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Policy for decent work in agriculture

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Abstract

The agricultural sector offers employment for a large share ($\frac{1}{8}$) of the global population, yet there are various employment challenges, including precarious working conditions and labor market frictions, contributing to labor shortages in some—and unemployment in other—regions. It remains unclear which policy tools are best suited to address these challenges as the extant evidence is scattered, limited, and lacks a comprehensive overview of policy options. Here, we fill this gap by offering the first literature review on this topic, unraveling the complexity of employment challenges, providing an overview of policy tools, and proposing a policy and research agenda. Our overview shows that a bundle of coherent, national and international policies is needed to address the interconnected and global nature of employment challenges in agriculture. Many such tools are available but few of them have been rigorously evaluated, often because suitable data are lacking. Our contribution is timely, given the surge in public interest in social sustainability, the proliferation of policies for decent work in agriculture, and limited research guiding these efforts.

JEL Codes: J43, J80, Q10, J21, O15



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1. Introduction

Human labor remains a key input for agricultural production globally, especially for labor-intensive products that are difficult to mechanize. While the agricultural sector employs a large share ($\frac{1}{8}$) of the global population (Davis et al., 2023)¹, it faces a range of interconnected challenges. Globally, working conditions are often precarious, especially for migrant workers, involving issues such as unduly low pay, inadequate and overpriced housing, exposure to health hazards, discrimination, labor trafficking, and sexual violence (Neef, 2020; Rye and Scott, 2018; Sabin et al., 2023). Farmers globally are challenged with farm labor shortages, especially for labor-intensive seasonal tasks (Fabry et al., in review; Taylor et al., 2012), while many people, particularly in lower-income countries, are unemployed (Christiaensen and Maertens, 2022). Several policy tools exist to address these challenges, spanning farm, labor, migration, trade, and social policy, involving actors from the public, private, and civic sectors. However, it remains unclear whether and which policies best serve to address the interconnected employment challenges in agriculture (Meemken et al., 2024b). A few reviews on labor in agriculture exist but have focussed on labor demand and supply in agriculture (Charlton et al., 2021; Christiaensen et al., 2021a; Christiaensen and Maertens, 2022) or on working conditions (Dedieu and Schiavi, 2019; Malanski et al., 2020; Moyce and Schenker, 2018; Rye and Scott, 2018), without addressing the policy-relevant question of which policy tools can best address employment challenges in agriculture. Additionally, several of these reviews focus on specific problems (e.g., occupational health and safety), groups (e.g., migrant workers), or continents (e.g., Africa). Thus, a comprehensive, global, policy-oriented overview is missing.

Here, we address this gap by providing the first review on this topic, unraveling the complexity of employment challenges in agriculture, providing an overview of the landscape of policy tools, and proposing a policy and research agenda. We offer a narrative review and a policy- and research-focused discussion, capturing how the particular features of the agricultural sector contribute to interconnected employment challenges of global relevance—and which policy tools are available to address them. Challenges addressed include the following: First, we outline how features of the agricultural sector can contribute to precarious working conditions across the globe, especially but not only among hired workers. Similar to workers, many farmers face precarious working conditions, but capturing the myriad of policies that can support farmers' working conditions via

¹ This number is likely an underestimation (Davis et al., 2023). National labor statistics often exclude individuals who engage in household farming for their own consumption as their primary occupation. These statistics typically report only primary jobs, thus overlooking those who have secondary jobs in agriculture. Additionally, most labor force surveys use a seven-day recall period, which may not capture all agricultural workers due to the sector's seasonal nature.

improved income and living conditions is beyond the scope of this paper. We, thus, focus mostly on policies aimed at hired workers, many of which however also affect farmers, either improving their conditions as well—or increasing their labor and production costs. We capture this trade-off in the discussion. Second, precarious working conditions contribute to farm labor shortage, especially for labor-intensive seasonal crops. Third, while some farmers face labor shortages, unemployment is rampant in many regions.

Given the global and interconnected nature of these challenges, we employ a global perspective, highlighting differences between lower-income and higher-income countries, where necessary. Policy tools covered to address these central challenges span different areas and actors. Many tools are applicable globally, others are more useful or feasible in higher- or lower-income countries. Policy tools captured include, social protection and public works programs, guestworker programs, minimum wages and other labor standards, and trade and due diligence policies targeting the private sector. While we mostly focus on tools applied by public policymakers, several tools target, include, or are also used by private and civil society actors. For many of these tools, scientific evidence is extremely limited, making our identification of research gaps crucial for guiding future policy-oriented research.

Our focus on policy for decent work is timely due to the proliferating policy initiatives and limited research guiding these efforts. In wealthy countries, particularly in Europe, there is increasing effort from consumers, companies, and policymakers to promote decent work in agriculture, supporting the 8th Sustainable Development Goal. Examples include the EU's 2022 directive on minimum wages to protect workers from unduly low pay (European Union, 2022), Europe's new due diligence supply chain laws that hold companies accountable for labor rights violations in their global supply chains (Sellare et al., 2022), and the extension of guestworker programs that seek to ensure farm labor supply while improving conditions for migrant workers (MISSM, 2021).

The rest of this paper is organized as follows. The second section offers an overview of key employment challenges in agriculture, the third a summary of available policy tools, the fourth a policy and research agenda, and the fifth concluding remarks.

2. Central challenges in agricultural labor markets

Due to particular features of the agricultural sector, agricultural employment faces several interconnected challenges, as illustrated in Figure 1.

Globally, key features of the agricultural sector include its dependence on nature, leading to seasonality and high uncertainty in agricultural production as well as in labor demand, and the spatial dispersion and remoteness of farms (Rosenzweig, 1988), sometimes accompanied by a lack of infrastructure. Together, these factors often lead to labor market frictions (Charlton et al., 2021; Richards et al., 2024) and high transaction costs in both monitoring of (labor) standards and labor matching. Typically, workers and farmers connect through various pathways (Taylor and Charlton, 2019), such as (i) social networks, (ii) labor contracting, which is common across the globe and involves intermediaries matching workers and farmers, with varying levels of formality (Barrientos, 2013; Basu et al., 2021; Martin, 1996; Vandeman et al., 1991), and (iii) less frequently, online recruiting platforms. Yet these strategies can fail, leading to labor shortages. Furthermore, agriculture involves a range of 3-D (dirty, demanding, dangerous) tasks (Moyce and Schenker, 2018), especially when mechanization and digitalization levels are low.

Another feature of the agricultural sector is its highly diverse workforce, comprising self-employed and hired, local and (un)documented migrant, permanent and seasonal, higher-skilled and lower-skilled, as well as formal and informal workers (Aremu et al., in review; Charlton et al., 2021). Livelihood strategies are equally diverse, with occupational multiplicity common among both farmers and workers (Laitha et al., in review; Rigg et al., 2018). This diversity of livelihoods and workers results in heterogeneous interests and low levels of unionization (Chen, 2013; Fisher et al., 2024; Freeman, 2010).

Finally, the agricultural sector, given its relevance for food security, holds substantial strategic, political, and cultural importance (Swinnen, 2018). While these features are nearly universal, the context (outer circle in Fig. 1) varies across countries, either exacerbating or alleviating the resulting challenges.

As a result of these features, agricultural employment faces three central challenges that attract sustained media and public attention (inner circle in Fig 1). First, there is growing concern and evidence of the precarious working conditions in agriculture. Second, labor shortages are widespread globally, particularly for labor-intensive, seasonal, and precarious jobs. Third, while farmers in some regions struggle to find enough workers, other regions suffer from high rates of unemployment. Below, we provide a detailed summary of these three central challenges.

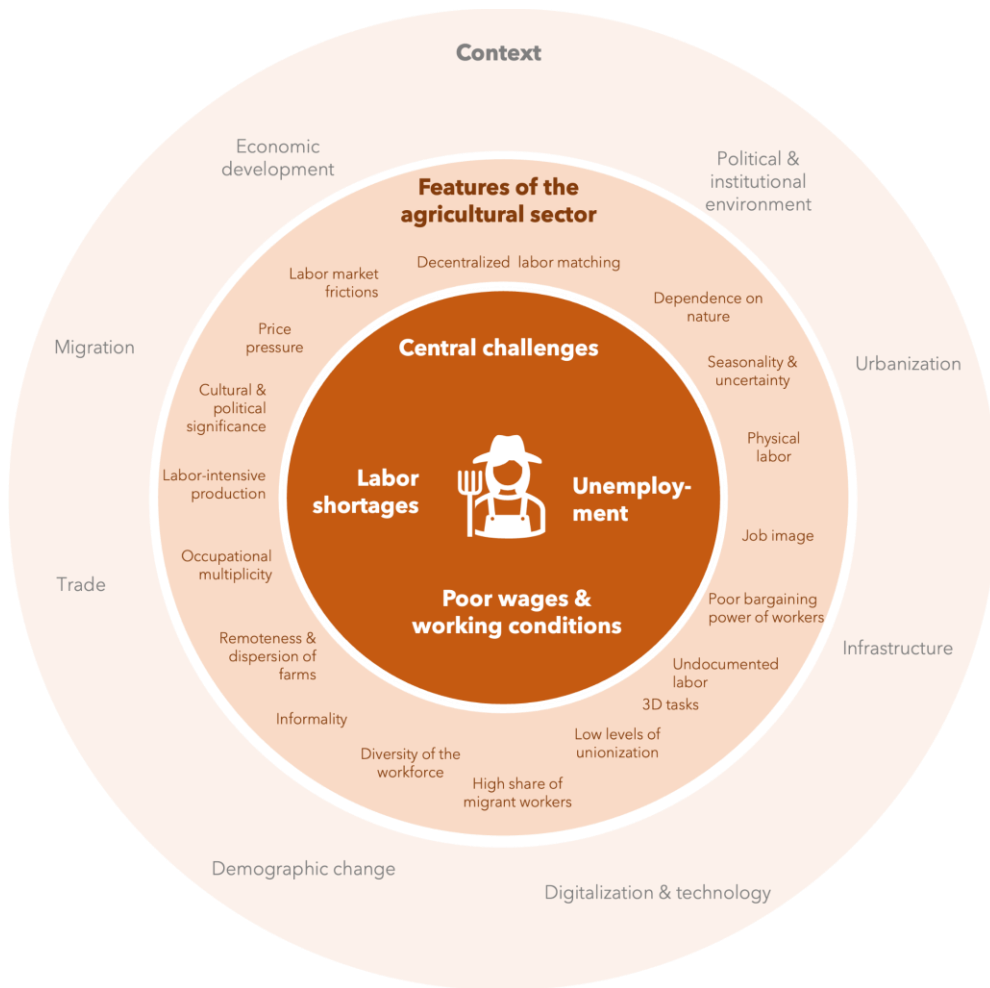


Figure 1. Central challenges in agricultural labor markets

2.1 Poor wages and working conditions

Working conditions in the agricultural sector are as diverse as the workforce, yet often fall short of the International Labor Organisation's decent work standards (ILO, 2023). These substandard conditions are well-documented in various sources, including media reports (e.g. New York Times, 2019; The Guardian, 2022), legal investigations (Europol, 2022), NGO reports (Public eye, 2024), and scientific studies, which are summarized below. Most of the available evidence,

however, is qualitative, and there is a scarcity of quantitative, representative data to assess the prevalence of labor rights violations in agriculture (Meemken et al., 2024b; Rye and Scott, 2018).

A substantial portion of the existing research focuses on migrant workers (especially in higher-income countries) who are typically involved in labor-intensive, seasonal, low-skilled tasks such as horticulture and animal production. These roles can involve unduly long working hours, inadequate housing, exposure to health hazards, harsh treatment, discrimination, labor trafficking, sexual violence, and low pay (Barrientos and Kritzinger, 2004; Bigler et al., 2017; Neef, 2020; Papadopoulos et al., 2018; Sabin et al., 2023). Thus, these jobs often fail to attract domestic workers in both higher-income and lower-income countries, explaining the reliance on migrant labor (Barrientos, 2013; Charlton et al., 2021; Fabry et al., 2022; Rye and Scott, 2018). More specifically, the following issues are well-documented in the literature.

Payment practices that result in low wages include wage theft, lack of overtime pay, delayed payments, and high deductions for housing, travel, visas, and equipment. Informal work arrangements, common in lower-income countries and among undocumented migrants in higher-income countries, exacerbate these issues by limiting social protection and creating uncertainty around employment duration, working hours, and pay (Alford et al., 2017; Devereux, 2020; Lever and Milbourne, 2017; Pelek, 2020).

Agriculture is classified as a high-hazard sector, with a high prevalence of occupational injuries, diseases, and accidents due to heavy machinery, extreme temperatures, hazardous substances, and inadequate hygiene standards (Degrendele et al., 2022; Fuhrmann et al., 2019; Hargreaves et al., 2019; Moyce and Schenker, 2018). For example, exposure to chemicals and pesticides poses severe health risks, including cancer (Dhananjayan and Ravichandran, 2018), and exposure to heat, exacerbated by climate change, can lead to kidney diseases (Ephraim et al., 2020; Freidin et al., 2024). Additionally, food insecurity (Al-Bazz et al., 2022; Hill et al., 2011) and poor mental health, including high levels of depression and substance use (Illien et al., in review; Laitha et al., in review; Reed and Claunch, 2020; Sandberg et al., 2012), affect farm workers globally. Many workers lack access to healthcare due to legal status, language barriers, or financial constraints and, thus, work while sick or injured (Arcury et al., 2012; Baker and Chappelle, 2012).

Many of the aforementioned issues also affect farmers, such as long working hours, health hazards, financial problems and indebtedness, leading to mental stress, high rates of depression, and suicide (Bossard et al., 2016; Guseva Canu et al., 2019). One factor contributing to stress

among farmers in higher-income countries is the criticism they face regarding issues like animal welfare, pesticide use, and worker exploitation (Ephraim et al., 2020; Freidin et al., 2024). On the other hand, farmers in higher-income countries receive substantial support (Swinnen, 2018), and working in and with nature has proven mental health benefits (Adewuyi et al., 2023; Moeller et al., 2018).

In sum, the precarious working conditions in agriculture, particularly for migrant workers, are well-documented but their prevalence is not well-understood due to the lack of quantitative, representative data (Meemken et al., 2024b).

2.2 Labor shortages

Agricultural labor markets are prone to labor market frictions that can lead to labor shortages, leaving farmers without the necessary workforce during critical production times (Fabry et al., In Review; Rutledge and Mérel, 2023). Limited evidence on these labor shortages in the agricultural sector reveals global patterns in shortages of both high and low-skilled workers. Shortages of high-skilled workers, although less studied, are becoming more relevant with technological advancements, which can lead to skill mismatches (Contzen and Forney, 2017), e.g., due to inadequate training in lower-income countries and aging populations in higher-income countries (Ryan, 2023).

Shortages of low-skilled labor are particularly critical for labor-intensive crops like fruits and vegetables (Rutledge and Mérel, 2023). For instance, during the COVID-19 pandemic, travel restrictions prevented workers from reaching farms, leaving perishable crops unharvested. While research focuses on higher-income countries, like the US (Richards and Rutledge, 2023), labor shortages are also common in lower-income countries with high unemployment rates (Fabry et al., in review). Labor shortages can occur due to the following reasons:

First, seasonality and uncertainty in agricultural production necessitate a flexible workforce during peak seasons (Charlton, 2022; Feuerbacher et al., 2022). Predicting these peaks is challenging, and farmers in the same regions compete for labor simultaneously.

Second, precarious jobs fail to attract workers when better options become available (Mabiso and Benfica, 2019; Taylor and Charlton, 2016). In various countries, rural-urban migration leads to labor shortages in rural agricultural sectors, such as in Vietnam (Bui and Hoang, 2021), Thailand (Kwanmuang and Lertjunthuk, 2021), Bangladesh (de Brauw et al., 2021), Malawi, and Ethiopia

(Mueller et al., 2018). Similarly, labor supply becomes less elastic when workers believe they have superior options (Duflo et al., 2021) or when social stigma associated with farm work makes unemployment more attractive than farm work (Hull, 2014; Mabiso and Benfica, 2019; Maïga, Eugenie et al., 2015). Consequently, the production of highly labor-intensive crops heavily relies on migrant labor worldwide (Fabry et al., 2022, 2024; Smith et al., 2022; Taylor and Charlton, 2016). Migrant workers, however, may also face improved options over time, leading to shifts in migration patterns and causing problems for farmers to adjust and find workers from other places (Christiaensen et al., 2021b; de Brauw et al., 2021).

Finally and relatedly, if migration is restricted, expensive, time-consuming, or otherwise challenging, workers willing to supply labor may struggle to reach farmers in need (Hertz and Zahniser, 2013; Taylor and Charlton, 2016). This issue can stem from e.g., poor infrastructure in lower-income countries, while in higher-income countries, migration and border policies often contribute to the problem.

2.3 Unemployment

While some regions face labor shortages, others experience high unemployment², limiting prosperity and making employment generation a strategic policy priority (Abé Ndjé et al., 2019; Li et al., 2023).

The role of the farm sector in employment varies by time and region. Agricultural employment has been decreasing in all regions, except for Africa, where the absolute number of people employed in the sector is still increasing. Today, agriculture employs around 48% of the population in Africa, 29% in Asia, 9.3% in the Americas, and 5.4% in Europe (Christiaensen et al., 2020; Davis et al., 2023; Yeboah and Jayne, 2018). Thus, in most regions, the farm sector employs few people, although employment in related upstream and downstream sectors gains in importance with economic development (Yi et al., 2021). Overall, the role of the agricultural sector in addressing unemployment in higher-income countries is limited. Most of the agricultural jobs are seasonal and do not attract unemployed domestic workers. Yet these seasonal jobs create options for labor migration from countries with lower wages, thereby mitigating unemployment—or exaggerating labor shortages—in migrant-sending countries. In contrast, agriculture remains a key source of

² The agricultural sector is known to have high underemployment rates. Due to the seasonal nature of the job, agricultural workers work on average less hours per year than workers in non-agricultural sectors (McCullough, 2017).

employment in Africa, especially for the poor, and hopes that it can create more jobs on and beyond farms are large (Christiaensen and Maertens, 2022; Davis et al., 2023).

Technology is a key factor driving regional differences in agricultural employment. Technology affects labor demand and productivity—and thus potentially underemployment rates. However, evidence is mixed on whether technology will create or destroy jobs. Over the past half-century, the spread of technology such as machinery has decreased agricultural employment globally, except in Sub-Saharan Africa (Pingali, 2007). In many high-income countries, agriculture is in the Agriculture 4.0 stage, utilizing artificial intelligence (AI), internet of things (IoT), and robotics (Rose and Chilvers, 2018), often decreasing the need for manual labor. However, some technologies are labor-intensive. For example, environmentally friendly practices, high-value crops, and greenhouses increase the need for manual labor (Christiaensen and Maertens, 2022; Meemken and Qaim, 2018; Stemmler and Meemken, 2023). Thus, technology is not always replacing labor but labor and technology can be complementary (Hamilton et al., 2022). Furthermore, even in cases when technology replaces labor, aggregate employment effects have to be considered as productivity gains in agriculture can shift labor from agriculture to industry (Bustos et al., 2016). This is in line with the notion that productivity increases in agriculture kick-start sectoral change and economic growth, generating off-farm employment (Barrett et al., 2022; Jayne and Sanchez, 2021). Generally, a well-supported finding is that technology often polarizes the labor market, meaning that especially mid-skilled jobs disappear as new low- and high-skilled jobs are created in the process (Autor et al., 2003). Thus, the effects of technology on employment are heterogeneous and can also be gender-specific (Caunedo and Kala, 2021; Afridi et al., 2023).

In sum, agriculture employs a large share of the global population, especially the poor, often as seasonal workers. The potential of the farm sector to create new jobs is highest when (i) shifting to labor-intensive crops and environmentally friendly practices, (ii) creating forward and backward linkages, (iii) and increasing labor productivity in agriculture to kick-start economic development.

3. Policy for decent work in agriculture

In the following section, we introduce key policy tools designed to address the central challenges outlined above. As illustrated in Figure 2, these tools span various policy areas, including agriculture, migration, labor, trade, and social policy. Many tools address or affect multiple challenges, highlighting the interconnected nature of these issues. This complexity underscores that the list of selected tools represents key and innovative tools rather than an exhaustive list.

Each subsection summarizes the rationale behind the tool, provides examples of their application, and reviews the scientific literature on their effects.

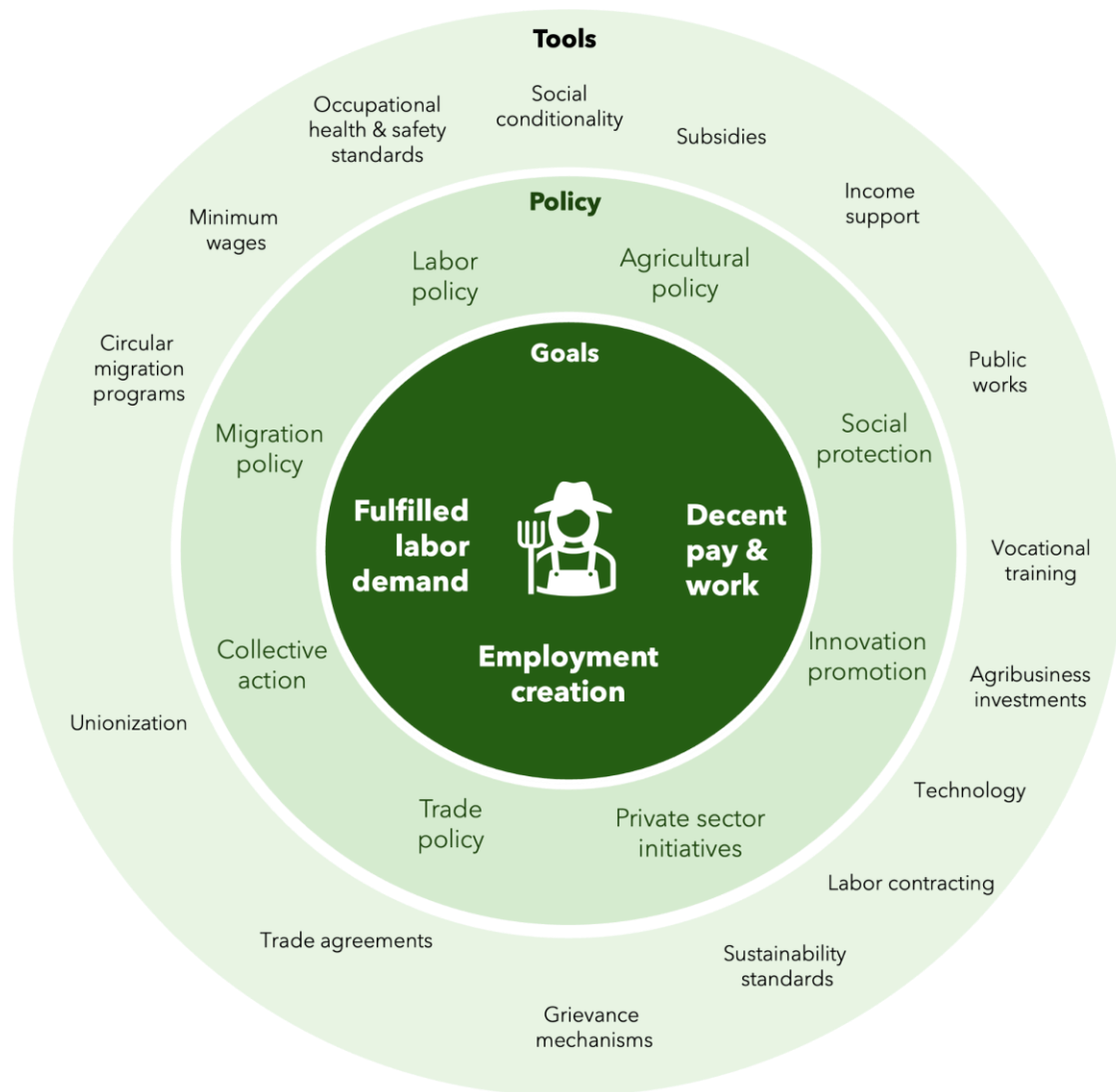


Figure 2. Policy for decent work in agriculture

3.1 Social protection and public works

Social protection policies encompass various tools relevant to all of our three employment challenges. Some policies are aimed at improving workers' conditions in the formal economy (e.g., unemployment insurance, health care, and pension funds), while others are rights-based,

thus targeting everyone, including unemployed and informal workers (e.g., cash transfers). Almost all social protection programs can have employment effects (Muralidharan et al., 2023), e.g., by improving the health and thus labor productivity of workers, and many can also be specifically tailored to the agricultural sector (for an overview, see Croppenstedt et al., 2018; Tirivayi et al., 2016).

Public work programs stand out as the social protection tool that can provide large-scale employment opportunities, thus addressing unemployment. Public works programs, popular in both high- and low-income countries, offer short-term employment on projects like road construction, irrigation, reforestation, and soil conservation during slack agricultural seasons (Nagamatsu, 2014; Subbarao, 2003). These programs are extensively studied in lower-income countries, often with large data sets and econometric impact assessment tools (Dreze and Sen, 1990; Subbarao, 2003). Especially India's National Rural Employment Guarantee (NREG), is well-studied. It is the largest of its kind and offers 100 days of guaranteed unskilled work annually to rural poor households. Many studies focus on wages (Bahal and Shrivastava, 2021; Berg et al., 2018; Misra, 2019), indicating higher reservation wages and non-farm employment (Muralidharan et al., 2023; Taraz, 2023). As a reaction to higher wages, the program also promotes the adoption of labor-saving technologies in agriculture (Bhargava, 2023) and changes in crop production decisions (Gehrke, 2019). Further welfare effects are observed, some only during the agricultural lean season (Imbert and Papp, 2015; Klöner and Oldiges, 2022), including increased school attendance but decreased enrollment (Afridi et al., 2016; Shah and Steinberg, 2021), increased consumption (Bose, 2017; Deininger and Liu, 2019; Ravi and Engler, 2015), including tobacco (Devaraj and Patel, 2020), and increased migration (Imbert and Papp, 2015; Nandy et al., 2021).

Results from public works programs beyond India are varied. Argentina's program was found to reduce crime rates although it discouraged workers' transition to the formal economy (Garganta and Gasparini, 2015; Meloni, 2014). Ethiopia's program was found to reduce food insecurity, promote climate-smart agriculture, despite limited agricultural productivity gains (Gazeaud and Stephane, 2023; Hirvonen et al., 2022; Scognamillo et al., 2024). In Malawi, no effects on food security but higher adoption rates of climate-smart practices were found (Beegle et al., 2017; Scognamillo and Sitko, 2021). As India, Rwanda saw increased household consumption, while Comoros experienced heightened international migration (Gazeaud et al., 2023; Habimana et al., 2021). Cross-country studies suggest public works programs reduce multidimensional poverty in

several countries but raise concerns about their cost-effectiveness due to short-lived employment and earning benefits (Borga and D'Ambrosio, 2021; Gehrke and Hartwig, 2018).

In sum, while public work programs are not a silver bullet but well-established and well-studied tools to support unemployed populations while enabling infrastructure investments to promote climate change adaptation and economic development.

3.2 Technical and vocational training (TVET)

Technical and vocational training (TVET) is a vital component of education systems worldwide, designed to equip individuals, particularly youth, with the skills and knowledge needed for specific roles across various sectors (McGrath, 2012). In theory, TVET has the potential to tackle multiple employment challenges by preparing workers for higher-skilled positions both within and beyond agriculture, thereby alleviating labor shortages in these areas while simultaneously reducing unemployment. However, the effectiveness of any training initiative hinges on whether the acquired qualifications and skills align with actual market demands, since the notion that supply creates its own demand (Say's law) is erroneous (Amsden, 2010). TVET's core strategy involves tailoring training programs to align with sectoral strategies and the evolving needs of the labor market (Hilal, 2012; Sumberg et al., 2020; Wignall et al., 2023), often achieved through close collaboration with industry.

A comprehensive examination of TVET interventions, primarily focusing on non-agricultural sectors in 26 low- and middle-income countries, indicates a modest yet positive impact on youth employability and employment outcomes (Tripney et al., 2013), even in fragile contexts (Van Der Veen and Datzberger, 2022). However, the sustainability of these effects over the medium to long term is not always guaranteed (Novella et al., 2024). Despite being widely endorsed by donor agencies, the scientific literature on the labor market effects of agricultural TVET (ATVET) remains sparse, with existing studies predominantly qualitative, underscoring the need for more robust and causal evidence on the subject (Brown, 2020; Carswell and De Neve, 2024).

In sum, coherent approaches to agricultural and vocational training are key to leverage and prepare for several key trends, such as the digital revolution in global agriculture and knowledge-intensive climate change adaptation. At the same time, ATVET, especially when including digital agriculture, could help make employment in the agricultural sector yet again more attractive for some young people in Africa. More generally, extending compulsory education could help tighten rural labor markets, thereby improving the wages of the older workforce (Cramer et al., 2016).

3.3 Guestworker programs

Guestworker programs, or circular migration programs, have a longstanding history of recruiting workers from lower-wage to higher-wage countries through bilateral agreements. They are currently used in migrant-receiving countries like Canada (Choudry and Thomas, 2013), the US (Basu et al., 2022), Oceania (Stead and Petrou, 2023), Poland (Górny, 2017), Sweden (Sörensson, 2020), and Spain (Medland, 2017).

In theory, guestworker programs could address all of the central employment challenges in agriculture and are, thus, often referred to as a win-win (Illés and Gellér-Lukács, 2022; Petrou and Connell, 2023). These programs provide farmers with labor for tasks that attract few domestic workers (Stead and Petrou, 2023), thereby addressing labor shortages and providing temporary jobs to migrant workers (Hammond and Connell, 2009; Petrou and Connell, 2023). For governments, these programs are a politically feasible tool that involves non-permanent migration (Nisbet, 2018), thereby reducing undocumented labor, for which precarious working conditions are particularly widespread.

However, the scientific evidence is mixed, and robust experimental evidence on the effect on workers is very limited (McKenzie and Yang, 2022), especially for the farm sector (Clemens and Tiongson, 2017; McKenzie et al., 2010; Naidu et al., 2023). Available studies indicate that labor migration is linked to higher labor productivity and wages in destination countries, enhancing household welfare at home (McKenzie, 2023; McKenzie and Yang, 2022; Yang, 2008). A few qualitative studies highlight additional benefits, such as knowledge acquisition (Dun et al., 2018) and women's empowerment (Radel et al., 2010). Yet most qualitative studies, primarily focusing on North America, challenge that guestworker programs promote decent work, highlighting racism (Keegan, 2023), sexism (Hellio and Moreno Nieto, 2021), poor housing (Basok et al., 2023), poor occupational health and safety (Keegan, 2023), food insecurity (Hill et al., 2011), and limited collective bargaining options (Choudry and Thomas, 2013). The prevalence of these issues might still be lower than among undocumented workers, but program features seem inadequate to address them. Workers often depend on their initial employers' sponsorship to maintain their visa status, reducing workers' options to quit and their bargaining power (Agar and Manolchev, 2020; Hennebry and Preibisch, 2012; Reilly et al., 2018).

The evidence on farmers' perspective is more limited, although the cost associated with participation matters for the uptake of guestworker programs (Minkoff-Zern et al., 2022), affecting the extent to which labor shortages and undocumented labor can be reduced. Quantitative studies show for the US that guestworker programs and undocumented labor can persist at the same time (Castillo and Charlton, 2023). In other words, the capacity of these programs may be too small or adoption among farmers too low to address labor shortages without relying on undocumented workers.

In sum, guestworker programs address labor shortages for some farmers and offer legal migration and employment options for some workers. Yet their scope currently seems below its potential and the design inadequate to ensure decent working conditions.

3.4 Minimum wages

Minimum wages are the primary policy tool for addressing poor wages by regulating adequate pay, and particularly relevant in the agricultural sector given that it is a low-wage sector. Defined as the lowest amount an employer can legally pay workers for their work during a specified period (ILO, 2016), minimum wages cannot be reduced by collective agreements or individual contracts. Politically, the motives for minimum wage policies include ensuring an equitable share of profits, preventing poverty, reducing inequality, and boosting consumption (ibid). In the agricultural sector, a large share of farm workers are eligible to receive the minimum wage, making it particularly exposed to minimum wage increases or introductions (Kammer et al., in review).

Historically, minimum wages targeted a small segment of low-wage workers and often excluded the agricultural sector. However, today, minimum wage laws are globally relevant and one of the most common labor market policies, implemented in over 150 countries and encompassing a broader range of sectors, including agriculture (ILO, 2017). The design of these minimum wage laws varies, with some countries adopting hourly rates, others monthly rates, and some implementing sector-specific (e.g., South Africa, Brazil), age-based (e.g., Netherlands, Ireland), occupation-based (e.g., Hungary), or region-based wages (e.g., USA, Portugal) (ibid). Minimum wage earners are frequently women, young workers under 25, individuals with lower levels of education, and rural workers (ILO, 2021).

While minimum wage policies and their effect on employment and wages is a highly controversial topic in mainstream economic research (Dube, 2019; Neumark and Wascher, 2007; Wolfson and Belman, 2019), the literature on the effects of minimum wages on agriculture is limited. Studies

focused on agriculture are scattered across a few countries, including the US, UK, China, and South Africa, and span a large time horizon. Despite being context-specific and employing different indicators, these studies reveal some general patterns, indicating that the introduction of minimum wages tends to decrease employment while increasing wages in the agricultural sector (Bassier and Ranchhod, 2024; Bhorat et al., 2014; Kandilov and Kandilov, 2020; Meer and West, 2016). In other words, farmers hire fewer workers when wages increase, potentially by increasing labor productivity (Bhorat et al., 2014; Kammer et al., in review) or replacing labor with machines (Kandilov and Kandilov, 2020). Thus, minimum wages benefit those workers who are not laid off, implying heterogeneous effects. Relatedly, Smith et al. (2022) find that minimum wages decrease the likelihood of employment loss for non-US workers compared to US workers. Kandilov and Kandilov (2020) identify that employment is reduced more for seasonal workers compared to year-round workers.

In summary, although minimum wage policies are common globally, their effect on the agricultural sector is largely overlooked in research (Kammer et al., in review). A handful of studies show that minimum wages raise agricultural wages but may reduce employment, indicating a trade-off between job quantity and quality. Evidence on overall working conditions beyond pay is scarce, with only Bhorat et al., (2014) noting improvements in non-wage conditions like contract coverage. Additionally, the impact of minimum wages on farming businesses and incomes remains unexplored despite the need for these businesses to manage increased labor costs (Kammer et al., in review).

3.5 Occupational health and safety standards (OHS)

Occupational health and safety standards (OHS) have proliferated since the industrial revolution and encompass regulations and guidelines aimed at protecting workers from harm in the workplace. For the agricultural sector, these standards may cover a wide range of issues such as machinery safety, pesticide handling, exposure to hazardous chemicals, ergonomic risks, and measures to prevent injuries related to farming activities. Thus, occupational health and safety standards could help address poor working conditions in the agricultural sector. However, coverage, enforcement, and compliance vary widely across countries and regions (Holte and Follo, 2018; Liebman et al., 2013; Reed et al., 2013). This variation can be attributed to contextual factors and limited resources authorities may have available for monitoring, farmers to comply, and workers to demand compliance (DeRoo and Rautiainen, 2000; Moyce and Schenker, 2018).

Available studies on public OHS mainly focus on high-income countries, often do not differentiate between farmers and hired workers, mostly use observational data, and present mixed results (DeRoo and Rautiainen, 2000; Garrigou et al., 2020). According to reviews (Afshari et al., 2021; Garrigou et al., 2020; Rautiainen et al., 2008), occupational health and safety measures such as farm safety audits, safety education programs, and the use of safety devices on machinery and personal protective equipment (PPE) can reduce workplace-related injuries and limit exposure to hazardous substances. These measures are more effective when implemented at the group/organization level and combined with independent controls (Dyreborg et al., 2022). Evidence on the effectiveness of public legislation and enforcement of OHS for agricultural workers is surprisingly scarce.

In sum, occupational health and safety standards address unsafe working conditions for both farmers and workers. OHS standards are more effective when implemented in combination with other measures, such as educational programs and regular monitoring. However, monitoring and enforcing occupational health and safety standards remains a big challenge globally.

3.6 Social conditionality

To improve working conditions in the agricultural sector and protect farm workers, the European Union (EU) has introduced so-called 'social conditionality' into the Common Agricultural Policy (CAP) (Regulation (EU) 2021/2115) in 2021. Traditionally, CAP has focused on providing income support and upholding environmental standards. This is the first time that social standards are integrated into the CAP and non-compliance by farm employers can result in deductions in their CAP subsidies.

Social conditionality does not introduce new labor standards but rather relies on existing EU labor laws, including transparent and predictable working conditions ((EU) 2019/1152), health and safety of workers ((EU) 89/391/EEC), and health and safety requirements when using equipment ((EU) 2009/104/EC). Enforcement and sanctioning is regulated at the national level and existing structures are used to control compliance. Thus, the only novel addition is the sanctioning of non-compliant farms via a deduction in CAP subsidies. France, Austria, and Italy have already adopted social conditionality measures in 2023. Starting in 2025, all EU member states will be required to comply with it.

As social conditionality is a new policy tool, only a few ex-ante assessments and comments on social conditionality exist. Lyngs (2024) evaluates whether social conditionality will effectively

improve working conditions for farm workers from a legal perspective. He determines that it will be ineffective in achieving its targets for two main reasons: (i) the horticultural sector, which has the highest number of labor rights violations, might fall outside the scope of social conditionality; and (ii) it does not introduce new obligations or enhance compliance detection, relying instead on existing laws and control systems. Lyngs acknowledged the innovative character of implementing sanctions in the form of subsidy reductions, but stresses that the detection of non-compliance will not increase under this mechanism. He concludes that, while social conditionality has positive goals, it is rather a form of 'redwashing' than a means of achieving actual improvements. Laurent and Nguyen (2022) highlight the complexity of work contracts and employment statuses in French farm employment, suggesting that new advisory services will be necessary for compliance with CAP's social standards. To simplify the implementation and assessment of social conditionality on farms, Di Noia et al., (2024) integrate its requirements into Social-Life-Cycle-Assessments methods. Thus, at this point in time, the evidence on social conditionality is very limited, with several concerns emerging.

The same holds for the public debate. Different civil society groups, while generally welcoming increased efforts towards addressing social issues in agriculture, have highlighted similar weaknesses to those identified by Lyngs (2024), including issues with timing, scope, and enforcement mechanisms. A common critique is the national flexibility in implementing social conditionality as well as the lack of harmonized sanctions and enforcement mechanisms among member states (Dahm, 2023; Willard, 2023). Worker representatives fear this will lead to insufficient action against poor working conditions, while employers are concerned it could create an unequal playing field in EU agriculture. A consensus can be derived that the current form of social conditionality is a first step, but more refined policies will need to be implemented in the future to effectively improve working conditions. One proposed idea is to expand the social pillar of CAP and go beyond the regulation of minimum standards by compensating farmers who provide additional social efforts. This would be similar to eco-schemes, where farmers receive compensation for additional environmental efforts, but extending it to social efforts (Willard, 2023).

In sum, adding social conditionality to CAP farm subsidies is overdue and might inspire other countries. However, to date, there is no evidence on its effectiveness, and several factors related to the tool design suggest its success in improving working conditions might be low, while potentially burdening farmers with additional bureaucracy.

3.7 Trade policies, due diligence and grievance mechanisms

Agricultural trade and trade policy can exacerbate or mitigate all three employment challenges. Trade can mitigate labor shortages by importing products from countries with abundant workers and lower wages—rather than importing workers from these countries (Charlton et al., 2021). However, when workers are not missing, outsourcing production to other countries through trade can also displace domestic workers (Autor et al., 2013). For exporting countries, access to new markets often creates job opportunities for workers, as shown for the horticultural export sector in Africa (Barrientos et al., 2016; Lim and Kim, 2022; Maertens and Fabry, 2019).

Conversely, trade policies—since they either facilitate or restrict trade—can also influence employment in both exporting and importing countries, where effects can vary, depending on labor market characteristics of countries as well as labor mobility between sectors and regions (Barros and Martínez-Zarzoso, 2022).

As globalization intensifies, labor issues such as poor working conditions are no longer confined to national borders. The concern that trade with countries having lower labor standards might undermine domestic labor regulations has led to the inclusion of labor aspects in trade policy. By aligning labor standards across trading partners, these agreements aim to prevent a "race to the bottom" where countries compete by lowering labor standards (Häberli et al., 2012). The integration of labor standards into trade policy occurs at different regulatory levels: multilaterally under the WTO, bilaterally in Regional Trade Agreements (RTAs), nationally through legislation impacting international supply chains, as well as through private initiatives.

Under multilateral agreements of the World Trade Organization (WTO), member countries commit to core labor standards, such as freedom of association, the prohibition of forced and child labor, and non-discrimination at work (WTO, n.d.). However, labor standards have been, and continue to be, a highly contentious issue in multilateral trade negotiations (Campling et al., 2016). As a result, the International Labour Organization (ILO), rather than the World Trade Organization (WTO), takes the lead on labor standards. This ensures that labor provisions in trade agreements are not used as disguised protectionism.

Apart from multilateral regulation, labor aspects are also increasingly incorporated into bilateral or regional trade agreements (RTAs) as so-called labor provisions. These provisions, which can include both conditional measures (sanctions or incentives) and promotional measures (monitoring or capacity building), are designed to uphold labor standards across borders (Häberli et al., 2012). Since the 1990s, labor provisions have become common in RTAs, particularly those involving the United States and the European Union (Horn et al., 2010; Posthuma and Ebert,

2010). These provisions vary substantially in their scope and depth (Campling et al., 2016) but often require adherence to the ILO's Fundamental Principles and Rights at Work, regulating both international and domestic labor markets. The inclusion of labor standards in RTAs reflects a commitment to fair labor practices and corporate accountability. A recent example is the US-Mexico-Canada Agreement (USMCA), which replaced NAFTA, and introduced the rapid response labor mechanism (RRM) to improve corporate responsibility regarding freedom of association and collective bargaining (Claussen and Bown, 2024). This mechanism allows Mexican workers to file complaints with US authorities if their rights are violated, potentially resulting in export bans for non-compliant companies. This approach focuses on corporate accountability rather than countries for regulatory failures. Although not yet applied to the agricultural sector, the RRM illustrates the increasing importance of labor rights in trade negotiations, suggesting a future trend of closer integration between trade and labor policies.

Beyond trade agreements, countries are increasingly implementing national legislation with cross-border reach, such as due diligence policies. These laws aim to hold companies accountable for labor rights violations in their global supply chains (Sellare et al., 2022). Companies, such as retailers, are required to establish grievance mechanisms, institutionalized complaint mechanisms allowing workers hired by suppliers to report labor rights violations anonymously to a third party (Saloranta, 2021). No evidence exists on the effectiveness of grievance mechanisms in agriculture. Most research focuses on grievance mechanisms employed by multilateral development banks, multi-stakeholder initiatives, or multinational mining companies as the tool has mostly been used in these contexts (Cooke et al., 2016; Gunaydin and Park, 2023; Harrison and Wielga, 2023; Kemp and Owen, 2017). The success of grievance mechanisms depends heavily on political support and willingness to address complaints (Hossain et al., 2023) but they can increase accountability by involving a wide range of actors (Gunaydin and Park, 2023).

Apart from governmental regulation of trade to improve working conditions, private forms of trade governance—such as sustainability standards and corporate codes of conduct—are also becoming increasingly important and often precede governmental regulation (Meemken et al., 2021; Skalidou and Oya, 2024; Swinnen, 2016). These initiatives are found to benefit workers on large plantations to some degree (Colen et al., 2012; Krumbiegel et al., 2020, 2018; Schuster and Maertens, 2016a, 2016b), with no effect on workers in the smallholder sector, where labor standards are hard to monitor (Cramer et al., 2016, 2015; Meemken et al., 2019).

In sum, trade and labor issues are inherently connected. The globalization of agri-food systems challenges labor regulation, leading countries to adopt cross-border policies to protect workers and uphold domestic labor standards. Examples like the US-Mexico-Canada Agreement and the EU's due diligence laws highlight the expanding scope of these regulations, which are expected to continue growing.

4. Discussion and implications for policy and research

Our overview of policy tools shows that a variety of farm, labor, migration, trade, and social policies are used globally. These policies have the potential to address employment challenges in agriculture, but robust evidence is often limited. Based on our synthesis of policy tools and the scientific evidence, this section outlines implications and recommendations for policy and research.

4.1 Policy recommendations

Our literature review raises the policy-relevant question: Who will produce our food, where, and under what conditions? Agricultural labor markets are globally interconnected, and labor-intensive production relies heavily on migrant labor, either through direct migration or embedded in products via trade. This labor supply is abundant, only limited by everything that increases the (opportunity) cost and risks of migration. This abundance diminishes workers' bargaining power, leading to precarious conditions regardless of production location. Against this background, we propose the following to address agricultural employment challenges both domestically and internationally.

Embrace ILO labor standards and promote social dialogue when integrating these standards into new policies. Violations of human and labor rights are negative social externalities that can be addressed through labor standards. ILO standards form the basis for most countries' legislations, which may need updates to address new threats like heat risks from climate change. Higher-income countries are increasingly incorporating labor standards into policies, such as making farm subsidies contingent on compliance with these standards. Social dialogue is crucial in policy development, ensuring the perspectives of workers, farmers, and other relevant actors are included. Acceptance among farmers is key, as highlighted by recent protests in Europe, demonstrating the need for dialogue to address diverse interests and avoid policy stagnation (Finger et al., in review). Agricultural workers' voices are equally important to ensure new policies meet their needs. However, farm worker organizations are often weak or nonexistent due to factors like seasonal employment, low union awareness, legal status, and worker diversity

(Chen, 2013; Freeman, 2010). Governments can support the development of these organizations to enable political participation and collective bargaining.

Innovate to improve compliance with labor standards. The challenge is not a lack of standards and policies but a lack of enforcement. In agriculture, monitoring is notoriously challenging due to the spatial dispersion of farms and the prevalence of migrant, informal, and contract labor. To improve enforcement, agencies in charge need more funding and novel tools for monitoring labor standards (Meemken et al., 2024a; Oya and Pontara, 2015). Unlike environmental outcomes, for which a range of digital monitoring solutions now exists (such as tracking deforestation with satellite data), such tools have still to be developed for social sustainability outcomes (Meemken et al., 2024a). Furthermore, policymakers can reduce the prevalence of forms of labor for which labor rights violations are common and labor standards particularly difficult to enforce, such as undocumented migrant and contract labor. This includes creating legal options for migration to reduce undocumented labor (see more details below), regulating labor contractors, or providing these services through governmental agencies. Relatedly, a food systems perspective is required that acknowledges and addresses the underlying causes of labor rights violations.

Employ food systems policies to address trade-offs. Farmers, as employers, often also face precarious conditions and pressure from their buyers, especially as market power is often highly concentrated in food systems. Avoiding such concentration is a key policy goal, as monopolistic rents aggravate the trade-offs between the welfare of other actors, including workers, farmers, and consumers.

From the farm perspective, an increase in labor costs—resulting e.g., from policy changes or increased migration and labor-sourcing costs—incentivizes farms to switch to less labor-intensive crops or go out of business. A reduction in domestic labor-intensive farm production can undermine social sustainability. Food security and domestic agricultural production are strategic priorities for governments and are jeopardized when farmers go out of business or lack essential workers. This is especially true for labor-intensive, hard-to-mechanize crops like fruits and vegetables, which are crucial for nutrition and public health (Masters et al., 2022).

There is an inherent trade-off between decent work, farm profitability, domestic production, and food prices. While consumers in higher-income countries claim to support products that meet high social standards, their willingness to pay is usually low (Clapp, 2017; Clapp and Moseley, 2020; Feldmann and Hamm, 2015; Willer and Aldridge, 2023). This trade-off between food prices and decent work is even more pronounced in lower-income countries.

A way to mitigate these trade-offs, especially for higher-income countries, is to promote the development and adoption of labor-saving technology. However, this can be costly and challenging, especially in the face of abundant and cheap migrant labor willing to migrate despite border protection, life-threatening risks, and precarious jobs. Therefore, while labor-saving technology is part of the solution, it's not a panacea, especially in the short term. Instead, a combination of well-coordinated policies recognizing the roles of migration and trade is essential.

Create legal pathways for labor migration. Globally, policymakers and citizens must recognize the vital role of migrant labor in food production. Despite rising anti-immigration sentiments and stricter border policies in high-income countries, these measures have not halted migration. Instead, they have driven up the risks of migration for workers, the cost of sourcing labor among farmers, and the benefits of labor-traffickers, contractors, and illicit organizations (such as the Mafia in Italy). As a result, Europe has seen an increase in undocumented labor, resulting in more violations of labor rights. Therefore, legal migration options are crucial for mitigating trade-offs and employment challenges in agriculture. Legal pathways for migration can alleviate unemployment in source countries, address labor shortages in destination countries, and provide better options for oversight of working conditions.

Include labor provisions in trade agreements. Acknowledging the importance of trade amid rising anti-trade sentiments is crucial. Trade serves as a vital option for ensuring food security, particularly in countries constrained by migration restrictions or heavily impacted by climate change affecting agricultural production. Trade agreements increasingly include labor provisions, which is a useful development in as far as monitoring of labor standards can be ensured (see above) which tends to be yet again more difficult along international supply chains. Promising new directions are legislation that targets private companies, such as the rapid response labor mechanism in North America and due diligence supply chain laws and grievance mechanisms in the EU. While the effectiveness of these mechanisms in addressing monitoring challenges remains uncertain, they represent a positive step toward corporate accountability, supported by many companies.

Beyond monitoring, a risk in international supply chains is "leakage," where production shifts to regions with lower standards, perpetuating labor issues elsewhere. Moreover, while high-income countries may impose stringent standards, these may not uniformly improve conditions in producing countries if not all trading partners or domestic consumers prioritize higher standards and associated costs.

Promote economic development and tighten labor markets in lower-income countries to improve conditions for workers outside higher-standard export sectors. Effective measures include social protection and public work programs to support especially unemployed populations. Additionally, expanding access to legal migration options and enhancing education and vocational training, particularly for youth, are crucial steps. Governments can capitalize on new trends by investing in agriculture to create more or better jobs. More jobs can be created by promoting labor-intensive and environmentally friendly production, contributing to climate adaptation, as well as horticultural production, contributing to better nutrition. Better jobs can be created, and the attractiveness of the agricultural sector improved, by promoting agricultural digitalization.

Fund research and data collection to evaluate policies for decent work in agriculture. Labor standards are common globally, and many new policies are emerging. Yet scientific evidence to guide these initiatives is lacking, often due to the lack of data that allows for causal analyses of how different policy tools affect workers, farmers, and food systems (Meemken et al., 2024b). Public funding to address these data gaps will be crucial.

4.2 Directions for future research

The literature on precarious working conditions, especially among migrant workers in higher-income countries, is extensive. However, evidence on improving these conditions is scarce. With increasing public and policy interest in social sustainability in agriculture, more research is needed to evaluate policy tools that address employment challenges in this sector.

Policy-focused research on employment challenges often overlooks agriculture, and findings from other sectors may not apply due to agriculture's unique characteristics (see section 2). A handful of studies look at how farm and migration policy affect labor outcomes (Olper et al., 2014; Petrick and Zier, 2012; Taylor and Charlton, 2016) yet labor policies remain hardly studied, especially beyond the US farm sector. More evaluations are needed to understand the effectiveness of labor policies across different contexts, such as higher- and lower-income countries, and their varied impacts on different types of workers and farmers. Furthermore, more research is needed on the trade-offs or synergies that different policies may create, such as between (i) working conditions among workers and farmers, (ii) improved working conditions and food prices (Headey et al., 2024), (iii) the quality and quantity of employment in lower-income countries, and (iv) social and environmental goals. Finally, there is much to be learned about how worker unionization and collective action in agriculture can become more efficient in participating in policy-making and benefitting their members (Cramer et al., 2008; Schuster and Maertens, 2016b).

Among the few available studies that look at policy options to address employment challenges in agriculture, many suffer from limited internal and external validity. Both require better data and research designs. The most convincing identification strategies require transdisciplinary research and government collaboration for RCTs, which is challenging and, thus, exceedingly rare. Research teams collecting farm worker data should share it to promote wider use, adhering to open science principles. Beyond internal and external validity, future research should also advance methodologies for measuring "decent work" and "labor shortages."

5 Conclusion remarks

Employment challenges in agriculture—such as precarious working conditions, labor shortages, and unemployment—are global issues receiving growing public and policy attention. However, research to guide these initiatives is scarce. This paper examines key characteristics of the agricultural sector that contribute to these challenges as well as a range of policy tools across farm, labor, migration, trade, and social policy. Different tools should be used in coherent bundles that acknowledge the interconnectedness of employment challenges, the trade-offs policies produce, and the global nature of food systems, including the importance of migrant labor and trade. Our policy agenda yields an even longer research agenda as much remains to be learned about what works—and where.

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