Africa have particularly high youth unemployment rates, especially in rural areas (Bezu & Holden, 2014; Carreras et al., 2021; Fox et al., 2016; Sumberg et al., 2021). In fact, a review by Christiaensen and Maertens (2022) confirms the existence of high levels of unemployment among adults and youth (15-24 years) between 2005-2009, mostly in Southern Africa followed by North Africa, but not in other regions of the continent (Figure

5). Nevertheless, underemployment among rural African youth is considerable. A study by Elder et al. (2015, cited by Christiaensen & Maertens, 2022) of eight African countries

Figure 5. Rural unemployment among adult (full line and youth (dotted line) rural labor force

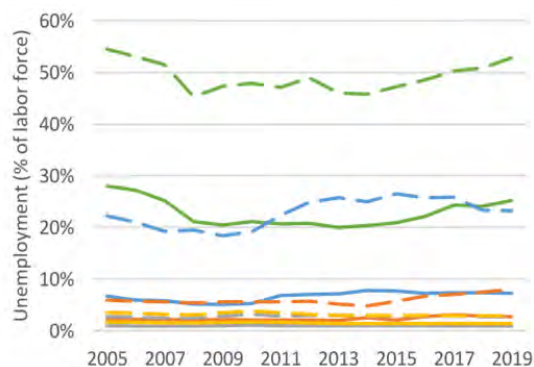
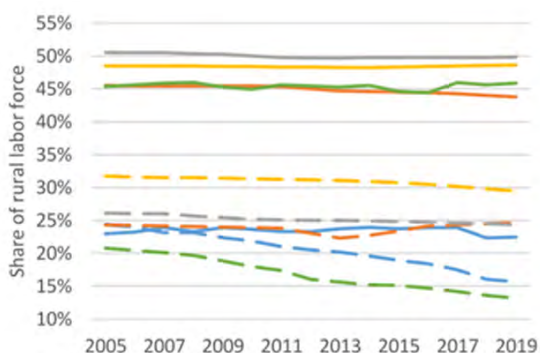


Figure 6. Share of women (full line) and youth (aged 15-24)(dotted line) in rural labor force



Source: (Christiaensen & Maertens, 2022, p.27)

estimates that 7.5% of the youth labor force is unemployed and another third works fewer than 20 hours per week. Furthermore, according to (Christiaensen & Maertens, 2022) between 2005-2009 there is evidence of an outflow of young people (15-24 years) from the rural labor force in all regions of Africa (Figure 6).

Most young African rural workers are informally employed in agriculture but estimates of this proportion vary between 40% and 80% across countries and studies (Abay et al., 2021; Christiaensen & Maertens, 2022; Elder et al., 2015; Fox et al., 2016; Yeboah & Jayne, 2018). According to Dolislager et al. (2020), own-account farming among rural full-time equivalent (FTE) youth is higher in Africa (51%), than in Asia (19%) and Latin America (12%).

The shares of rural youth in FTE agricultural wage employment in Africa, Asia, and Latin America are small (4%, 13%, and 16%), while the shares in FTE wage employment in agrifood value chains (agricultural and non-agricultural) are more significant (21%, 21%, and 23%) (Dolislager et al., 2020).

63 The United Nations defines youth as individuals between ages 15 and 24, while the African Union uses the range of 15 to 35 years.

More recently, Davis et al. (2023) analyzed both agricultural and non-agricultural jobs within AVC for 18 developing countries and found that, in line with Dolislager et al. (2020) and Yeboah & Jayne (2018), young people ages 15 to 35 represent about half of all workers in AVC, especially in Sub-Saharan Africa. Agriculture remains important for job creation and livelihoods for youth in Africa, but less so in Asia and Latin America.

As African youth (ages 15 to 24) move into young adulthood (ages 25 to 34), there is evidence of a decline in the percentage of FTE jobs in agriculture and increased participation in both farm and non-farm AFS jobs (McCullough, 2017; Yeboah & Jayne, 2018). As the age of younger workers increases, they seek more wage work (Jarvis & Vera-Toscano, 2004).

Younger youth are more likely to work in family farming and informal enterprises with low entry requirements and low labor returns due to a lack of skills and work experience, limited access to land and productive resources, an underdeveloped land-leasing market, lack of connections for employment in the formal sector, poor rural infrastructure, and the low economic dynamism of rural territories (Allen et al., 2016; Christiaensen et al., 2021; Christiaensen & Maertens, 2022; Djido & Shiferaw, 2018; White, 2012; Yeboah & Jayne, 2018).

Similarly, economic inactivity among youth ages 15 to 24 varies from 23% in Tanzania to 63% in Nigeria, primarily because of the pursuit of advanced education and training, and secondarily, in the case of women, because of child rearing (Yeboah & Jayne, 2018). For Africa, Yeboah and Jayne also highlight that between 2005 and 2013, the share of FTE jobs in agriculture among young adults has declined rapidly, except in Nigeria, and overall, agriculture's share of FTE jobs declined by 8% to 13% over this period (Yeboah & Jayne, 2018).

Related to the above, there is ample evidence from several African countries, mainly in East Africa, that rural women and youth are less likely to engage in paid non-farm employment and non-farm self-employment than rural men and older workers (McCullough, 2017; Nix et al., 2016; Van den Broeck & Kilic, 2019, all cited in Christiaensen & Maertens, 2022). Indeed, young people are more likely to be unemployed or underemployed in small-scale agriculture, resulting in lower marginal productivity and a lower reservation wage (Maertens & Fabry, 2019).

According to White (2012, p. 11) *“formal education (particularly secondary education) may contribute to the “deskilling of rural youth in which farming skills are neglected and farming itself downgraded as an occupation.” Protection against child labor has led to children and youth completing their schooling without any work experience, while in schools, young people are taught “not to want to be farmers”* (Biriwasha, 2012; White, 2012). In contrast, young people who combine school and part-time work have many more opportunities in labor markets after finishing school (Bourdillon et al., 2010, cited

by White, 2012). In that sense, a new and broader approach to agricultural education and training could provide young people with the skills, understanding, and innovative capacity they need to enter rural labor markets (IFAD, 2010, cited by White, 2012).

Land access for young rural Africans is conditioned by landlessness, corporate concentration, and control of productive resources by older generations reluctant to cede ownership to their children (Anseeuw et al., 2012; Cotula, 2012; Hall et al., 2011; Quan, 2007, cited by White, 2012). The latter causes an evident tension between the older generation's desire to maintain control of resources and young people's desire to take advantage of them, form their own independent farms and households, and achieve adult social and economic status without having to wait until they are 40 or 50 years old (White, 2012). In this sense, youth aversion to agriculture is focused not on agriculture as such, but on young people's vulnerability, village conditions, and the control of farms by local elites and gerontocrats (Peters & Krijn, 2011, cited by White, 2012).

Similarly, Asensio (2019) points out that the demographic transition in Latin America, characterized by the increase in life expectancy, has allowed the older generations to remain active in economic and labor activity, which has delayed the intergenerational transmission of assets (tangible and intangible), forcing young people to obtain their own livelihoods, therefore, the intangible inheritance has ceased to be an efficient economic insertion mechanism, but still very important among the most vulnerable young people with fewer resources. At the same time, adults would be afraid of being overwhelmed by a generation that they perceive as more prepared and ambitious but lacking experience and advancing too fast without considering local traditions and dynamics; while young people complain that adults are excessively conservative and do not take advantage of the opportunities that the new economic dynamics offer for rural territories (Asensio, 2019).

Asensio (2019) also highlights the progress made in Latin America, which, although uneven across countries, regions, and territories, shows that there are more and better employment opportunities in both urban and rural areas. The economy has diversified, and rural youth have a greater variety of employment options outside of agriculture. In addition, state presence has increased in rural areas, which has improved access to basic education and primary health care. In turn, the expansion of information and communication technologies into the rural world has led to a progressive convergence of urban and rural lifestyles. Rural youth now have aspirations, preferences, and practices more similar to those of their urban counterparts, which broadens their educational and economic opportunities. Moreover, there is a growing appreciation of cultural identities in Latin America, which has been reflected in more inclusive legislation and a significant reduction in the most extreme forms of discrimination in the region (Asensio, 2019).

Despite these improvements, the weak economic dynamism of many rural territories implies that the available jobs are of low quality and unprofitable. In addition, education in these areas has problems of quality and relevance, and gender systems are more closed and oppressive than in urban areas, further limiting women's opportunities. Despite advances in economic diversification, these structural conditions still prevail in much of Latin America, posing complex dilemmas for rural youth, who must decide whether to remain in their territories or migrate in search of better opportunities (Asensio, 2019). The latter implies a better understanding of the relative weight of endowment factors (individual or household) and structural factors that determine the inclusion of rural youth in labor markets.

AVC could contribute to increased youth employment. In Senegal, Ghana, and Kenya, certain export-oriented agribusiness sectors have been reported to be particularly inclusive for women, youth and/or migrant workers (Krumbiegel et al., 2020; Maertens et al., 2012a; Oduol et al., 2017, cited by Christiaensen & Maertens, 2022). The use of contracts between smallholder farmers and the palm oil industry in Ghana has led to a significant reduction in the need for domestic labor, including child and youth labor, because of the adoption of more efficient technologies and procedures. Simple marketing contracts allow the saved labor to be employed in off-farm work, while resource provision contracts lead to a stronger reallocation of labor within the farming enterprise (Ruml & Qaim, 2021)

“ In Senegal, Ghana, and Kenya, certain export-oriented agribusiness sectors have been reported to be particularly inclusive for women, youth and/or migrant workers

The role of SME in rural youth employment

Small and medium-size enterprises (SME) in intermediate segments (processors, wholesalers and wholesale markets, and logistics) of transforming AVC have proliferated rapidly over the past decades in Africa, Asia, and Latin America, significantly increasing youth labor market participation

(Dolislager et al., 2020; Reardon et al., 2021; Vos & Cattaneo, 2021). Most SME are located in urban areas, at least in sub-Saharan Africa and South Asia, where the penetration of large-scale processing companies, as well as large wholesale and logistics companies, is still small (Reardon et al., 2021). However, SME employment accounts for one-fifth to one-quarter of rural and urban FTEs employment in these regions and is disproportionately important for youth jobs (Reardon et al., 2021).

Reardon and coauthors place special emphasis on what they refer to as the “hidden middle” and its contribution to youth employment in AVC: “For youth employment, the share of employment in SMEs in the agrifood value chain is 24% of adult FTE and 21% of youth FTE in Sub-Saharan Africa; in Asia it is 26% versus 32%; and in Latin America, 21% versus 23%. This suggests significant inclusion of youth in employment” (Reardon et al., 2021; p.11).

While employment in non-farm segments of AFS is expanding rapidly in percentage terms, in absolute terms, non-farm activities remain the main source of off-farm employment in the African, Asian, and Latin American regions (Dolislager et al., 2020). In the case of Africa, Allen et al. (2016) note that non-farm employment in the agrifood system is growing much faster in percentage terms than employment in agriculture, but the growth starts from a lower base and the contribution to new jobs in off-farm employment is therefore lower than that of agriculture, implying that non-farm employment in the agrifood system will not match it in absolute terms for at least a decade.

“On-site rural employment generation alone will not be sufficient to absorb all new labor market entrants and generate good jobs for all” (Christiaensen & Maertens, 2022; p.10). Labor mobility is necessary to find jobs. Better-educated and better-resourced youth are more likely to migrate and find skilled jobs in cities (Young, 2013, cited by Christiaensen & Maertens, 2022). As discussed earlier, distance to urban centers is a determinant variable for the most vulnerable youth (Christiaensen & Maertens, 2022; De Weerd et al., 2021)

In that sense, rural youth in urban and peri-urban areas significantly increase their participation in wage employment within and outside of AFS, compared to youth in the rural sector, who rely more on their own agricultural work (Dolislager et al., 2020; Reardon et al., 2021; Vos & Cattaneo, 2021). Intra-rural migration could offer young people the opportunity to obtain land or diversify into non-farm employment (Wineman & Jayne, 2017, cited by Christiaensen & Maertens, 2022).

In situations where salaried jobs are not created fast enough to absorb the number of young people entering the labor force, young people may create their own employment in less-consolidated economic niches and with lower entry costs (A. Allen et al., 2016; Fox & Signé, 2021). In Latin America, Asensio (2019) highlights that rural enterprises are uncertain activities that rarely become sources of long-term permanent

employment; rather, they are an adaptive response to existing conditions in rural economies, which imply abandoning enterprises and opening new ones, transitioning between salaried work and self-employment, migrating or remaining in the territory, and engaging in traditional or new activities depending on the conjunctures of the moment.

Despite the difficulties, job opportunities exist for rural youth. Population growth, urbanization, internet access, and rising incomes of the working class are increasing domestic demand for more diverse and value-added agricultural and food products in developing countries (A. Allen et al., 2016; Shukla, 2019). The increase in domestic demand for food could drive job creation in the food economy if local food systems were mobilized to meet the challenge of higher and changing domestic food demand (OECD, 2021).

The opportunity to use new technologies to modernize agricultural production could attract rural youth (Charlton et al., 2022; FAO, 2022; Fox & Signé, 2021).

For example, Information and Communication Technology (ICT) connectivity provides farmers, including youth, the possibility of finding solutions with their peers, as well as accessing productive resources, financing, technical advice, and information, which can improve their market position (FAO, 2017; FAO & ITU, 2016; Mabiso & Benfica, 2019, cited by Vos & Cattaneo, 2021).

Adopting agricultural automation technologies can also benefit the sector, as it can alleviate labor shortages, increase productivity and resource efficiency, improve incomes and working conditions, and generate new business opportunities. However, if this automation is not adequately adapted to local needs, it may result in increased unemployment, especially for flexible and less-skilled labor, including young wage-earners (Dolan, 2004b; FAO, 2022; IFAD, 2016).

The deployment of digitalization and automation could create formal jobs in the service sector at a faster rate than the growth of the labor force, improving incomes in the informal sector. However, this change is likely to be gradual because of the trajectory already established by past demographic change and the current level of economic development (Fox & Signé, 2021).

On average, rural youth are more educated than their parents, positioning them to take better advantage of employment opportunities generated by using technology (FAO, 2022). However, for most employees, whether casual or permanent, skilled or unskilled, formal education is largely irrelevant to job requirements in AVC, while prior training is not. This creates greater vulnerability for younger workers with no prior work experience (Charlton et al., 2022; Rijnks et al., 2022).

Increasingly, successful agricultural entrepreneurs will require access to skilled agricultural extension and marketing workers using ICTs, but the quality of these workers will only be as good as the local vocational and agricultural colleges that train them (Jayne et al., 2014a). Youth may face

particularly high barriers to obtaining quality education and training, as well as accessing land, credit, and markets (FAO, 2022). Thus, while digitalization and automation promise new types of skilled jobs, it is extremely important that their adoption go hand in hand with the implementation of youth-focused human capital development and skills development programs that also facilitate the transition from low-skilled manual activities to more complex technologies (T. Allen et al., 2018; Charlton et al., 2022; FAO, 2022; Jayne et al., 2014a).

Youth in developing countries often face precarious working conditions (Best & Mamic, 2008; Kabeer et al., 2011; Sehnbuch et al., 2020, cited by Fabry et al., 2022), but little is known about how global value chains affect this situation.

A study in Senegal of horticultural agribusiness enterprises found that only 67% of young workers have a decent job, while this percentage is 91% for older workers. In turn, adults earn 21% more, but young people are almost as likely to earn at least the minimum wage (88%). Job characteristics, such as having a contract and permanent worker status, explain 96% of the wage differences between youth and adults (Fabry et al., 2022).

The study by Schuster et al. (2020) for the Peruvian horticultural agro-export chain indicates that young people have a higher value for wage and non-wage attributes of employment, such as formal contracts, training, and duration of employment, but they have a lower value for job security attributes, whose value increases with age. Regardless of their preferences, older and male workers are more likely to be close to their preferred job, while workers from more vulnerable households, with fewer assets and a female head of household, are less likely to be close to their preferred job (Schuster et al., 2020).

Finally, Allen et al. (2016) proposes a series of recommendations to strengthen the insertion of rural youth into employment in African countries, which undoubtedly apply to other regions, as well. Among them, they suggest supporting research on and knowledge of strategies and policies that increase agricultural productivity and profitability; expanding agrifood training programs while increasing private sector participation; developing and implementing comprehensive agricultural and non-agricultural youth employment strategies; sensitizing youth to opportunities related to AFS; accelerating the application of ICTs; integrating more and better experiential learning in a cost-effective manner; institutionalizing monitoring, learning and communication; and focusing especially on value chains that serve the out-of-home food, food manufacturing, and horticulture sectors.



13. Knowledge gaps

- 1. There is insufficient understanding of the composition and dynamics of the non-agricultural AFS labor market.** The evidence shows that most jobs are being created in the non-agricultural AFS. If we judge by the share of the “*hidden middle*” in total AFS employment in high-income countries (76%), there is still plenty of room for further growth, even in the upper middle (30%), and even more in the rest of the country’s income categories. We also know that non-agricultural AFS is very broad and heterogeneous, ranging from high-tech manufacturing firms (e.g., alternative proteins) to individuals selling fruit on a street corner. Given the importance of non-agricultural AFS employment, there is a need for a deeper understanding of the distribution of employment by levels of productivity and remuneration, the formality of labor relationships, determinants of better jobs, gender systems, and, very importantly, the capacity to pull large numbers of youth into productive employment. We also have very limited understanding of the relative importance of innovations in the “*hidden middle*” compared to those on the farm, as drivers of inclusive transformation of the AFS. Without more detailed knowledge of non-agricultural AFS labor markets, it is difficult to design effective policies to support better employment in AFS.
- 2. There is a lack of research on the aggregate social and economic effects of AVC development and modernization policies.** There is a strong bias, in the literature and in policymaking, toward modern value chains that involve contracts, formal standards, certification, etc. There is also strong evidence that smallholders and wage-earners who participate in these schemes increase their income and wages and can overcome market failures that limit their development. However, there is also strong evidence of entry barriers that limit the participation of many farmers and workers in these modern value chains, so that the large majority remains in the traditional and transitional AFS value chains. Evidence is lacking that would compare the aggregate economic and social effects of policies that support the development of modern value chains, which have larger individual impacts on a smaller number of participants, to those of policies that improve traditional and transitional value chains, which lower individual effects but spread over a larger number of farmers, agrifood SME, and workers.
- 3. More studies from varied geographies are needed to understand Global South trends.** There is a substantive concentration of studies in a very limited number of low- and middle-income countries (including India, Ethiopia, Kenya, Nigeria, and Senegal). This is probably due to data availability and research opportunities, which in turn could be a function of donor priorities. Research and policy conclusions and recommendations are easily extrapolated from this limited sample to the whole of the Global South.
- 4. Studies that (better) estimate and analyze productivity gaps are required.** Trends in labor productivity in AFS in the Global South are understudied. Given its centrality in economic and social outcomes, this is a gap that must be addressed. The finding that productivity gaps between agriculture and other sectors may be significantly lower than previously estimated, and the research and policy implications of this result, reveal the need to extend accurate measurements of labor productivity and productivity gaps in AFS to a broader range of countries and value chains. This would also shed new light on debates about informality in AFS.
- 5. Traditional and transitional AVC studies are needed to complement the abundance of studies of modern and more dynamic AVC.** In the literature, there is significant attention to modern value chains within the more dynamic export and, sometimes, domestic markets (e.g. supermarkets). There are far fewer studies of traditional and transitional value chains in AFS, where most farmers, agrifood firms, and workers are concentrated. This imbalance probably affects our knowledge and understanding of staple food value chains and of food markets relevant for the urban poor and vulnerable, but it also is relevant for high-value products like fruits and vegetables, where we know (and advocate) more about export than domestic value chains.
- 6. There is a need to identify the conditions and complementary interventions required for ensuring that contract farming delivers welfare improvements.** Contrary to a frequent assumption in policymaking, contract farming has been found to increase farmer income and wage employment in some contexts, but not in all circumstances. Community spillover effects are limited. What the literature does not address are the conditions and complementary interventions needed to ensure more consistent welfare improvements, as well as a clear understanding of the situations in which contract farming will not deliver the desired outcomes. This could include systematically documenting the types of contractual arrangements associated with desired outcomes.
- 7. There is a need for conclusive evidence about the impacts of standards that include commitments related to labor conditions.** Standards such as GLOBALG.A.P. and Fairtrade, which explicitly include commitments related to farmer and worker remuneration and working conditions, exhibit very mixed results. More research is needed on these types of standards because there is no conclusive evidence in the literature about the conditions that are conducive to the desired results. In deciding to allocate research resources, one should consider that GLOBALG.A.P. and Fairtrade reach only a tiny minority of AFS producers, workers, and firms.
- 8. In-depth studies are needed of promising innovations, interventions, and policies for improving AFS employment.** Thirteen innovations, interventions, and policies were identified in the literature reviewed as promising options to improve AFS employment (see Annex 1 for more information). Most of the identified interventions still require more research efforts to

untangle the required conditions that enable positive effects on AFS employment in the Global South, to understand the interlinkages of such interventions with the context in which they are implemented, and on how to overcome the risks on the desired positive employment effects derived from implementing them in different settings and contexts. The challenge is to better understand how these innovations, interventions, and policies can work better (with larger positive impacts and lower unintended negative effects) and can be successfully implemented in less conducive or favorable contexts without endangering their positive results.

9. **More research analyzing the impacts of “bundles” of innovations, interventions, or policies is needed to better inform policymakers and development agencies.** There is an abundance of studies that look at individual innovations and their economic and distributional effects (e.g., agricultural technologies, types of contracts, etc.). When comparing many studies that examine similar innovations in different settings, results often are not conclusive. What is lacking are more studies that look at bundles of innovations, or minimum sets of concurrent interventions, that could consistently deliver positive impacts across a wider set of contexts. Examples include the complementarity of investments in infrastructure and services that can strengthen rural-urban linkages, with investments and policies in key downstream areas such as wholesale markets; simultaneous provision of social protection (e.g., cash transfers) and agricultural development services (e.g., extension); provision of public extension, finance, and financial inclusion support; and strengthening of producers’ organizations -with interventions that support the participation of women and youth in such organizations. All of these areas should be viewed through gender and generational lenses to ensure their inclusiveness.
10. **There is an opportunity to contribute to AFS decent work debates linking labor market analyses with recent social protection debates** (universal coverage, economic inclusion, financial and digital interventions to enhance social protection). Decent work in AFS is a worthy but distant aspiration. In many countries in the Global South, there is a substantial rural labor surplus, and in some regions, it is even growing. Informal employment, which may be productive and deliver a good income, but which lacks security in the workplace and social protection, is the norm in agricultural and non-agricultural AFS. Under these two conditions, market-based mechanisms or labor laws and regulations, by themselves, will not deliver decent work in AFS. At the same time, the social protection literature is advancing in the understanding of innovations that could contribute to better AFS employment, ranging from digital innovations (such as digital identification to follow workers, instead of jobs) and financial services that improve inclusion, to broader debates about universal coverage of certain social protection (e.g., basic health services and non-contributory pensions). These two literature areas are **ships passing each other in the night**.

11. **Gender systems approaches are required to address women’s inclusion in AFS employment.** According to extensive literature reviews, gender inequality and women’s empowerment in rural labor markets are among the five-most researched AFS issues. This literature focuses largely on different gender gaps (including productivity, income, wages, and working conditions) and on the characteristics of female employment in agricultural and non-agricultural AFS. Still, there is little understanding of the endowment and structural determinants of those gaps or of the gender systems that determine agricultural and non-agricultural AFS employment opportunities for women, and which condition the impacts of this employment on women’s welfare, empowerment, and development.
12. **There are several knowledge gaps in understanding how automation and digitalization can advance decent work in agrifood systems:**
 - a. The impact on employment: While automation and digitalization can increase efficiency and productivity, there is a lack of understanding of how they will impact employment in the agrifood sector. It is unclear how many jobs will be created or lost as a result of these technological advancements.
 - b. The role of labor standards: There is a need to understand how labor standards can be incorporated into the design and implementation of automated and digital technologies in agrifood systems. This includes understanding how to ensure that decent work is upheld in the development and deployment of these technologies.
 - c. The impact on rural communities: Many agrifood systems are located in rural areas, and there is a need to understand how automation and digitalization will impact these communities. This includes understanding how to ensure that the benefits of these technologies are distributed equitably across these communities.
 - d. The impact on smallholder farmers: Smallholder farmers make up a significant portion of the agrifood sector, and there is a need to understand how automation and digitalization will impact them. This includes understanding how these technologies can be made accessible and affordable for smallholder farmers, and how they can be used to improve their livelihoods.
 - e. The impact on gender equity and women’s empowerment: There is a need to understand how automation and digitalization will impact gender relations in agrifood systems. This includes understanding how these technologies can be used to empower women and promote gender equality in the sector.⁶⁴

64 The knowledge gaps on automation and digitalization were written by ChatGPT, in reply to the question “What are the main knowledge gaps in understanding how automation and digitalization can advance decent work in agrifood systems?”

References

- Abay, K. A., Asnake, W., Ayalew, H., Chamberlin, J., & Sumberg, J. (2021). Landscapes of opportunity: patterns of young people's engagement with the rural economy in sub-Saharan Africa. **Journal of Development Studies**, *57*(4), 594–613. <https://doi.org/10.1080/00220388.2020.1808195>
- Abdulai, A., & Crolerees, A. (2001). Determinants of income diversification amongst rural households in Southern Mali. **Food Policy**, *26*, 437–452. www.elsevier.com/locate/foodpol
- Adam, R. I., Quinhentos, M. da L., Muindi, P., & Osanya, J. (2019). Gender relations along the maize value chain in Mozambique. **Outlook on Agriculture**, *49*(2), 133–144. <https://doi.org/10.1177/0030727019888661>
- Adu-Baffour, F., Daum, T., & Birner, R. (2019). Can small farms benefit from big companies' initiatives to promote mechanization in Africa? A case study from Zambia. **Food Policy**, *84*, 133–145. <https://doi.org/10.1016/J.FOODPOL.2019.03.007>
- Ahsan, M. B., Mehdi, M., Ahmad, B., & Ahmad, U. S. (2018). Understanding the interdependence between worker livelihoods and decent work at certified and non-certified mango orchards in Pakistan. *Earth Systems and Environment*, *2*(3), 621–632. <https://doi.org/10.1007/S41748-018-0075-5/METRICS>
- Alford, M., Barrientos, S., & Visser, M. (2017). Multi-scalar labour agency in global production networks: Contestation and crisis in the South African fruit sector. **Development and Change**, *48*(4), 721–745. <https://doi.org/10.1111/DECH.12317>
- Allen, A., Howard, J., Kondo, M., Jamison, A., Jayne, T., Snyder, J., Tschirley, D., & Yeboah, K. F. (2016). Agrifood youth employment and engagement study. In **Agri-food Youth Employment and Engagement Study (AGYEES)** (Vol. 1). https://www.isp.msu.edu/files/4814/7249/7008/AgYees_Report_FINAL_web.pdf
- Allen, T., Heinrigs, P., & Heo, I. (2018). **Agriculture, food and jobs in West Africa** (No. 14). OECD Publishing. <https://doi.org/https://doi.org/10.1787/24142026>
- Alston, J. M., Beddow, J. M., & Pardey, P. G. (2009, September 4). Agricultural research, productivity, and food prices in the long run. **Science**, *325*(5945), 1209–1210. <https://doi.org/10.1126/science.1170451>
- Altieri, M. A., & Nicholls, C. I. (2008). Scaling up agroecological approaches for food sovereignty in Latin America. **Development**, *51*(4), 472–480. <https://doi.org/10.1057/dev.2008.68>
- Altieri, M. A., & Toledo, V. M. (2011a). The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants. **Journal of Peasant Studies**, *38*(3), 587–612. <https://doi.org/10.1080/03066150.2011.582947>
- Altieri, M. A., & Toledo, V. M. (2011b). The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants. **Journal of Peasant Studies**, *38*(3), 587–612. <https://doi.org/10.1080/03066150.2011.582947>
- Amanor, K. S. (2012). Global resource grabs, agribusiness concentration and the smallholder: Two West African case studies. **Journal of Peasant Studies**, *39*(3–4), 731–749. <https://doi.org/10.1080/03066150.2012.676543>
- Ampofo, A. A., Beoku-Betts, J., Njambi, W. N., & Osirim, M. (2004). Women's and gender studies in English-speaking sub-Saharan Africa: A review of research in the social sciences. In **Gender and Society** (Vol. 18, Issue 6, pp. 685–714). SAGE Publications Inc. <https://doi.org/10.1177/0891243204269188>
- Andrews, C., De Montesquiou, A., Arévalo, I., Puja, D., Boban, P., Samaranyake, S., Heisey, J., Clay, T., & Chaudhary, S. (2021). **The state of economic inclusion report 2021. The potential to scale**. <https://doi.org/10.1596/978-1-4648-1598-0>
- Anriquez, G., Foster, W., Melo, M., Subercaseaux, J. P., & Valdés, A. (2015). **Empleo estacional en la fruticultura en Chile: evidencia, desafíos y políticas**.
- Anseeuw, Ward., Wily, L. A., Cotula, L., Bending, T., & Taylor, M. (2012). **Land rights and the rush for land : findings of the global commercial pressures on land research project**. ILC.
- Asensio, R. H. (2019). Superando el muro: rutas (y frustraciones) de inclusión económica de los jóvenes rurales latinoamericanos. **Rimisp**, *261*, 1–31.
- Atake, E.-H., Dandonougbo, Y., Litaaba-Akila, D., Kouevidjin, D., & Sika Limazie, M. (2020a). **Agricultural investments, labor productivity, and rural poverty reduction: gender disparities in Togo**. www.pep-net.org
- Atake, E.-H., Dandonougbo, Y., Litaaba-Akila, D., Kouevidjin, D., & Sika Limazie, M. (2020b). **Agricultural investments, labor productivity, and rural poverty reduction: gender disparities in Togo**. www.pep-net.org
- Baccarin, J. G. (2012). Mudanças tecnológicas recentes e ocupação canavieira no centro-sul do Brasil. **Laborativa**, *4*(1), 56–78.
- Bain, C. (2010). Structuring the flexible and feminized labor market: GlobalGAP standards for agricultural labor in Chile. **Journal of Women in Culture and Society**, *35*(2), 343–370. <https://doi.org/https://doi.org/10.1086/605479>
- Baležentis, T., Li, T., & Chen, X. (2021). Has agricultural labor restructuring improved agricultural labor productivity in China? A decomposition approach. **Socio-Economic Planning Sciences**, *76*, 10. <https://doi.org/10.1016/j.seps.2020.100967>
- Barrett, C. B., Bezuneh, M., & Aboud, A. (2001). Income diversification, poverty traps and policy shocks in Côte d'Ivoire and Kenya. **Food Policy**, *26*, 367–384. www.elsevier.com/locate/foodpol
- Barrett, C. B., Reardon, T., Swinnen, J., & Zilberman, D. (2022). Agri-food value chain revolutions in low- and middle-income countries. **Journal of Economic Literature**, *60*(4), 1316–1377. <https://doi.org/10.1257/jel.20201539>
- Barrett, C. B., Reardon, T., & Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications. **Food Policy**, *26*, 315–331. www.elsevier.com/locate/foodpol
- Barrientos, S. (2008a). Contract labour: The "Achilles Heel" of corporate codes in commercial value chains. **Development and Change**, *39*(6), 977–990. <https://doi.org/10.1111/j.1467-7660.2008.00524.x>
- Barrientos, S. (2008b). Contract labour: The "Achilles Heel" of corporate codes in commercial value chains. **Development and Change**, *39*(6), 977–990. <https://doi.org/10.1111/j.1467-7660.2008.00524.x>
- Barrientos, S. (2013). "Labour chains": Analysing the role of labour contractors in global production networks. **The Journal of Development Studies**, *49*(8), 1058–1071. <https://doi.org/10.1080/00220388.2013.780040>
- Barrientos, S. (2014a). Gendered global production networks: Analysis of cocoa-chocolate sourcing. **Regional Studies**, *48*(5), 791–803. <https://doi.org/10.1080/00343404.2013.878799>

- Barrientos, S. (2014b). Gendered global production networks: Analysis of cocoa–chocolate sourcing. **Regional Studies**, **48**(5), 791–803. <https://doi.org/10.1080/00343404.2013.878799>
- Barrientos, S., Dolan, C., & Tallontire, A. (2001). **Gender and ethical trade: A mapping of the issues in African horticulture**.
- Barrientos, S., Dolan, C., & Tallontire, A. (2003a). A gendered value chain approach to codes of conduct in African horticulture. **World Development**, **31**(9), 1511–1526. [https://doi.org/10.1016/S0305-750X\(03\)00110-4](https://doi.org/10.1016/S0305-750X(03)00110-4)
- Barrientos, S., Dolan, C., & Tallontire, A. (2003b). A gendered value chain approach to codes of conduct in African horticulture. **World Development**, **31**(9), 1511–1526. [https://doi.org/10.1016/S0305-750X\(03\)00110-4](https://doi.org/10.1016/S0305-750X(03)00110-4)
- Barrientos, S., Gereffi, G., & Rossi, A. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. **International Labour Review**, **150**(3–4), 319–340. <https://doi.org/10.1111/j.1564-913X.2011.00119.x>
- Barrientos, S., & Kritzing, A. (2004). Squaring the circle: Global production and the informalization of work in South African fruit exports. **Journal of International Development**, **16**(1), 81–92. <https://doi.org/10.1002/jid.1064>
- Barrientos, S., Mayer, F., Pickles, J., & Posthuma, A. (2011). Decent work in global production networks: Framing the policy debate. **International Labour Review**, **150**(3–4), 297–317. <https://doi.org/10.1111/j.1564-913X.2011.00118.x>
- Bellemare, M. F. (2010). Agricultural extension and imperfect supervision in contract farming: Evidence from Madagascar. **Agricultural Economics**, **41**(6), 507–517. <https://doi.org/10.1111/j.1574-0862.2010.00462.x>
- Bellemare, M. F. (2012). As you sow, so shall you reap: the welfare impacts of contract farming. **World Development**, **40**(7), 1418–1434. <https://doi.org/10.1016/j.worlddev.2011.12.008>
- Bellemare, M. F. (2018). Contract farming: opportunity cost and trade-offs. **Agricultural Economics (United Kingdom)**, **49**(3), 279–288. <https://doi.org/10.1111/agec.12415>
- Bellemare, M. F., & Bloem, J. R. (2018). Does contract farming improve welfare? A review. In **World Development** (Vol. 112, pp. 259–271). Elsevier Ltd. <https://doi.org/10.1016/j.worlddev.2018.08.018>
- Bellemare, M. F., & Lim, S. (2018). In all shapes and colors: varieties of contract farming. **Applied Economic Perspectives and Policy**, **40**(3), 379–401. <https://doi.org/10.1093/AEPP/PPY019>
- Benin, S., & Nin-Pratt, A. (2016). Chapter 2: Intertemporal trends in agricultural productivity. In S. Benin (Ed.), **Agricultural productivity in Africa: trends, patterns and determinants** (pp. 25–104). International Food Policy Research Institute. <https://doi.org/10.24999780896298811>
- Berdegú, J. (2001). **Cooperating to Compete. Associative Peasant Business Firms in Chile**.
- Berdegú, J., Proctor, F. J., & Cazzuffi, C. (2014). **Inclusive rural-urban linkages** (No. 123; Territorial Development). www.rimisp.org
- Berdegú, J., Ramírez, E., & Escobar, G. (2001). Rural nonfarm employment and incomes in Chile. **World Development**, **29**(3), 411–425. www.elsevier.com/locate/worlddev
- Best, S., & Mamic, I. (2008). **Employment and social issues in fresh fruit and vegetables**. <http://www.ilo.org/publns>
- Beuchelt, T. D., & Zeller, M. (2011). Profits and poverty: Certification’s troubled link for Nicaragua’s organic and fairtrade coffee producers. **Ecological Economics**, **70**(7), 1316–1324. <https://doi.org/10.1016/j.ecolecon.2011.01.005>
- Bezu, S., & Holden, S. (2014). Are rural youth in Ethiopia abandoning agriculture? **World Development**, **64**, 259–272. <https://doi.org/10.1016/j.worlddev.2014.06.013>
- Bhorat, H., Kanbur, R., & Stanwix, B. (2014). Estimating the impact of minimum wages on employment, wages, and non-wage benefits: The case of agriculture in South Africa. **American Journal of Agricultural Economics**, **96**(5), 1402–1419. <https://doi.org/10.1093/AJAE/AAU049>
- Biriwasha, I. (2012, March). Agriculture and the School Curriculum in Zimbabwe. **International Conference on Young People, Farming and Food: The Future of the Agrifood Sector in Africa, Accra**.
- Bizikova, L., Nkonya, E., Minah, M., Hanisch, M., Turaga, R. M. R., Speranza, C. I., Karthikeyan, M., Tang, L., Ghezzi-Kopel, K., Kelly, J., Celestin, A. C., & Timmers, B. (2020). A scoping review of the contributions of farmers’ organizations to smallholder agriculture. **Nature Food**, **1**(10), 620–630. <https://doi.org/10.1038/s43016-020-00164-x>
- Block, S., & Webb, P. (2001). The dynamics of livelihood diversification in post-famine Ethiopia. In **Food Policy** (Vol. 26). www.elsevier.com/locate/foodpol
- Bolwig, S., Ponte, S., du Toit, A., Riisgaard, L., & Halberg, N. (2008). **Integrating poverty, gender and environmental concerns into value chain analysis: a conceptual framework and lessons for action research**. Copenhagen: Danish Institute for International Studies (DIIS). <https://www.econstor.eu/handle/10419/44670>
- Bosc, P.-M. (2018). **IFAD RESEARCH SERIES 29 Empowering through collective action**.
- Bourdillon, M., Levison, D., Myers, W., & White, B. (2010). **Rights and wrongs of children’s work**. Rutgers University Press.
- Bowman, M. S., & Zilberman, D. (2013). Economic factors affecting diversified farming systems. **Ecology and Society**, **18**(1). <https://doi.org/10.5751/ES-05574-180133>
- Brandão, F., & Schoneveld, G. (2021). Oil palm contract farming in Brazil: Labour constraints and inclusivity challenges. **Journal of Development Studies**, **57**(8), 1428–1442. https://doi.org/10.1080/00220388.2021.1919629/SUPPL_FILE/FJDS_A_1919629_SM0410.ZIP
- Bullock, R., Gyau, A., Mithoefer, D., & Swisher, M. (2018). Contracting and gender equity in Tanzania: Using a value chain approach to understand the role of gender in organic spice certification. **Renewable Agriculture and Food Systems**, **33**(1), 60–72. <https://doi.org/10.1017/S1742170517000151>
- Burattini, B., Perin, G., Alvarenga, K., & Valiyaparambil, V. (2022). Digital innovations in delivering social protection in rural areas: Lessons for public provisioning during the post-pandemic recovery and beyond. **International Policy Centre for Inclusive Growth**. <https://socialprotection.org/discover/publications/digital-innovations-delivering-social-protection-rural-areas-lessons-public-0>
- Canagarajah, S., Newman, C., & Bhattamishra, R. (2001). Non-farm income, gender, and inequality: evidence from rural Ghana and Uganda. **Food Policy**, **26**, 405–420. www.elsevier.com/locate/foodpol

- Carreras, M., Sumberg, J., & Saha, A. (2021). Work and Rural Livelihoods: The Micro Dynamics of Africa's 'Youth Employment Crisis.' **European Journal of Development Research**, **33**(6), 1666-1694. <https://doi.org/10.1057/s41287-020-00310-y>
- Cazzuffi, C., Pereira-López, M., & Soloaga, I. (2017). Local poverty reduction in Chile and Mexico: The role of food manufacturing growth. **Food Policy**, **68**, 160-185. <https://doi.org/10.1016/j.foodpol.2017.02.003>
- Charlton, D., Hill, A. E., & Taylor, J. E. (2022). **Automation and social impacts: winners and losers**. FAO. <https://doi.org/10.4060/cc2610en>
- Charlton, D., Taylor, E., Vougioukas, S., & Rutledge, Z. (2019). Innovations for a shrinking agricultural workforce. **Agricultural & Applied Economics Association**, **34**(2), 1-8. <https://www.jstor.org/stable/26785766>
- Christiaensen, L., & Maertens, M. (2022). Rural employment in Africa: Trends and challenges. In **Annual Review of Resource Economics** (Vol. 14, Issue 66). <https://doi.org/10.1146/annurev-resource-111820-014312>
- Christiaensen, L., Rutledge, Z., & Taylor, J. E. (2021). Viewpoint: the future of work in agri-food. **Food Policy**, **99**, 1-12. <https://doi.org/10.1016/j.foodpol.2020.101963>
- Christian, M., Evers, B., & Barrientos, S. (2013). Women in value chains: Making a difference. **Capturing the Gains**, **6.3**, 1-6. <http://ssrn.com/abstract=2265832> Electronic copy available at: <https://ssrn.com/abstract=2265832>
- Cock, J., Prager, S., Meinke, H., & Echeverria, R. (2022). Labour productivity: the forgotten yield gap. **Agricultural Systems**, **201**, 103452. <https://doi.org/10.1016/j.agsy.2022.103452>
- Cotula, L. (2012). The international political economy of the global land rush: A critical appraisal of trends, scale, geography and drivers. **Journal of Peasant Studies**, **39**(3-4), 649-680. <https://doi.org/10.1080/03066150.2012.674940>
- Cross, P., Edwards, R. T., Opondo, M., Nyeko, P., & Edwards-Jones, G. (2009). Does farm worker health vary between localised and globalised food supply systems? **Environment International**, **35**(7), 1004-1014. <https://doi.org/10.1016/j.envint.2009.04.009>
- Davis, B., Lipper, L., & Winters, P. (2022). Do not transform food systems on the backs of the rural poor. **Food Security**, **14**(3), 729-740. <https://doi.org/10.1007/s12571-021-01214-3/TABLES/2>
- Davis, B., Mane, E., Gurbuzer, L. Y., Caivano, G., Piedrahita, N., Azhar, N., Benali, M., Chaudhary, N., & Rivera, R. (2023). **Estimating global and country-level employment in agrifood systems** (Issues 23-24). FAO. <https://www.fao.org/documents/card/en/c/cc4337en>
- Davis, B., Winters, P., Carletto, G., Covarrubias, K., Quiñones, E. J., Zezza, A., Stamoulis, K., Azzarri, C., & DiGiuseppe, S. (2010). A cross-country comparison of rural income generating activities. **World Development**, **38**(1), 48-63. <https://doi.org/10.1016/j.worlddev.2009.01.003>
- De Castro, C., Reigada, A., & Gadea, E. (2020). The devaluation of female labour in fruit and vegetable packaging plants in Spanish Mediterranean agriculture. **Organization**, **27**(2), 232-250. https://doi.org/10.1177/1350508419883387/ASSET/IMAGES/LARGE/10.1177_1350508419883387-FIG1.JPEG
- De Grammont, H., & Lara Flores, S. (2010). Productive restructuring and "standardization" in Mexican horticulture: consequences for labour. **Journal of Agrarian Change**, **10**(2), 228-250.
- De Janvry, A., McIntosh, C., & Sadoulet, E. (2015). Fair trade and free entry: can a disequilibrium market serve as a development tool? **Review of Economics and Statistics**, **97**(3), 567-573. https://doi.org/10.1162/REST_a_00512
- De Janvry, A., & Sadoulet, E. (2001). Income strategies among rural households in Mexico: The role of off-farm activities. **World Development**, **29**(3), 467-480. [https://doi.org/10.1016/S0305-750X\(00\)00113-3](https://doi.org/10.1016/S0305-750X(00)00113-3)
- De Janvry, A., & Sadoulet, E. (2020). Using agriculture for development: Supply- and demand-side approaches. **World Development**, **133**. <https://doi.org/10.1016/j.worlddev.2020.105003>
- De Weerd, J., Christiaensen, L., & Kanbur, R. (2021). **When Distance Drives Destination, Towns Can Stimulate Development**. www.iza.org
- Dedehouanou, S. F. A., Swinnen, J., & Maertens, M. (2013). Does contracting make farmers happy? Evidence from Senegal. **Review of Income and Wealth**, **59**(SUPPL1). <https://doi.org/10.1111/roiw.12041>
- Dedieu, B., Nettle, R., Schiavi, S. M. de A., Sraïri, M. T., & Malanski, P. (2022). Which perspectives for work in agriculture? Food for thought for a research agenda. **Frontiers in Sustainable Food Systems**, **6**. <https://doi.org/10.3389/fsufs.2022.857887>
- Deininger, K., & Olinto, P. (2001). Rural nonfarm employment and income diversification in Colombia. **World Development**, **29**(3), 455-466. www.elsevier.com/locate/worlddev
- Desai, R. M., & Joshi, S. (2014). Collective action and community development: Evidence from self-help groups in rural India. **World Bank Economic Review**, **28**(3), 492-524. <https://doi.org/10.1093/wber/lht024>
- Djido, A. I., & Shiferaw, B. A. (2018). Patterns of labor productivity and income diversification - Empirical evidence from Uganda and Nigeria. **World Development**, **105**, 416-427. <https://doi.org/10.1016/j.worlddev.2017.12.026>
- Dolan, C. (2001). The good wife struggles over resources in the Kenyan horticultural sector. **The Journal of Development Studies**, **37**(3), 39-70.
- Dolan, C. (2004). On Farm and Packhouse: Employment at the Bottom of a Global Value Chain. **Rural Sociology**, **69**(1), 99-126. <https://doi.org/10.1526/003601104322919928>
- Dolan, C., & Humphrey, J. (2000). Governance and Trade in Fresh Vegetables: the Impact of UK Supermarkets on the African Horticulture Industry. **Journal of Development Studies**, **37**(2), 147-176.
- Dolan, C., & Sorby, K. (2003). **Gender and employment in high-value agriculture industries**. <https://www.ssatp.org/sites/ssatp/files/publications/HTML/Gender-RG/Source%20%20documents/Technical%20Reports/Gender%20Research/TEGEN6%20Gender%20employ%20in%20hi%20value%20AgWB03.pdf>
- Dolislager, M., Reardon, T., Arslan, A., Fox, L., Liverpool-Tasie, S., Sauer, C., & Tschirley, D. L. (2020). Youth and adult agrifood system employment in developing regions: Rural (peri-urban to hinterland) vs. Urban. **The Journal of Development Studies**, **57**(4), 571-593. <https://doi.org/10.1080/00220388.2020.1808198>
- Dorin, B. (2022). Theory, practice and challenges of agroecology in India. **International Journal of Agricultural Sustainability**, **20**(2), 153-167. <https://doi.org/10.1080/14735903.2021.1920760>

- Dorosh, P., & Thurlow, J. (2018). Beyond Agriculture Versus Non-Agriculture: Decomposing Sectoral Growth–Poverty Linkages in Five African Countries. **World Development**, **109**, 440–451. <https://doi.org/10.1016/j.worlddev.2016.08.014>
- Eaton, C., & Shepherd, A. W. (2013). Does contracting make farmers happy? Evidence from Senegal. **Review of Income and Wealth**, **59**(SUPPL1). <https://doi.org/10.1111/roiw.12041>
- Eberhardt, M., & Vollrath, D. (2018). The effect of agricultural technology on the speed of development. **World Development**, **109**, 483–496. <https://doi.org/10.1016/j.worlddev.2016.03.017>
- Elder, S., De Haas, H., Principi, M., & Schewel, K. (2015). **Youth and rural development: Evidence from 25 school-to-work transition surveys Publication Series**. www.ilo.org/publns
- Escobal, J. (2001). The determinants of nonfarm income diversification in rural Peru. **World Development**, **29**(3), 497–508. www.elsevier.com/locate/worlddev
- Escobal, J., & Cavero, D. (2012). Transaction costs, institutional arrangements and inequality outcomes: Potato marketing by small producers in rural Peru. **World Development**, **40**(2), 329–341. <https://doi.org/10.1016/j.worlddev.2011.07.016>
- Evenson, R. E., & Gollin, D. (2003). Assessing the impact of the Green Revolution, 1960 to 2000. **New Series**, **300**(5620), 758–762.
- Fabregas, R., Kremer, M., & Schilbach, F. (2019). Realizing the potential of digital development: The case of agricultural advice. In **Science** (Vol. 366, Issue 6471). American Association for the Advancement of Science. <https://doi.org/10.1126/science.aay3038>
- Fabry, A., Van den Broeck, G., & Maertens, M. (2022). Decent work in global food value chains: Evidence from Senegal. **World Development**, **152**, 105790. <https://doi.org/10.1016/j.worlddev.2021.105790>
- FAO. (2017). **The State of Food and Agriculture 2017: Leveraging Food Systems for Inclusive Rural Transformation**. www.fao.org/publications
- FAO. (2022). The state of food and agriculture: leveraging automation in agriculture for transforming agrifood systems. In **El estado mundial de la agricultura y la alimentación 2022**. FAO. <https://doi.org/https://doi.org/10.4060/cb9479en>
- FAO. (2023). **The status of women in agrifood systems**. FAO. <https://doi.org/10.4060/cc5343en>
- FAO, & ITU. (2016). **E-agriculture strategy guide. Piloted in Asia-Pacific countries**. www.fao.org/
- FAO, & ITU. (2021). Poverty reduction through the development of inclusive food value chains. **Journal of Integrative Agriculture**, **20**(4), 964–978. [https://doi.org/10.1016/S2095-3119\(20\)63398-6](https://doi.org/10.1016/S2095-3119(20)63398-6)
- Ferguson, R. S., & Lovell, S. T. (2019). Diversification and labor productivity on US permaculture farms. **Renewable Agriculture and Food Systems**, **34**(4), 326–337. <https://doi.org/10.1017/S1742170517000497>
- Ferreira, F. H. G., & Lanjouw, P. (2001). Rural nonfarm activities and poverty in the Brazilian Northeast. **World Development**, **29**(3), 509–528. www.elsevier.com/locate/worlddev
- Fibaek, M. M. (2021). Working Poor? A Study of Rural Workers' Economic Welfare in Kenya. **Journal of International Development**, **33**(1), 41–69. <https://doi.org/10.1002/jid.3511>
- Fox, L., Senbet, L. W., & Simbanegavi, W. (2016). Youth employment in Sub-Saharan Africa: Challenges, constraints and opportunities. **Journal of African Economies**, **25**, i3–i15. <https://doi.org/10.1093/jae/ejv027>
- Fox, L., & Signé, L. (2021). **The fourth industrial revolution (4IR) and the future of work: Could this bring good jobs to Africa?** <https://includeplatform.net/wp-content/uploads/2021/06/The-fourth-industrial-revolution-4IR-and-the-future-of-work.pdf>
- Fuglie, K. (2015). Accounting for growth in global agriculture. **Bio-Based and Applied Economics**, **4**(3), 221–254.
- Fuglie, K., Gautam, M., Goyal, A., & Maloney, W. F. (2019). **Harvesting prosperity: Technology and productivity growth in agriculture**.
- Geertz, Clifford. (1963). **Agricultural involution: the processes of ecological change in Indonesia**. University of California Press.
- Gereffi, G. (1994). The Organization of Buyer-Driven Global Commodity Chains: How US Retailers Shape Overseas Production Networks. In G. Gereffi & M. Korzeniewicz (Eds.), **Commodity chains and global capitalism** (pp. 43–71). Praeger Publishing. <https://doi.org/10.1017/9781108559423.003>
- German, L. A., Bonanno, A. M., Foster, L. C., & Cotula, L. (2020). “Inclusive business” in agriculture: Evidence from the evolution of agricultural value chains. **World Development**, **134**, 105018. <https://doi.org/10.1016/j.worlddev.2020.105018>
- Ghori, S., Lund-Thomsen, P., Gallemore, C., Singh, S., & Riisgaard, L. (2022). Compliance and cooperation in global value chains: The effects of the better cotton initiative in Pakistan and India. **Ecological Economics**, **193**, 107312. <https://doi.org/10.1016/j.ecolecon.2021.107312>
- Glover, D., & Kusterer, K. (1990). **Small farmers, big business: contract farming and rural development**. Macmillan.
- Gollin, D., Lagakos, D., & Waugh, M. E. (2014). The agricultural productivity gap. **The Quarterly Journal of Economics**, **129**(2), 939–993. <https://doi.org/10.1093/qje/qjt056>
- Graber, D. R., Jones, W. J., & Johnson, J. A. (2005). Human and ecosystem health: The environment-agriculture connection in developing countries. **Journal of Agromedicine**, **9**(2), 129–146. https://doi.org/10.1300/J096v09n02_08
- Graziano da Silva, J., & Del Grossi, M. E. (2001). Rural non-farm employment and incomes in Brazil: Patterns and evolution. **World Development**, **29**(3), 443–454. www.elsevier.com/locate/worlddev
- Haggblade, S., Hazell, P. B. R., & Reardon, T. (2007). **Transforming the rural nonfarm economy: Opportunities and threats in the developing world** (S. Haggblade, P. B. R. Hazell, & T. Reardon, Eds.). Johns Hopkins University Press.
- Haggblade, S., Hazell, P., & Reardon, T. (2010). The rural non-farm economy: prospects for growth and poverty reduction. **World Development**, **38**(10), 1429–1441. <https://doi.org/10.1016/j.worlddev.2009.06.008>
- Hall, D., Hirsch, P., & Murray Li, T. (2011). **Powers of exclusion: land dilemmas in Southeast Asia**. NUS Press.
- Hammond, J., Pagella, T., Caulfield, M. E., Fraval, S., Teufel, N., Wichern, J., Kihoro, E., Herrero, M., Rosenstock, T. S., & van Wijk, M. T. (2023). Poverty dynamics and the determining factors among East African smallholder farmers. **Agricultural Systems**, **206**(January), 103611. <https://doi.org/10.1016/j.agsy.2023.103611>

- Hamory, J., Kleemans, M., Li, N. Y., & Miguel, E. (2021). Reevaluating agricultural productivity gaps with longitudinal microdata. **Journal of the European Economic Association**, **19**(3), 1522-1555. <https://doi.org/10.1093/JEEA/JVAA043>
- Hayami, Y., & Ruttan, V. W. (1989). **Agricultural development: an international perspective**. Baltimore, Md/London: The Johns Hopkins Press.
- Hazell, P., & Haggblade, S. (1993). Farm-nonfarm growth linkages and the welfare of the poor. In M. Lipton & J. Van der Gaag (Eds.), **Including the poor** (pp. 197-211). World Bank.
- Hernandez, R., Belton, B., Reardon, T., Hu, C., Zhang, X., & Ahmed, A. (2018). The "quiet revolution" in the aquaculture value chain in Bangladesh. **Aquaculture**, **493**, 456-468. <https://doi.org/10.1016/j.aquaculture.2017.06.006>
- Hunt, R. C. (2000). Labor productivity and agricultural development: Boserup revisited. **Human Ecology**, **28**(2), 251-277. <https://doi.org/https://doi.org/10.1023/A:1007072120891>
- Ibarrola-Rivas, M. J., Kastner, T., & Nonhebel, S. (2016). How much time does a farmer spend to produce my food? An international comparison of the impact of diets and mechanization. **Resources**, **5**(4). <https://doi.org/10.3390/resources5040047>
- IFAD. (2003). **Agricultural Marketing Companies as Sources of Smallholder Credit in Eastern and Southern Africa. Experiences, Insights and Potential Donor Role**.
- IFAD. (2010). **Rural poverty report 2011**.
- IFAD. (2016). **Rural development report 2016: fostering inclusive rural transformation** (International Fund for Agricultural Development, Ed.). International Fund for Agricultural Development. <https://www.ifad.org/en/web/knowledge/-/rural-development-report-2016-fostering-inclusive-rural-transformation>
- IFAD. (2019). **Rural development report 2019: creating opportunities for rural youth**.
- IFPRI. (2023). **Measuring empowerment across the Value Chain: The evolution of the project-level women's empowerment index for market inclusion (pro-WEAI+MI)**. <https://www.ifpri.org/publication/measuring-empowerment-across-value-chain-evolution-project-level-womens-empowerment>
- International Labor Organization. (2019). **Decent and productive work in agriculture. Policy guidance note**.
- International Labour Organisation. (2023). **Decent work**. <https://www.ilo.org/global/topics/decent-work/lang--en/index.htm>
- Jacobs, S., Brahic, B., & Olaiya, M. M. (2015). Sexual harassment in an east African agribusiness supply chain. **The Economic and Labour Relations Review**, **26**(3), 393-410. <https://doi.org/10.1177/1035304615595604>
- Jarvis, L., & Vera-Toscano, E. (2004). **The impact of Chilean fruit sector development on female employment and household income**. 1-40. <https://ssrn.com/abstract=525602>
- Jayne, T. S., Chamberlin, J., & Headey, D. D. (2014). Land pressures, the evolution of farming systems, and development strategies in Africa: a synthesis. **Food Policy**, **48**, 1-17. <https://doi.org/10.1016/j.foodpol.2014.05.014>
- Jena, P. R. (2019). Can minimum tillage enhance productivity? Evidence from smallholder farmers in Kenya. **Journal of Cleaner Production**, **218**, 465-475. <https://doi.org/10.1016/j.jclepro.2019.01.278>
- Johnston, B. F., & Mellor, J. W. (1961). The role of agriculture in economic development. **American Economic Review**, **51**(4), 566-593.
- Jourdain, D., Scopel, E., & Affholder, F. (2001). **The impact of conservation tillage on the productivity and stability of maize cropping systems: A case study in Western Mexico**. <http://agroecologie.cirad.fr/DocumentobtenusurlesiteCiraduriseauhttp://agroecologie.cirad.fr>
- Kabeer, N. 1950-, Mahmud, S., & Tasneem, S. (2011). **Does paid work provide a pathway to women's empowerment? : empirical findings from Bangladesh**. IDS.
- Korovkin, T. (1992). Peasants, Grapes and Corporations: The Growth of Contract Farming in a Chilean Community. **The Journal of Peasant Studies**, **19**(2), 228-254. <https://doi.org/10.1080/03066159208438479>
- Kramer, B., & Lambrecht, I. (2019). **Gender and preferences for non-farm income diversification: A framed field experiment in Ghana** (No. 01855). IFPRI. <https://papers.ssrn.com/abstract=3430750>
- Kritzing, A., Barrientos, S., & Rossouw, H. (2004). Global production and flexible employment in South African horticulture: Experiences of contract workers in fruit exports. **Sociologia Ruralis**, **44**(1), 17-39. <https://doi.org/10.1111/J.1467-9523.2004.00259.X>
- Krumbiegel, K., Maertens, M., & Wollni, M. (2018). The Role of Fairtrade Certification for Wages and Job Satisfaction of Plantation Workers. **World Development**, **102**, 195-212. <https://doi.org/10.1016/j.worlddev.2017.09.020>
- Krumbiegel, K., Maertens, M., & Wollni, M. (2020). Can employment empower women? Female workers in the pineapple sector in Ghana. **Journal of Rural Studies**, **80**, 76-90. <https://doi.org/10.1016/j.jrurstud.2020.05.012>
- Lanjouw, P. (2001). Nonfarm employment and poverty in rural El Salvador. **World Development**, **29**(3), 529-548. www.elsevier.com/locate/worlddev
- Lanjouw, P., Quizon, J., & Sparrow, R. (2001). Non-agricultural earnings in peri-urban areas of Tanzania: evidence from household survey data. **Food Policy**, **26**, 385-403. www.elsevier.com/locate/foodpol
- Lewis, W. A. (1954). Economic development with unlimited supplies of labour. **The Manchester School**, **22**(2), 139-191. <https://doi.org/10.1111/J.1467-9957.1954.TB00021.X>
- Little, P., & Watts, M. (1994). **Living under contract: Contract farming and agrarian transformation in Sub-Saharan Africa**. University of Wisconsin Press.
- Liu, Y., Barrett, C. B., Pham, T., & Violette, W. (2020). The intertemporal evolution of agriculture and labor over a rapid structural transformation: Lessons from Vietnam. **Food Policy**, **94**, 101913. <https://doi.org/10.1016/j.foodpol.2020.101913>
- Losch, B. (2016). **Structural transformation to boost youth labour demand in sub-Saharan Africa: The role of agriculture, rural areas and territorial development** **Employment and Labour Market Policies Branch**. http://www.ilo.org/global/about-the-ilo/mission-and-objectives/WCMS_099766/lang--en/indx.htm
- Losch, B. (2022). Decent employment and the future of agriculture. How dominant narratives prevent addressing structural issues. **Frontiers in Sustainable Food Systems**, **6**, 190. <https://doi.org/10.3389/FSUFS.2022.862249/BIBTEX>

- Losch, B., Freguin-Gresh, S., & White, E. T. (2012). **Structural transformation and rural change revisited**. The World Bank. <https://doi.org/10.1596/978-0-8213-9512-7>
- Lowder, S. K., Bertini, R., & Croppenstedt, A. (2017). Poverty, social protection and agriculture: Levels and trends in data. **Global Food Security, 15**, 94-107. <https://doi.org/10.1016/j.gfs.2017.06.001>
- Mabiso, A., & Benfica, R. (2019). **The narrative on rural youth and economic opportunities in Africa: Facts, myths and gaps**. www.ifad.org/ruraldevelopmentreport
- MacDonald, J. M., Perry, J., Ahearn, M. C., Banker, D., Chambers, W., Dimitri, C., Key, N., Nelson, K. E., Southard, L. W., Hasanov, S., Abebe, G. K., Bijman, J., Kemp, R., Omta, O., Tsegaye, A., Key, N., Runsten, D., Mergenthaler, M., Weinberger, K., ... Vasiljević, Z. (2012). Impact of contract farming on smallholder poultry farmers' Income in Kenya. **Supply Chain Management, 12**(4).
- Maertens, M., Dries, L., Dedehouanou, F. A., & Swinnen, J. (2007). High-value Supply Chains, Food Standards and Rural Households in Senegal. In J. F. M. Swinnen (Ed.), **Global supply chains, standards and the poor** (pp. 159-172). CABI Publishing.
- Maertens, M., & Fabry, A. (2019). Creating more and better jobs in global value chains. **Future of Work in Agriculture, 1**-24. [https://farmlabor.ucdavis.edu/sites/g/files/dgvnks5936/files/inline-files/Miet Maertens%3B Global Value Chains.pdf](https://farmlabor.ucdavis.edu/sites/g/files/dgvnks5936/files/inline-files/Miet%20Maertens%20Global%20Value%20Chains.pdf)
- Maertens, M., Minten, B., & Swinnen, J. (2012). Modern food supply chains and development: Evidence from horticulture export sectors in Sub-Saharan Africa. **Development Policy Review, 30**(4), 473-497. <https://doi.org/10.1111/J.1467-7679.2012.00585.X>
- Maertens, M., & Swinnen, J. (2007). Globalization, privatization, and vertical coordination in food value chains in developing and transition countries. **Agricultural Economics, 37**(S1), 89-102. <https://doi.org/10.1111/J.1574-0862.2007.00237.X>
- Maertens, M., & Swinnen, J. (2009). Trade, standards, and poverty: Evidence from Senegal. **World Development, 37**(1), 161-178. <https://doi.org/10.1016/j.worlddev.2008.04.006>
- Maertens, M., & Swinnen, J. (2012). Gender and modern supply chains in developing countries. **The Journal of Development Studies, 48**(10), 1412-1430. <https://doi.org/10.1080/00220388.2012.663902>
- Maertens, M., & Verhofstadt, E. (2011). **Maternal off-farm wage employment and primary school enrollment: evidence from a natural quasi-experiment in Senegal**. <https://www.researchgate.net/publication/254386578>
- Magar, S. T., Timsina, J., Devkota, K. P., Weili, L., & Rajbhandari, N. (2022). Conservation agriculture for increasing productivity, profitability and water productivity in rice-wheat system of the Eastern Gangetic Plain. **Environmental Challenges, 7**. <https://doi.org/10.1016/j.envc.2022.100468>
- Malanski, P., Dedieu, B., & Schiavi, S. (2021). Mapping the research domains on work in agriculture. A bibliometric review from Scopus database. **Journal of Rural Studies, 81**, 305-314. <https://doi.org/10.1016/j.jrurstud.2020.10.050>
- Malanski, P., Schiavi, S. M. de A., Dedieu, B., & Damansceno, J. C. (2022). International research on labor in agri-food value chains: A bibliometric review from web of science. **Frontiers in Sustainable Food Systems, 6**, 1-12. <https://doi.org/10.3389/fsufs.2022.852178> OPEN
- Malapit, H., Ragasa, C., Martinez, E. M., Rubin, D., Seymour, G., & Quisumbing, A. (2020). Empowerment in agricultural value chains: Mixed methods evidence from the Philippines. **Journal of Rural Studies, 76**, 240-253. <https://doi.org/10.1016/j.jrurstud.2020.04.003>
- Manda, S. (2022). Sugarcane commercialization and gender experiences in the Zambian "Sweetest Town." **Feminist Economist, 28**(4), 254-284. <https://doi.org/10.1080/13545701.2022.2079697>
- Masamha, B., Thebe, V., & Uzokwe, V. N. E. (2018). Mapping cassava food value chains in Tanzania's smallholder farming sector: The implications of intra-household gender dynamics. **Journal of Rural Studies, 58**, 82-92. <https://doi.org/10.1016/j.jrurstud.2017.12.011>
- Mazoyer, M. (2001). **Protecting small farmers and the rural poor in the context of globalization**.
- McCullough, E. B. (2017). Labor productivity and employment gaps in Sub-Saharan Africa. **Food Policy, 67**, 133-152. <https://doi.org/10.1016/J.FOODPOL.2016.09.013>
- Meemken, E. M., Sellare, J., Kouame, C. N., & Qaim, M. (2019). Effects of fairtrade on the livelihoods of poor rural workers. **Nature Sustainability, 2**(7), 635-642. <https://doi.org/10.1038/S41893-019-0311-5>
- Meemken, E.-M., & Bellemare, M. F. (2020). Smallholder farmers and contract farming in developing countries. **2020 Proceedings of the National Academy of Sciences, 117**(1), 259-264. <https://doi.org/10.6077/190x-1677>
- Mehdi, M., Ahsan, M. B., Ahmad, B., Sadozai, K. N., Hameed, G., & Asif, M. (2020). Value chain development and social upgrading at upstream of mango value in Pakistan. **Sarhad Journal of Agriculture, 36**(2), 574-585. <https://doi.org/10.17582/journal.sja/2020/36.2.574.585>
- Minot, N., & Sawyer, B. (2016). Contract farming in developing countries: theory, practice, and policy implications. In A. Devaux, M. Torero, J. Donovan, & D. Horton (Eds.), **Innovation for inclusive value-chain development: Successes and challenges** (pp. 127-158). IFPRI.
- Minten, B., Randrianarison, L., & Swinnen, J. F. M. (2009). Global Retail Chains and Poor Farmers: Evidence from Madagascar. **World Development, 37**(11), 1728-1741. <https://doi.org/10.1016/j.worlddev.2008.08.024>
- Miyata, S., Minot, N., & Hu, D. (2009). Impact of contract farming on income: Linking small farmers, packers, and supermarkets in China. **World Development, 37**(11), 1781-1790. <https://doi.org/10.1016/j.worlddev.2008.08.025>
- Mukasa, A. N., & Salami, A. O. (2015). **Gender productivity differentials among smallholder farmers in Africa: A cross-country comparison** (No. 231). www.afdb.org/
- Murphy, S., Arora, D., Kruijssen, F., McDougall, C., & Kantor, P. (2020). Gender-based market constraints to informal fish retailing: Evidence from analysis of variance and linear regression. **PLoS ONE, 15**(3). <https://doi.org/10.1371/journal.pone.0229286>
- Muyanga, M., & Jayne, T. S. (2014). Effects of rising rural population density on smallholder agriculture in Kenya. **Food Policy, 48**, 98-113. <https://doi.org/10.1016/j.foodpol.2014.03.001>
- Neven, D., Odera, M. M., Reardon, T., & Wang, H. (2009). Kenyan supermarkets, emerging middle-class horticultural farmers, and employment impacts on the rural poor. **World Development, 37**(11), 1802-1811. <https://doi.org/10.1016/j.worlddev.2008.08.026>

- Nix, E., Gamberoni, E., & Heath, R. (2016). Bridging the gender gap: Identifying what is holding self-employed women back in Ghana, Rwanda, Tanzania, and the Republic of Congo. **World Bank Economic Review**, *30*(3), 501–521. <https://doi.org/10.1093/wber/lhv046>
- Njuki, J., Eissler, S., Malapit, H., Meinzen-Dick, R., Bryan, E., & Quisumbing, A. (2021). **A review of evidence on gender equality, women's empowerment, and food systems**. <https://doi.org/10.1016/2022.10622>
- Oberlack, C., Blare, T., Zambrino, L., Bruelisauer, S., Solar, J., Villar, G., Thomas, E., & Ramírez, M. (2023). With and beyond sustainability certification: Exploring inclusive business and solidarity economy strategies in Peru and Switzerland. **World Development**, *165*, 106187. <https://doi.org/10.1016/J.WORLDDEV.2023.106187>
- Oduol, J. B. A., Mithöfer, D., Place, F., Nang'ole, E., Olwande, J., Kirimi, L., & Mathenge, M. (2017). Women's participation in high value agricultural commodity chains in Kenya: Strategies for closing the gender gap. **Journal of Rural Studies**, *50*, 228–239. <https://doi.org/10.1016/j.jrurstud.2017.01.005>
- OECD. (2021). **Jobs for rural youth: The role of local food economies**. <https://doi.org/https://doi.org/10.1787/692c0ca1-en>.
- Otsuka, K., Nakano, Y., & Takahashi, K. (2016). Contract farming in developed and developing countries. **Annual Review of Resource Economics**, *8*(1), 353–376. <https://doi.org/10.1146/annurev-resource-100815-095459>
- Palacios-Lopez, A., Christiaensen, L., & Kilic, T. (2017). How much of the labor in African agriculture is provided by women? **Food Policy**, *67*, 52–63. <https://doi.org/10.1016/j.foodpol.2016.09.017>
- Palacios-López, A., & López, R. (2015). The gender gap in agricultural productivity: The role of market imperfections. **Journal of Development Studies**, *51*(9), 1175–1192. <https://doi.org/10.1080/00220388.2015.1028539>
- Parrot, L., Biard, Y., Klaver, D., Kabré, E., & Vannière, H. (2022). Slicing the fruit five ways: An economic, social, and environmental assessment of five mango food supply chains in Burkina Faso. **Sustainable Production and Consumption**, *30*, 1032–1043. <https://doi.org/10.1016/j.spc.2022.01.019>
- Pathways for Prosperity Commission. (2018). **Charting pathways for inclusive growth**. www.click.co.uk
- Paudel, S., Filipinski, M., & Minten, B. (2022). **Income diversification and the rural non-farm economy** (No. 27). IFPRI. https://books.google.cl/books?hl=es&lr=&id=o6yeEAAAQBAJ&oi=fnd&pg=PA4&dq=Income+diversification+and+the+rural+non-farm+economy&ots=jPkiEqJ7r5&sig=slmTSt_u6IPmv2KtrmYKZmudUkc&redir_esc=y#v=onepage&q=Income+diversification+and+the+rural+non-farm+economy&f=t
- Perin, G., Bregolin Dytz, J. P., Sato, L., & Mohamed Yousif, N. (2022). The state of social protection for agrifood systems workers in West Africa. In **The state of social protection for agrifood systems workers in West Africa**. FAO; International Policy Centre for Inclusive Growth (IPC-IG)/UNDP; <https://doi.org/10.4060/cc3310en>
- Peters, & Krijn. (2011). **War and the Crisis of Youth in Sierra Leone**. Cambridge: University Press.
- Pingali, P. (2007). Westernization of Asian diets and the transformation of food systems: Implications for research and policy. **Food Policy**, *32*(3), 281–298. <https://doi.org/10.1016/j.foodpol.2006.08.001>
- Pingali, P. L. (2012). Green revolution: Impacts, limits, and the path ahead. In **Proceedings of the National Academy of Sciences of the United States of America** (Vol. 109, Issue 31, pp. 12302–12308). <https://doi.org/10.1073/pnas.0912953109>
- Pingali, P., & Rosegrant, M. W. (1994). **Confronting the environmental consequences of the Green Revolution in Asia**.
- Porter, G., & Phillips-Howard, K. (1997). Comparing Contracts: An Evaluation of Contract Farming Schemes in Africa. **World Development**, *25*(2), 227–238.
- Quan, J. (2007). 4. Changes in intra-family land relations. In **Changes in 'Customary' Land Tenure Systems in Africa** (pp. 51–63).
- Rajkhowa, P., & Qaim, M. (2022). Mobile phones, off-farm employment and household income in rural India. **Journal of Agricultural Economics**, *73*(3), 789–805. <https://doi.org/10.1111/1477-9552.12480>
- Rao, E. J. O., & Qaim, M. (2013). Supermarkets and agricultural labor demand in Kenya: A gendered perspective. **Food Policy**, *38*(1), 165–176. <https://doi.org/10.1016/J.FOODPOL.2012.11.008>
- Rasmussen, W. D. (1968). **Advances in American agriculture: The mechanical tomato harvester as a case study**. *9*(4), 531–543. <https://www.jstor.org/stable/3101894?seq=1&cid=pdf->
- Reardon, T. (1997). Using evidence of household income diversification to inform study of the rural nonfarm labor market in Africa. **World Development**, *25*(5), 735–747. [https://doi.org/10.1016/S0305-750X\(96\)00137-4](https://doi.org/10.1016/S0305-750X(96)00137-4)
- Reardon, T. (2015). The hidden middle: the quiet revolution in the midstream of agrifood value chains in developing countries. **Oxford Review of Economic Policy**, *31*(1), 45–63. <https://doi.org/10.1093/OXREP/GRV011>
- Reardon, T., Barrett, C. B., Berdegue, J. A., & Swinnen, J. (2009). Agrifood industry transformation and small farmers in developing countries. **World Development**, *37*(11), 1717–1727. <https://doi.org/10.1016/j.worlddev.2008.08.023>
- Reardon, T., & Berdegue, J. A. (2002). The rapid rise of supermarkets in Latin America: Challenges and opportunities for development. **Development Policy Review**, *20*(4). <https://doi.org/10.1111/1467-7679.00178>
- Reardon, T., Berdegue, J., & Escobar, G. (2001). Rural nonfarm employment and incomes in Latin America: Overview and policy implications. **World Development**, *29*(3), 395–409. [https://doi.org/10.1016/S0305-750X\(00\)00112-1](https://doi.org/10.1016/S0305-750X(00)00112-1)
- Reardon, T., Chen, K. Z., Minten, B., Adriano, L., Dao, T. A., Wang, J., & Gupta, S. Das. (2014). The quiet revolution in Asia's rice value chains. **Annals of the New York Academy of Sciences**, *1331*(1), 106–118. <https://doi.org/10.1111/nyas.12391>
- Reardon, T., Liverpool-Tasie, L. S. O., & Minten, B. (2021). Quiet revolution by SMEs in the midstream of value chains in developing regions: wholesale markets, wholesalers, logistics, and processing. **Food Security**, *13*(6), 1577–1594. <https://doi.org/10.1007/s12571-021-01224-1>
- Reardon, T., Stamoulis, K., Cruz, M. E., Balisacan, A., & Berdegue, J. A. (1999). The state of food and agriculture 1998. Rural non-farm income in developing countries. In **The State of Food and Agriculture**. <http://www.fao.org/docrep/017/w9500e/w9500e.pdf>
- Riisgaard, L. (2009). Global value chains, labor organization and private social standards: Lessons from East African cut flower industries. **World Development**, *37*(2), 326–340. <https://doi.org/10.1016/j.worlddev.2008.03.003>

- Riisgaard, L., & Hammer, N. (2011). Prospects for labour in global value chains: Labour standards in the cut flower and banana industries. *British Journal of Industrial Relations*, **49**(1), 168-190. <https://doi.org/10.1111/j.1467-8543.2009.00744.x>
- Rijnks, R. H., Crowley, F., & Doran, J. (2022). Regional variations in automation job risk and labour market thickness to agricultural employment. *Journal of Rural Studies*, **91**, 10-23. <https://doi.org/10.1016/J.JRURSTUD.2021.12.012>
- Rodrik, D. (2016). Premature deindustrialization. *Journal of Economic Growth*, **21**(1), 1-33. <https://doi.org/10.1007/s10887-015-9122-3>
- Rolon, C., Burattini, B., Sato, L., Thives, V., Wagner, L., Figueiredo, N., Rénique, A., & Mireles, M. (2022). Social protection response to COVID-19 in rural LAC: social and economic double inclusion. *International Policy Centre for Inclusive Growth*. <https://ipicg.org/publication/31129>
- Roser, M. (2023). **Employment in agriculture**. <https://ourworldindata.org/employment-in-agriculture>
- Ruben, R. (2008). **The impact of fair trade** (R. Ruben, Ed.). Wageningen Academic Publishers.
- Ruben, R., & Hoebink, P. (2015). **Coffee certification in East Africa: impact on farmers, families and cooperatives**. (R. Ruben & P. Hoebink, Eds.). Wageningen Academic Publishers.
- Ruml, A., & Qaim, M. (2021). New evidence regarding the effects of contract farming on agricultural labor use. *Agricultural Economics*, **52**(1), 51-66. <https://doi.org/10.1111/AGEC.12606>
- Saha, D. (2020). Producer collectives through self-help: sustainability of small tea growers in India. *International Review of Applied Economics*, **34**(4), 471-490. <https://doi.org/10.1080/02692171.2020.1773646>
- Sánchez, A. C., Kamau, H. N., Grazioli, F., & Jones, S. K. (2022). Financial profitability of diversified farming systems: A global meta-analysis. *Ecological Economics*, **201**, 107595. <https://doi.org/10.1016/j.ecolecon.2022.107595>
- Sato, L. (2021). The state of social insurance for agricultural workers in the Near East and North Africa and challenges for expansion. In **The state of social insurance for agricultural workers in the Near East and North Africa and challenges for expansion** (No. 189). FAO and UNDP. <https://doi.org/10.4060/cb3150en>
- Schlogl, L., & Sumner, A. (2020). Automation and structural transformation in developing countries. In **Disrupted Development and the Future of Inequality in the Age of Automation** (pp. 51-78). Palgrave Pivot, Cham. https://doi.org/10.1007/978-3-030-30131-6_5
- Schumacher, K. P. (2014). Gender relations in global agri-food value chains - a review. *DIE ERDE*, **145**(3), 127-134. <https://doi.org/10.12854/erde14510>
- Schuster, M., & Maertens, M. (2013). Do private standards create exclusive supply chains? New evidence from the Peruvian asparagus export sector. *Food Policy*, **43**, 291-305. <https://doi.org/10.1016/j.foodpol.2013.10.004>
- Schuster, M., Vranken, L., & Maertens, M. (2020). You can('t) always get the job you want: employment preferences in the Peruvian horticultural export chain. *Journal of Development Studies*, **56**(7), 1408-1429. <https://doi.org/10.1080/00220388.2019.1666976>
- Sehnbruch, K., González, P., Apablaza, M., Méndez, R., & Arriagada, V. (2020). The Quality of Employment (QoE) in nine Latin American countries: A multidimensional perspective. *World Development*, **127**. <https://doi.org/10.1016/j.worlddev.2019.104738>
- Selwyn, B. (2013). Social upgrading and labour in global production networks: A critique and an alternative conception. *Competition and Change*, **17**(1), 75-90. <https://doi.org/10.1179/1024529412Z.00000000026>
- Shukla, P. (2019). Linkages between value addition, employment and farmers' income. *Indian Journal of Agricultural Economics*, **74**(3), 408-419. <https://www.cabdirect.org/cabdirect/abstract/20203412185>
- Signé, L. (2022). Africa's role in the Fourth Industrial Revolution: Riding the world's biggest wave of disruptive innovation. **Cambridge University Press**.
- Singh, S. (2002). Contracting out solutions: political economy of contract farming in the Indian Punjab. *World Development*, **30**(9), 1621-1638. [https://doi.org/10.1016/S0305-750X\(02\)00059-1](https://doi.org/10.1016/S0305-750X(02)00059-1)
- Smith, D. R., Gordon, A., Meadows, K., & Zwick, K. (2001). Livelihood diversification in Uganda: patterns and determinants of change across two rural districts. In *Food Policy* (Vol. 26). www.elsevier.com/locate/foodpol
- Soullier, G., & Moustier, P. (2018). Impacts of contract farming in domestic grain chains on farmer income and food insecurity. Contrasted evidence from Senegal. *Food Policy*, **79**, 179-198. <https://doi.org/10.1016/j.foodpol.2018.07.004>
- Storper, M., & Scott, A. (1990). Work Organisation and Local Labour Markets in an Era of Flexible Production. *International Labour Review*, **129**, 573-591.
- Sumberg, J., Fox, L., Flynn, J., Mader, P., & Oosterom, M. (2021). Africa's "youth employment" crisis is actually a "missing job" crisis. *Development Policy Review*, **39**(4), 621-643.
- Suri, T., & Jack, W. (2016). **The long-run poverty and gender impacts of mobile money**. <http://science.sciencemag.org/>
- Swinnen, J. (2006). **The dynamics of vertical coordination in agrifood chains in Eastern Europe and Central Asia** (No. 42). <http://www.copyright.com/>
- Swinnen, J. (2007). Global supply chains, standards and the poor: How the globalization of food systems and standards affects rural development and poverty. In **Global Supply Chains, Standards and the Poor: How the Globalization of Food Systems and Standards Affects Rural Development and Poverty**. CABI Publishing. <https://doi.org/10.1079/9781845931858.0000>
- Swinnen, J. (2016). Economics and politics of food standards, trade, and development. *Agricultural Economics (United Kingdom)*, **47**, 7-19. <https://doi.org/10.1111/agec.12316>
- Swinnen, J. F. M., & Maertens, M. (2007). Globalization, privatization, and vertical coordination in food value chains in developing and transition countries. *Agricultural Economics*, **37**(S1), 89-102. <https://doi.org/10.1111/J.1574-0862.2007.00237.X>
- Tabe-Ojong, M. P., Molua, E. L., Nanfouet, M. A., Mkong, C. J., Kiven, V., & Ntegang, V. A. (2023). Oil palm production, income gains, and off-farm employment among independent producers in Cameroon. *Ecological Economics*, **208**. <https://doi.org/10.1016/j.ecolecon.2023.107817>
- Tallontire, A., Dolan, C., Smith, S., & Barrientos, S. (2005). Reaching the marginalised? Gender value chains and ethical trade in African horticulture. *Practice*, **15**(3), 559-571. <https://doi.org/10.1080/09614520500075771>

- Tamru, S., Minten, B., Alemu, D., & Bachewe, F. (2017). The rapid expansion of herbicide use in smallholder agriculture in Ethiopia: Patterns, drivers, and implications. *European Journal of Development Research*, **29**(3), 628–647. <https://doi.org/10.1057/s41287-017-0076-5>
- Technopolis & Research ICT Africa & Tambourine Innovation Ventures. (2019). **Study on unlocking the potential of the fourth industrial revolution in Africa**. <https://doi.org/10.13140/RG.2.2.14260.12163>
- Theunissen, I. (2015, November 26). **E-agriculture: How ICT is taking farming into the future**. IT News Africa.
- Thurlow, J. (2021). **Beyond Agriculture Measuring Agri-Food System GDP and Employment**. IFPRI. <https://pim.cgiar.org/2021/03/30/beyond-agriculture-measuring-agri-food-system-gdp-and-employment/>
- Timmer, P. (1988). The agricultural transformation. In H. Chenery & T. Srinivasan (Eds.), **Handbook of Development Economics** (Vol. 1, pp. 275–331). Elsevier. <https://www.researchgate.net/publication/4825947>
- Timmer, P. (2009). **A world without Agriculture. The Structural Transformation in Historical Perspective**. The AEI Press.
- Tirivayi, N., Knowles, M., & Davis, B. (2013). **The interaction between social protection and agriculture A review of evidence**. www.fao.org/publications
- Tirivayi, N., Knowles, M., & Davis, B. (2016). The interaction between social protection and agriculture: A review of evidence. In **Global Food Security** (Vol. 10, pp. 52–62). Elsevier. <https://doi.org/10.1016/j.gfs.2016.08.004>
- Trivelli, C., & Morel, J. (2019). **IFAD RESEARCH SERIES 45 Rural youth inclusion, empowerment and participation**. www.ifad.org/ruraldevelopmentreport
- Trivelli, C., Vargas, S., & Clausen, J. (2017). **Social protection and inclusive rural transformation**. IFAD. https://socialprotection.org/sites/default/files/publications_files/Research%20Series%20Issue%209%20-%20Social%20protection%20and%20inclusive%20rural%20transformation.pdf
- Tschirley, D., Kondo, M., & Snyder, J. (2016). Chapter 3: downstream report. In **Agri-food youth employment and engagement study** (pp. 43–71). <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EX->
- Valdés, A., & Foster, W. (2010). Reflections on the role of agriculture in pro-poor growth. *World Development*, **38**(10), 1362–1374. <https://doi.org/10.1016/j.worlddev.2010.06.003>
- Valkila, J. (2009). Fair trade organic coffee production in Nicaragua – Sustainable development or a poverty trap? *Ecological Economics*, **68**(12), 3018–3025. <https://doi.org/10.1016/j.ecolecon.2009.07.002>
- Valkila, J., & Nygren, A. (2010). Impacts of fair trade certification on coffee farmers, cooperatives, and laborers in Nicaragua. *Agriculture and Human Values*, **27**(3), 321–333. <https://doi.org/10.1007/S10460-009-9208-7/METRICS>
- Van den Broeck, G., & Kilic, T. (2019). Dynamics of off-farm employment in Sub-Saharan Africa: A gender perspective. *World Development*, **119**, 81–99. <https://doi.org/10.1016/j.worlddev.2019.03.008>
- Van den Broeck, G., & Maertens, M. (2017). Moving up or moving out? Insights into rural development and poverty reduction in Senegal. *World Development*, **99**, 95–109. <https://doi.org/10.1016/j.worlddev.2017.07.009>
- Van der Ploeg, J. D., Barjolle, D., Bruil, J., Brunori, G., Costa Madureira, L. M., Dessein, J., Drag, Z., Fink-Kessler, A., Gasselin, P., Gonzalez de Molina, M., Gorchach, K., Jürgens, K., Kinsella, J., Kirwan, J., Knickel, K., Lucas, V., Marsden, T., Maye, D., Migliorini, P., ... Wezel, A. (2019). The economic potential of agroecology: Empirical evidence from Europe. *Journal of Rural Studies*, **71**, 46–61. <https://doi.org/10.1016/j.jrurstud.2019.09.003>
- Van Herck, K., & Swinnen, J. (2015). Small farmers, standards, value chains, and structural change: panel evidence from Bulgaria. *British Food Journal*, **117**(10), 2435–2464. <https://doi.org/10.1108/BFJ-11-2014-0389/FULL/XML>
- Van Hoyweghen, K., Fabry, A., Feyaerts, H., Wade, I., & Maertens, M. (2021). Resilience of global and local value chains to the Covid-19 pandemic: Survey evidence from vegetable value chains in Senegal. *Agricultural Economics*, **52**(3), 423–440. <https://doi.org/10.1111/AGEC.12627>
- Van Hoyweghen, K., Van den Broeck, G., & Maertens, M. (2020). Employment dynamics and linkages in the rural economy: Insights from Senegal. *Journal of Agricultural Economics*, **71**(3), 904–928. <https://doi.org/10.1111/1477-9552.12387>
- Vetrova, S. A., Zayachkovskiy, V. A., & Sirota, S. M. (2019). Monogerm table beet from the perspective of economic efficiency. *IOP Conference Series: Earth and Environmental Science*, **395**(1). <https://doi.org/10.1088/1755-1315/395/1/012052>
- Vos, R. (2019). Agriculture, the Rural Sector, and Development. In **Asian Transformations: An Inquiry into the Development of Nations** (pp. 160–185). Oxford University Press. <https://doi.org/10.1093/oso/9780198844938.003.0007>
- Vos, R., & Cattaneo, A. (2021). Poverty reduction through the development of inclusive food value chains. *Journal of Integrative Agriculture*, **20**(4), 964–978. [https://doi.org/10.1016/S2095-3119\(20\)63398-6](https://doi.org/10.1016/S2095-3119(20)63398-6)
- Vos, R., Mamun, A., Traore, F., & Laborde, D. (2021). Agricultural transformation in Asia. An overview of recent experiences. In **Agricultural transformation in Asia. Policy and institutional experiences**. FAO. <https://doi.org/10.4060/cb4946en>
- Warsanga, W. B., & Evans, E. A. (2018). Welfare impact of wheat farmers participation in the value chain in Tanzania. *Modern Economy*, **09**(04), 853–887. <https://doi.org/10.4236/me.2018.94055>
- Weber, J. G. (2011). How much more do growers receive for fair trade-organic coffee? *Food Policy*, **36**(5), 678–685. <https://doi.org/10.1016/j.foodpol.2011.05.007>
- White, B. (2012). Agriculture and the generation problem: Rural youth, employment and the future of farming. *IDS Bulletin*, **43**(6), 9–19. <https://doi.org/10.1111/J.1759-5436.2012.00375.X>
- Whitt, C. (2022, June 23). **Farmers' use of contracts has declined over last 25 years**. USDA Economic Research Service. <https://www.ers.usda.gov/amber-waves/2022/june/farmers-use-of-contracts-has-declined-over-last-25-years/>
- Wilson, J. (1986). The Political Economy of Contract Farming. *Review of Radical Political Economics*, **18**(4), 47–70. <https://doi.org/10.1177/048661348601800403>
- Winder Rossi, N., & Faret, P. (2019). **Garantias minimas de proteccion social para el desarrollo incluyente de la economia rural en America Latina y Caribe**.
- Wineman, A., & Jayne, T. S. (2017). Intra-rural migration and pathways to greater well-being: Evidence from Tanzania. **Feed the Future Innovation Lab for Food Security Research Paper 60: Michigan State University**.

Woldenhanna, T., & Oskam, A. (2001). Income diversification and entry barriers: evidence from the Tigray region of northern Ethiopia. **Food Policy**, **26**, 351–365. www.elsevier.com/locate/foodpol

Woodhill, J. (2016). **Inclusive agribusiness: the state of play background working paper prepared for the global donor platform for rural development.**

World Bank. (2006). **The dynamics of vertical coordination in agrifood chains in Eastern Europe and Central Asia. Implications for policy and world bank operations.** <http://www.copyright.com/>.

World Bank. (2008). **World development report 2008: agriculture for development.** https://reliefweb.int/report/world/world-development-report-2008-agriculture-development?gclid=Cj0KCCQIA3eGfBhCeARIsACpJNU8Ufv6Puom5qhBG2Va40rrwh2f2PGWALEnK0DEQUZJd7FNdnj4nsAkaAq7qEALw_wcB

Yeboah, F. K., & Jayne, T. S. (2018). Africa's Evolving Employment Trends. **Journal of Development Studies**, **54**(5), 803–832. <https://doi.org/10.1080/00220388.2018.1430767>

Young, A. (2013). Inequality, the urban-rural gap, and migration. **The Quarterly Journal of Economics**, **128**(4), 1727–1786. <https://doi.org/10.2307/26372536>

Yunez-Naude, A., & Taylor, E. (2001). The determinants of nonfarm activities and incomes of rural households in Mexico, with emphasis on education. **World Development**, **29**(3), 580. www.elsevier.com/locate/worlddev

Zhang, J., Mishra, A. K., Zhu, P., & Li, X. (2020). Land rental market and agricultural labor productivity in rural China: A mediation analysis. **World Development**, **135**, 105089. <https://doi.org/10.1016/J.WORLDDEV.2020.105089>

Zhang, X., Yang, J., & Thomas, R. (2017). Mechanization outsourcing clusters and division of labor in Chinese agriculture. **China Economic Review**, **43**, 184–195. <https://doi.org/10.1016/J.CHIECO.2017.01.012>

Annex 1

Innovations, interventions, and policies that support more employment, more income, and better working conditions in AFS

Based on the reviewed literature, 13 innovations, interventions, and policies were identified as promising to increase employment in AFS, improve AFS employment inclusivity, and/or generate better working conditions in AFS. These 13 innovations, interventions, and policies are well documented in the literature. Some have been evaluated in specific locations and are frequently mentioned as promising areas that require more analyses to become sound recommendations for improving AFS employment in the Global South.

The selection is arbitrary based on the authors' review of the gathered literature, which, as discussed in this document, might be biased toward certain topics and positive examples. These 13 analyzed interventions clearly are not the only ones mentioned in the literature, but they are the ones that have been worked on thoroughly and probably represent a small set of the available innovations, interventions, and policies that could positively affect AFS employment.

The types of effects on employment presented for each innovation, intervention, or policy represent a general indication of the type of effects documented in the literature. As discussed in this document, however, the effects of each vary widely across locations; types of products; and economic, social, environmental, and cultural contexts, so generalizations must be taken with extreme caution. We use three types of general effects: + which is to be read as mostly positive, - as mostly negative, and ? as mixed result (which could imply that there is no agreement about the effects in the literature or that the net effect of any of the measures is not clearly identified).

For each of the innovations, interventions, or policies included in the following table, employment effects, such as the number of on- and off-farm jobs, productivity changes, and improvements in workers' income and in working conditions, as well as inclusion effects, such as reducing gender or generation gaps, or poverty reduction for AFS workers, are presented when supported by the reviewed literature. Additional comments on the size of the identified effects and the outreach of each type of analyzed measure are included when needed. In the case of policy interventions, there is a need to further analyze the costs of each of them, the fiscal space that could be compromised in their implementation, the considerably complex institutional arrangements needed for them, and the political economy behind them.

These 13 identified innovations, interventions, and policies are promising, but several still require more research on and debate about how to obtain the identified positive effects in different contexts. The research challenge for most of them is to identify how to implement them effectively in different settings and get the same, or better, results.

Employment effects

Innovations or interventions

Description

Labor
productivity
(off and on farm)

Employment
creation
(off and on farm)

Rural wages
and incomes
(off and on farm)

Gender gaps

Youth
employment

Poverty
reduction

Value chain innovations or interventions

Mechanization	SME providing farm mechanization services (e.g., land preparation, harvesting), with or without use of mobile phone apps. Potential to reach millions of small-scale farmers.	+ on-farm and/or off-farm productivity.	+ employment (through increases in scale) and -employment (through substitution effect). + new skilled jobs and - replaces non-skilled workers.	+ skilled jobs and - for those who are replaced by machines.			
Digital innovations (on and off farm)	Digital services that allow better agrifood production and marketing (risk-management tools, weather monitoring, mobile payments, e-commerce, etc.). Potential to reach many farmers, but primarily those with more assets and in better-endowed territories (connectivity, electrification).	+ on-farm and/or off-farm productivity.	+ employment (through increases in scale) + new skilled jobs	+ on-farm and/or off-farm for adopters.	+ on-farm and/or off-farm opportunities for women (and more resilience). ? women have lower chances of adopting, gender gaps could increase.	+ off-farm opportunities.	? poorer segments may not be able to adopt such innovations, enlarging gaps. + more and/or better on-farm and/or off-farm opportunities and lower impacts of shocks and other risks (resilience) for adopters.
Food standards that include labor provisions	Adoption of standards such as Fairtrade or GLOBALG.A.P. Large impacts, but in small numbers of farmers and households. A niche innovation.	? very heterogeneous effects.	? very heterogeneous effects.	? very heterogeneous effects.			? very heterogeneous effects.
Modern contract farming and VC contracting	Contract farming for higher-value products. Large impacts, but for small numbers of farmers, mostly those with more assets. Labor market effects could reach many more households, including many with a lower asset endowment.	Mostly + although some reports in the literature of no or little productivity effects.	+ Higher-value products tend to be more demanding of on farm labor. + Off farm employment, although some studies find that traditional and transitional value chains serving domestic markets employ more people.	+ for producers and for many categories of non-farm workers, particularly those with formal, permanent jobs. ? Not clear for other categories of workers. - smallholder producers tend to be replaced by larger and wealthier ones as value chain grows and modernizes.	+ Contract farming is frequently associated with more off-farm employment for women. ? women remain under flexible and informal contracts. ? Gender gaps in salaries/income remain high.	+ Contract farming is frequently associated with more off-farm employment for youth. ? youth remain under flexible and informal contracts. ? Youth gaps in salaries/ income remain high.	+ Poverty reduction due to production and labor market effects. ? community effects not clear.
Small scale irrigation schemes	On-farm improved irrigation systems. Potential to reach relatively large numbers of farmers and workers, with significant impacts, although investment in irrigation is slowing.	+ on-farm productivity.	+ on-farm employment (Could also increase off-farm employment).	+ incomes from on-farm higher productivity.			+ on-farm income reduces poverty.

Employment effects

Innovations or interventions	Description	Labor productivity (off and on farm)	Employment creation (off and on farm)	Rural wages and incomes (off and on farm)	Gender gaps	Youth employment	Poverty reduction
Agroecology and other types of diversified agricultural systems	<p>Adoption of agroecology and other diversified production systems.</p> <p>Reaches relatively small numbers of farmers, with contested economic impacts (but with positive environmental effects).</p>	- lower labor productivity. ? debate about impact in agricultural productivity.	+ on-farm employment.	+ incomes from higher-value crops (due to their agroecological characteristics).	+ on-farm employment opportunities for women (but they could be through family support work).	+ on-farm employment opportunities for new workers.	
Flexible labor contracts	<p>Labor contracts adapted to production and marketing needs with no job stability.</p> <p>Reaches large numbers of on- and off-farm workers employed in global value chains.</p>	+ on-farm Labor productivity.	+ on-farm employment. ? off-farm employment. - mostly jobs lacking decent working conditions and social protection.	+ incomes, but only during contract period.	+ on-farm employment. - mostly jobs lacking decent working conditions and social protection.	+ on-farm employment. - mostly jobs lacking decent working conditions and social protection.	
Policy innovations or interventions							
Investments in infrastructure that “pull” rural employment and income diversification (public and private)	<p>Investments that improve connectivity, both physical (roads) and digital (mobile internet); support to increase access to and use of (private and public) services (financial, training,).</p> <p>Very large impacts (in many dimensions) potentially in large numbers of rural households and small-scale farmers.</p> <p>Subject to investment policies, fiscal space, and implementation capacity.</p> <p>Best results when investments simultaneously provide a bundle of basic infrastructure (electricity, roads, connectivity, water, etc.).</p>	+ Increases in productivity can be observed due to increased access to and use of productive services and inputs.	+ Increased employment through market opportunities, mitigation of financial constraints, and better use of inputs and services.	+ Increasing incomes through diversification and new employment opportunities in rural or peri-urban locations.	+ More income-generating opportunities for women.	+ More income-generating opportunities for youth.	+ Poverty can be reduced through new economic opportunities and lower transaction costs. + more rural-urban linkages.
Modernization of wholesale markets	<p>Better infrastructure and services at wholesale markets.</p> <p>Potentially very large impacts for most small-scale farmers and for rural households (as food consumers).</p>		+ Employment increases in the “hidden middle.”	+ Incomes for producers could increase through more competitive marketing, and for “hidden middle” through more competitive practices (fewer losses, better price information, more efficient services).	? Could improve working conditions for women.	? Could create employment opportunities for youth.	? Could improve access to quality food and enhance nutrition.

Employment effects

Innovations or interventions	Description	Labor productivity (off and on farm)	Employment creation (off and on farm)	Rural wages and incomes (off and on farm)	Gender gaps	Youth employment	Poverty reduction
Social protection and agricultural development intervention	<p>Social protection in conjunction with agricultural development interventions (services, assets, etc.). Agricultural development interventions increase agricultural productivity, and social protection facilitates access to these benefits for traditionally excluded groups.</p> <p>Large impacts for large numbers of farmers and off-farm workers.</p>	+ Labor productivity increases on farm and could also increase in off-farm employment.	+ Due to increases in agricultural production, new jobs can be created (scale effect).	+ Income increases, and resilience also increases, reducing the losses derived from negative shocks.	+ Social protection, if it targets women, can promote women's inclusion in productive or wage employment; women's income can increase; access to better social services (health). Women can increase their empowerment.	+ Social protection, if it targets youth, can promote access to productive opportunities or wage employment	+ Poverty reduction through increased productivity on farm and to social protection benefits (transfers, services, and resilience).
Social Protection with economic inclusion	<p>Social protection that includes economic inclusion interventions increases rural income and supports livelihood diversification.</p> <p>Large impacts for large numbers of farmers and off-farm workers.</p>	+ Economic inclusion interventions tend to increase productivity through provision of productive assets, training services, and financial inclusion.	+ self-employment. ? wage and off-farm employment could increase.	+ Households increase incomes through diversification.	+ New economic opportunities for women, better health, and more empowered women.	+New economic opportunities for youth.	+ Poverty reduction through income increases and food security improvements.
Labor regulation	<p>Adoption of minimum wages.</p> <p>Significant impacts, but for small numbers of workers (those with formal contracts).</p>		- Amount of employment can be reduced, but + hours worked can increase. Benefits reach only formal employees. Impact depends on state's capacity to enforce the adoption of minimum wage in agriculture.	+ Wages tend to increase.			? Depending on the outreach of the impacts. In most countries, will only benefit better-off workers (those with formal contracts, working for formal enterprises).
Collective action organizations	<p>Collective action organizations improve workers' bargaining power, help them obtain better contracts, and improve opportunities and working conditions for their members. However, complex to develop and requires long processes.</p> <p>Moderate to large impacts for low to moderate numbers of farmers.</p>	+ Cooperatives tend to increase productivity.	+ Workers' unions improve working conditions and incomes.	+ Incomes for unionized workers and/or cooperative members could increase.	+ Self-help groups show effectiveness in improving women's opportunities.	- Younger workers tend to be excluded from collective action organizations.	+ Improved working conditions and bargaining for traditionally excluded groups.

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