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POLICY PAPER SERIES

IZA Policy Paper No. 184

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A Key Enabler for Climate Change  
Adaptation and Mitigation**

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# **Social Protection and Labor: A Key Enabler for Climate Change Adaptation and Mitigation**

**Jamele Rigolini**

*World Bank and IZA*

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## ABSTRACT

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# Social Protection and Labor: A Key Enabler for Climate Change Adaptation and Mitigation\*

This paper reviews the role of Social Protection and Labor in supporting both climate adaptation and mitigation efforts. The Climate Crisis is impacting the poor and vulnerable disproportionately, both as a consequence of climate shocks and through the distributional impacts of climate mitigation policies. The paper discusses how – even without explicit environmental objectives – Social Protection and Labor strengthens resilience against climate shocks. However, integrating crisis-sensitive elements into social protection and labor programs increases substantially their ability to respond to shocks. Social protection and labor programs also facilitate green and Just Transitions by supporting equitable policies and can ease transitions towards Green jobs. Finally, Social protection and labor programs can also directly support mitigation measures by positively affecting behaviors. While investments in climate-related Social Protection and Labor are rapidly expanding, its full potential to support adaptation, decarbonization and mitigation is still to be realized.

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## Social Protection and Labor: A key enabler for Climate Change adaptation and mitigation

**Climate Change is profoundly affecting the lives and livelihoods of billions of people around the World – especially the poor and vulnerable.** Each year, magnified natural disasters such as floods, wind storms, earthquakes, and tsunamis are causing more than \$300 billion in damages, and generating more than \$500 billion in welfare and consumption losses (Hallegatte et al. 2017). Climate change is also affecting human capital and labor productivity – especially of the more than 1.2 billion jobs that depend on natural systems, agriculture, and the environment (Montt and Fraga 2018). The sufferings from the losses due to climate change are not equitably distributed: they mostly fall on poor and vulnerable households, which are less prepared to face natural disasters and suffer more from their impacts. Up to 130 million more people may fall into extreme poverty by 2030 due to the impacts of climate change caused by rising food prices, lost incomes and the changing nature of diseases (Jafino et al. 2020), and climate change will also force hundreds of millions of people to migrate in search of better (or any) livelihoods (Clement et al. 2021). In most contexts, women are also more vulnerable to the effects of climate change than men as they are more dependent on natural resources that are threatened by climate change for their livelihoods, and also face social, economic and political barriers that limit their ability to cope with shocks. The climate crisis is also rapidly “urbanizing”: as cities in low and middle income countries expand exponentially, the gentrification process is leading the poorest to live in densely populated, high-hazard risk areas such as riverbanks or zones prone to mudslides and floods (Rana and Iliina 2021).

### **The need to fast-forward the Green Transition – while imperative – will also affect jobs and livelihoods.**

With the right policies and investments, the move towards a greener economy will generate millions of new jobs in the renewable energy sector, environmental services and the circular economy, among others (ILO 2018). In fact, climate-related investments and policies — from building retrofits to expanding public transit systems to environmental services such as landscape, watershed, or forestry management — are already having a positive impact on job creation. But many jobs will also be lost, and the green jobs created may be located in different regions than the lost jobs, or may require different skill sets. Coal mine closures, for instance, can affect entire communities where it may be difficult to attract other investments and generate new jobs, profoundly impacting local re-employment opportunities (Ruppert Bulmer et al. 2021). And the labor market impacts of the Green Transition will go beyond job creation or destruction: the transition will also affect the task content and the skills required to perform many existing jobs in traditional sectors such as transport, agriculture, construction or manufacturing, to reduce carbon emissions and comply with more environmentally friendly regulations

**The Green Transition will not only impact jobs, but also prices and consumption patterns – further affecting the poor.** Changing regulations, carbon taxes and the elimination of fuel subsidies will impact energy and food prices, and overall consumption patterns. The poor and vulnerable populations will be most affected, and without adequate support they may be constrained to adopt negative coping strategies such as switching to less healthy diets, or limiting heating in winter: after Ukraine increased tariffs for natural gas in 2015, for instance, household energy costs rose to 20 percent of the income of the bottom quartile (Alberini and Umapathi 2021).

**Climate Change is happening but – without equitable policies – the Green Transition may not.** Equitable policies that support a Green Transition are not only necessary from an equity and poverty reduction perspective, but also for the Green Transition to happen in the first place. Social protection and labor policies are necessary to cushion welfare losses during the transition period and help workers and

households adjust to new economic contexts. While the overall magnitude of job losses from a Green Transition can often be relatively small (Botta 2018), these losses may affect well-organized sectors (i.e. unionized or public sector workers) with the capacity to derail reforms such as the closure of coal mines or coal power plants. Similarly, transition-related price changes, or tax and subsidy reforms essential to support the Green Transition may be blocked or delayed without being accompanied by equitable compensation policies to facilitate buy-in and avoid political backlash.

**The Green Transition will not only require green investments, but also workers with the right skill sets.**

Green investments are most effective in communities whose workers have the appropriate skills required to adopt new technologies (Chen et al. 2020). For example, specific “green” skills will be needed to ensure the adoption of energy efficiency practices in construction, deploy telecommuting, or switch to more resilient and sustainable agricultural practices. The changing skill needs that accompany green investments will necessitate massive efforts to reskill and upskill workers, both young and old, and support workers’ transition to new jobs, potentially in new occupations or sectors. Job transition and skills development, even when possible, will affect differently people of different age: older workers may find more difficulties to develop new skills and adapt to different jobs, and this, in turn, may result in unemployment of older workers, or increasing pressures to retire at younger ages, with potentially negative implications for public finance and quality of life.

**Social Protection and Labor protects and prepares people for adaptation, decarbonization and mitigation – and has become an essential pillar of many Climate Change and Green Transition policies.**

Social protection and labor systems have developed an array of programs and policy tools designed to help people prepare for and cope with a variety of shocks (natural, economic, employment, health,...) and adapt to changing labor markets. Social protection also has a strong equity focus by design, making it an essential pillar of many Climate Change and Green Transition policies (Figure 1). The development of climate-sensitive social protection remains however quite recent, and there is a need to review and evaluate existing initiatives, share knowledge about best practices, mainstream climate components into existing systems, identify gaps, and further develop and evaluate innovative approaches.

Figure 1: The role of Social Protection and Labor in Adaptation, Decarbonization and Mitigation

Social Protection and Labor Protects and Prepares people for		
Social Protection Instrument	Adaptation	Decarbonization and Mitigation
Cash transfers	Adaptive Social Protection (ASP) helps households build resilience and cope with shocks by facilitating savings, food security and livelihood adaptation and diversification. ASP also provides post-shock support to mitigate impacts and avoid damaging coping strategies.	Payments for Environmental Services (PES) help manage critical ecosystems, and cash transfers can reduce deforestation. Social protection measures / cash transfers are also a central element of Just Transition policies and post-carbon / energy subsidy reforms.
Public works	Public works promote food security, shock coping and livelihood diversification at the household level, and the creation of adaptive assets at the community level through better management of land and natural resources. They also support post-disaster reconstruction efforts.	Public Works contribute to carbon capture through reforestation and restoration of ecosystems.
Livelihoods / Economic Inclusion	Multidimensional programs with livelihoods and economic inclusion components support medium and long-term resilience building through food security, higher productivity, savings and diversification of livelihoods.	Livelihoods and Economic Inclusion programs support Just Transition policies and enhance resilience to labor market disruptions caused by Green transitions in both rural and urban settings.
Training and Active Labor Market Programs	Training and ALMPs support reskilling and job transitions in urban and rural areas for household whose livelihoods are affected by climate shocks.	Training and ALMPs support post-carbon “Just Transitions” in energy, coal, agriculture, transport and other sectors. They also prepare the workforce for new post-carbon jobs and enhance resilience to labor market disruptions caused by Green transitions.

Social protection – even without explicit environmental objectives – strengthens resilience against climate shocks

**Poverty makes households more susceptible to face climate shocks and to be severely affected by their impacts** (Hallegatte et al. 2017). Where poor people live, the quality of their dwelling, lack of savings, social barriers (especially for women and girls), the reliance of many poor households on subsistence agriculture or the limited employment opportunities they face all increase their likelihood to be affected by climate shocks and stressors, and to suffer from it.

**Even without explicit environmental objectives, social protection and labor programs such as cash transfers, public works, skills and employment support programs help the poor and vulnerable better absorb the impacts of climate shocks.** Cash transfers help households protect themselves against shocks and promote resilience by facilitating savings, asset accumulation and income smoothing. A multiyear government cash transfer program in rural Niger, for instance, was able to mitigate the welfare effects of drought shocks by increasing savings and protecting household earnings in agriculture and off-farm businesses when shocks occurred (Premand and Stoeffler 2020). Targeting many measures to women also

helped boost their ability to cope with shocks, including climate-related ones. A new generation of social assistance programs is also expanding coverage to urban areas, reaching informal urban settlements highly exposed to natural disasters (Gentilini, Khosla, and Almenfi 2021). Skills and employment programs can also help shifting to more climate-sensitive behaviors and livelihoods. In Nepal, for example, around 60,000 people are expected to benefit from training in basic skills, sanitation, health practices and nutrition or from temporary employment support that will help promoting sustainable land and water management.

**Social protection also supports food security, which is severely affected by climate change.** The impacts of climate change shocks reverberate throughout food supply chains, from smallholder farmers to off/non-farm activities in peri urban areas, and social protection helps mitigate some of these impacts. Social protection programs help bolster demand for food staples, diversify diets and livelihoods, spark investments in local rural economies, reduce food price volatility, and transition toward productive self-employment activities (Daidone et al. 2019; Baird, McKenzie, and Özler 2018).

**Cash transfers and labor programs also help foster long-term human capital accumulation and resilience.** Many cash transfers have components designed to stimulate the demand for education and health services among the poor and vulnerable populations. If well designed, these components help developing the Human Capital of future generations in terms of better health and education outcomes, fostering their long-term resilience (Ralston, Andrews, and Hsiao 2017; Fiszbein and Schady 2009). Similarly, effective labor programs — particularly when targeting youth — can also support the generation and use of human capital for many years to come, contributing to overall resilience (Kugler et al. 2015). Labor programs to support longer careers will also be necessary to prevent an amplification of the negative effect of aging on human capital due to the complexities of transitioning older workers to greener jobs (Čiutienė and Railaitė 2015).

[Integrating crisis-sensitive elements into social protection and labor programs further enhances their ability to respond to climate shocks](#)

**When trying to forestall long term consequences of shocks, speed of assistance can be of utmost importance.** The logic is intuitive. If assistance is to prevent a negative coping tactic, it must be timely, before a baby becomes malnourished, before the household withdraws children from school, sells its assets, racks up high interest debt, or loses its home, workshop or land. Each such coping tactic can be very difficult to reverse, ratcheting down the individual or family's welfare for years or for the rest of their lives (Hill, Skoufias, and Maher 2019; Caruso 2017; Baez, de la Fuente, and Santos 2010). Crisis-sensitive design features can substantially accelerate the response. In Bangladesh, for example, the Jumana river experienced in July 2020 unprecedented and protracted flooding, and data on upstream river levels was used to trigger electronic cash payments to downstream households a few days in advance of the flooding. Subsequent evaluations showed that the anticipatory cash transfer was mostly spent on food and water, and that treated households were 36 percent less likely to go a day without eating during the flood. Three months after the flood, households that had received the transfer reported significantly higher child and adult food consumption and wellbeing. They also experienced lower asset loss, engaged in less costly borrowing, and reported higher earnings potential (Pople et al. 2021).



**Adaptive Social Protection (ASP) – the integration of disaster risk management, climate change adaptation and social protection – is fast becoming a central tool in the adaptation policy toolkit.** In addition to speed, advance preparation is also essential including links to early warning systems and sustainable financing mechanisms. Senegal, for instance, experienced unusually heavy rains in 2020 leading to severe floods in both urban and rural areas, affecting thousands of households and leaving many homeless. Thanks to the adaptive nature of its safety net the government was able to provide a timely response to the most affected and poor households. No more than a few days following the severe floods social workers were deployed to assess damages, survey households, and ensure that the most in need were targeted, crosschecking lists of potential beneficiaries with the social registry containing information about the poorest and most vulnerable households. Less than two weeks after the floods over 10,000 direct recipients – mostly women – received \$300 into their mobile money account to help them rebuild or provide for their basic needs and avoid negative coping strategies. To achieve such a swift deployment preparation was key: without prior investment in adaptive systems such as the social registry, digital payments, predefined response mechanisms and operational procedures, such a quick and timely response would have not been possible.

**Effective shock responses require crisis-sensitive institutional arrangements and delivery mechanisms.** In Pakistan, for instance, the government developed a national strategy for managing catastrophic events, the Federal Disaster Response Action Plan, which outlines contingency plans and the minimum resources and swiftest approval processes required to respond to shocks. The plan also defines the cash response model for emergencies and roles and responsibilities of partner agencies. Designing crisis-sensitive delivery mechanisms is also essential. Social registries that cover a large share of the population and contain geo-referenced household data, such as in the Philippines or the Dominican Republic, can be more effective and precise in assessing household exposure to shocks through coordination with hazard data from the Disaster Risk Management (DRM) sector, allowing rapid identification of potential beneficiaries affected by shocks. During the COVID-19 pandemic, Togo and Nigeria have also relied on a mix of geographical and machine learning tools to enroll beneficiaries in rapid and large expansions of cash transfers. Early warning systems, such as satellite-based triggers for drought response in Uganda, help enact benefit payments well before any late-onset indicators reach emergency levels. And post-disaster, household-level data collection tools that are integrated into the social protection system, such as in Chile and Jamaica, allow for a better assessment of the level of support needed by disaster-affected households (Bowen et al. 2020). Investing in delivery systems also helps tailoring the response to people’s profile and needs. Better social registries, for instance, improve the ability to identify vulnerable individuals more accurately. Risks do not affect ethnic minorities, women and men, girls and boys equally; and the ability to cope with shocks also varies substantially according to people’s profile and identity.

**In addition to cash transfers, public works can also serve as a response to extreme climate events.** After shocks like earthquakes or cyclones, public works can play a critical role in the recovery phase through cleaning, reconstruction and jumpstarting local economic dynamics. For instance, after the Idai cyclone hit Mozambique in 2019, public works carried out short term activities like debris clearing, rehabilitation of tertiary roads and drainage canals, and even the production of artisanal bricks that helped the reconstruction of houses damaged by the cyclone. In Mexico, the Temporary Employment Program has a contingent modality to accelerate implementation after disasters, resulting in increased community involvement, faster economic recovery and shortened impact on human capital.

## Incorporating climate-adaptation components into social protection and labor programs helps build climate resilience

**The ability of households and communities to cope with climate shocks can be further enhanced by integrating climate adaptation components into social protection and labor programs.** It is not only important to support households in the event of a shock, but also to help them prepare and become more resilient to climate shocks in the first place. Adaptive Social Protection not only integrates disaster risk management components into social protection, but also adaptation measures that enhance poor households' resilience to shocks by improving their preparedness for climate-induced disasters through designs, delivery systems and needs assessments that take into consideration the climate vulnerabilities of target populations. Experience from Niger to Nicaragua shows that resilience can be further enhanced when cash transfers are reinforced with economic inclusion and labor services such as behavioral change interventions, savings and livelihoods support, financial inclusion, and skills training and coaching.

**At the household level, the integration of productive and economic measures within foundational social protection programs helps building long-term resilience.** Multidimensional programs – often leveraging cash transfers, public works, training, business skills, coaching, financial inclusion, savings and insurance – have proven to boost further poor households' resilience to climate shocks by stabilizing consumption and income, developing insurance mechanisms, and protecting key agricultural, forestry, and fisheries assets (Andrews et al. 2021). Many target women and have an explicit climate focus: for instance, sixty-five percent of World Bank-supported economic inclusion programs seek to mitigate climate change and develop sustainable livelihoods. A prime example is the Sahel Adaptive Social Protection Program (SASPP), which seeks to mitigate recurrent climate shocks for the extreme poor by complimenting established national cash transfer programs with productive measures including the formation of savings groups, life skills and micro-entrepreneurship training and access to markets.

**At the community level, public works can support communities to adapt to climate shocks through investments that promote adaptation and livelihood diversification.** Public works have proven to be important means through which communities and governments build local infrastructure, such as roads and health clinics, and manage their natural resources. Increasingly, countries are focusing their public works investments in soil conservation and watershed management. In India, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) public works are directed to agriculture and associated activities, such as water and land development, and positive impacts on climate change adaptation have been documented in areas that promoted investments in water conservation (Steinbach et al. 2020). In Malawi, Madagascar, Niger, and Tanzania, beneficiaries of public works programs create soil bunds, terrace land, and area enclosures that progressively stabilize degraded lands and hillsides and allow for the regrowth of vegetation, restoring water tables and leading to longer periods of seasonal stream flows.

## Social Protection and Labor supports Green and Just Transitions through equitable policies

**Social protection and labor programs can support people affected by Green Transition policies and help them cope with some of the negative impacts.** Transitioning from old production technologies to new ones, or from environmentally harmful processes to greener activities will benefit some workers, but will

displace others. The transition is likely to have significant employment but also social impacts and could result in or exacerbate pre-existing disparities, if not well managed. Social acceptance will play a critical role to ensure successful and just transitions, where the costs and benefits of any climate action are shared more equitably.

**Social protection and labor policies have a long track record of helping those adversely affected by transitions to cope with some of the most harmful impacts.** A well-designed and properly financed support package to communities affected by mine and power plant closures, for instance, can help mitigate some of the negative impacts. Success hinges on support packages that are adequately financed over the medium- to long-term, are comprehensive in nature and consider the whole community, that is, workers either directly or indirectly affected by closures and their dependents. Packages also need to be tailored to local economic and social conditions. In addition to social protection, active labor market and community support programs, it is crucial to include private sector support measures that are tailored to local economic potentials. A Mines Closure and Social Mitigation project in Romania, for instance, in addition to cash-based compensation included the support of a newly created agency with the mandate to deal with the consequences of the mine closures, employment and training incentives schemes, community-driven development projects, and a micro-credit program. The project supported the creation of more than 13,000 jobs, and in project communities almost half of those affected by mine closures found other sources of employment (World Bank 2006).

**Offsetting price hikes from energy subsidy reforms through targeted cash transfers can mitigate the impacts on the poor while achieving substantial fiscal savings.** Brown energy subsidy reforms are needed to promote energy savings and the use of cleaner energy sources. Nevertheless, the increase in energy prices tends to disproportionately affect the poor in spite of consuming much less energy than the middle class or the rich. To offset the negative impacts of higher energy prices on the poor many countries are implementing compensatory cash transfers, and by targeting them on the poor they are still able to achieve substantial fiscal savings: a review of compensatory cash transfers in 14 countries found net savings in 13 of them, ranging from 0.2 to 8 percent of GDP (Mukherjee et al. 2021).

**Local conditions substantially affect the design, cost and impacts of Green and Just Transition policies.** Some cash transfers that have been implemented to help people cope with the elimination of energy subsidies, for instance, only focused on the poor, while others (at least initially) were universal in nature or included a large share of the population (i.e. Iran, El Salvador, India or Jordan). These drastic different policy choices – which have implications on both the fiscal envelope and poverty impacts – originate to a large extent from socioeconomic and political economy factors that transition reforms need to take into consideration. But local conditions matter beyond political factors. Many rural or remote communities affected by coal mine closures struggle to recover from the transition, in part because of the limited opportunities for private sector development: an analysis of transitions out of coal in the Appalachia region of the United States, for instance, found that only 4 out of 222 counties managed to sustain positive population growth and viable local economies in the medium term (Ruppert Bulmer et al. 2021); and one of the most successful transitions out of coal – Germany’s Ruhr valley – required massive investments over several decades that few countries may be able to afford (Botta 2018).

[Social protection and labor policies can facilitate transitions towards Green jobs...](#)

**Green jobs tend to pay better, but they require higher skills and are more concentrated in urban areas** (Vona, Marin, and Consoli 2019; Marin and Vona 2019). The greening of the economy, coupled with other mega-trends such as technological change, globalization and urbanization, will transform existing jobs through a shift from brown to greener but more complex tasks: green jobs require more frequently the use of high-level abstract thinking, and workers in green occupations exhibit higher levels of education, work experience and on-the-job training (Muro, Rothwell, and Saha 2011). Green jobs, particularly those in green innovation, green engineering, and green manufacturing, may also be in different places than the non-Green jobs they replace. Many low-skilled, vulnerable workers are therefore likely to suffer from a move towards green jobs – because they lack the necessary skills, and/or because they find it more challenging to migrate.

**The Green Transition needs to be supported by sustained investments in both old and young workers' skills across sectors and the skills spectrum.** Training services will become increasingly important for both youth and workers of all ages. Training is needed both to up-skill workers (top-up current skills) to become more productive and greener in their own occupations, and to re-skill workers to facilitate the transition to new green jobs. Construction workers – even those in less skilled occupations – may need short courses to acquire the necessary certification to retrofit buildings with energy efficiency upgrades, for example, and smallholder farmers may require extension services and entrepreneurship training to shift to sustainable farming techniques and drought resistant varieties. These demands will put added pressure on often weak workforce training systems, requiring not only greater, but also smarter skills investments. Effective and sustained Green Transitions will require earlier interventions as well, namely through the education system, to produce school graduates with the technical and soft skill competencies in demand by a more modern, competitive and greener private sector.

**In addition to training initiatives, employment programs can support job search and mobility to connect workers to jobs in emerging green sectors or in less climate-affected regions.** Active and inclusive labor policies can support workers throughout the Green Transition and minimize the social costs, as illustrated by research on previous transitions such as trade liberalization or technological changes. Employment services that support internal migration to relocate from climate-affected areas, for example, will become more critical. So will intermediation and job search support services that can help workers to find new, greener and climate-change resilient opportunities. In Niger, for example, in the context of high-vulnerability to climate-related shocks, more than 20,000 rural youths have been equipped with skills and start-up capital needed to identify economic opportunities, diversify activities and build resilience. For the most vulnerable, effectively linking these programs with social assistance, training and insurance support will be central.

**Employment programs can further assist the green transition through climate-sensitive support to firms.** Targeted and temporary support to micro- and small businesses in the form of technical assistance, micro-credit or small grants, or subsidized employment to generate Green jobs, can complement investments in skills by targeting specific constraints faced by the low-skilled and the poor: micro-entrepreneurs may be well-placed to provide environmental services, for example, but require business skills training to develop a sustainable business model. In Nigeria, more than 500,000 farmers in the context of Covid-19 recovery plans will receive grants and support to access climate-smart inputs and

services, as well as climate-smart infrastructure; and support to micro and small enterprises will favor climate-sensitive activities such as solar power technology.

**The greening of the economy will also require supportive labor regulations and institutions.** With changing production patterns and skills needs labor reallocations within and across firms will be significant, and labor regulations and institutions will have to balance the need for labor reallocations with their central role in protecting workers (Packard et al. 2019). The transition to a greener economy will require therefore taking a closer look at regulations and institutions in place to ensure a balance is achieved.

### ...and support (some) direct mitigation measures

**Social protection and labor programs can support direct mitigation measures by positively affecting behaviors.** The success of many mitigation measures depends on people's behaviors and consumption choices. Social protection programs establish a direct link between people and the State by supporting beneficiaries with social care and employment services, training, cash and in-kind payments. These entry points are often used to influence people's behaviors to improve a variety of outcomes that depend on their behaviors (such as the take up of health and social services, child rearing practices, nutrition, and gender-based violence) through a mix of cash incentives, advisory services, training, communications campaigns, and use of role models, among others (Macours and Vakis 2014); and the same instruments can be used to steer people's behaviors to support climate mitigation measures.

**Payments for ecosystem services (PES) support behavioral changes to manage critical ecosystems such as forests and small scale fisheries** (Costella et al. 2021). Examples include Paraguay's *PROEZA* program, which provides environmental conditional cash transfers in exchange for community-based climate-sensitive agroforestry; Brazil's *Bolsa Floresta*, where a cash transfer is paid in exchange for a commitment to zero net deforestation; and Mexico's *Pago por Servicios Ambientales*, which pays communities to provide land conservation services and managed to reduce the loss of tree cover by 29 percent (Györi, Diekmann, and Kühne 2021; J. M. Alix-Garcia et al. 2019).

**Even without explicit environmental objectives cash transfers can influence land use and conservation behaviors – although the impacts remain context specific.** Cash transfers affect both consumption and production patterns and, under the right conditions, can influence positively conservation behaviors. Indonesia's Conditional Cash Transfer (CCT) program, for instance, has reduced tree cover loss in rural villages by 30 percent, thanks to reduced consumption of deforestation-sourced goods and lower deforestation rates as a response to shocks; and similar effects have been observed in Colombia with the *Familias en Acción* CCT program (Ferraro and Simorangkir 2020; Malerba 2020). Nevertheless, context matters: in Mexico, for instance, the cash transfer provided by its CCT program (at the time called *Oportunidades*) raised consumption of land-intensive goods and increased deforestation, in particular in communities with poor road infrastructure and limited access to markets (J. Alix-Garcia et al. 2013).

**Public works can also contribute to carbon capture through reforestation and restoration of ecosystems.** Examples include South Africa's Climate Change Response Public Works, and Ethiopia's Productive Safety Net Program (PSNP), which have components promoting projects for soil conservation and afforestation (Györi, Diekmann, and Kühne 2021); and the *Employment Generation Program for the Poorest* in Bangladesh, which promotes marine conservation and diversity. If properly designed, the

carbon capture impacts can be significant: Ethiopia’s PSNP, for instance, has managed to capture and reduce emissions by 3.4 million tons of CO<sub>2</sub> per year thanks to increases in biomass and soil organic carbon, and reduced livestock greenhouse gas emissions (Woolf et al. 2015).

The full potential of Social Protection and Labor in supporting adaptation, decarbonization and mitigation is still to be realized

**Low and lower-middle income countries contribute a small fraction of global carbon emissions but suffer disproportionately from them.** In 2018, 58 percent of the World population lived in low and lower-middle income countries, and contributed less than 15 percent to global carbon emissions (Ritchie 2018). Many low- and lower-middle income countries are however more susceptible to climate shocks and are less prepared to face them. While the high-income World must fast-forward the Green Transition, it is also imperative to support less advanced countries to adapt and cope with climate shocks.

**Supporting poor and vulnerable populations to adapt to a changing climate and cope with climate shocks will only grow in priority.** Climate shocks will only grow in frequency and magnitude, and poor and vulnerable populations will increasingly need support to prepare for, cope with, and adapt to shocks. Adaptive Social Protection has quickly become an essential policy tool in the adaptation agenda. But there is a need to invest more and better – both in terms of coverage and adequacy of support, and in the knowledge required to improve further program design and delivery mechanisms.

**Developing further the knowledge and social protection and labor investments supporting Just and Green Transitions is not only smart economics, but will also help pass difficult reforms.** Green Jobs will be in different sectors and locations than the job they may replace, and will require workers to move, switch sectors, and acquire different and often more complex skills. Social protection, training, and Active Labor Market Programs (ALMPs) will be playing a central role in preparing workers for the Green Transition and ensure that the supply of qualified workers will meet the demand. Well-designed social protection and labor policies will also help pass difficult reforms by supporting the people affected through compensation, training, and employment support programs. Effective support to the Green Transition will however require more and better investments on the Labor side: many low- and middle income invest little in training and ALMPs, and the existing ALMPs often suffer from design and implementation flaws that hamper their effectiveness.

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