

POLICY BRIEF N° IDB-PB- 00400

Labor Markets and Climate Change: How to Adapt Labor Market Policies and Improve Employment Opportunities?

Dulce Dias Alvarenga
Juan Manuel Sandoval Ayala
Heewan Noh
Rafael Novella

Inter-American Development Bank
Labor Markets and Social Security Division
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April 2024



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Cataloging-in-Publication data provided by the

Inter-American Development Bank

Felipe Herrera Library

Labor markets and climate change: how to adapt labor market policies and improve employment opportunities? / Dulce Baptista, Juan Manuel Sandoval Ayala, Heewan Noh, Rafael Novella.

p. cm. — (IDB Policy Brief; 400)

Includes bibliographical references.

1. Manpower policy-Latin America. 2. Manpower policy-Caribbean Area. 3. Labor market-Latin America. 4. Labor market-Caribbean Area. 5. Climatic changes-Latin America. 6. Climatic changes-Caribbean Area. I. Baptista, Dulce. II. Sandoval Ayala, Juan Manuel. III. Noh, Heewan. IV. Novella, Rafael. V. Inter-American Development Bank. Energy Division. VI. Inter-American Development Bank. Labor Markets Division. VII. Inter-American Development Bank. Climate Change Division. VIII. Series.

IDB-PB-400

JEL Codes: J08, J21, J24, J38, Q54, Q56, Q58

Keywords: Active labor market policies, just transition, climate change, decarbonization, inequality, jobs, skills, green economy, economic resilience, green jobs, green skills

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LABOR MARKETS AND CLIMATE CHANGE



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Policies and Improve
Employment Opportunities?

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Acknowledgments: The authors would like to thank Ferdinando Regalia, Soledad Bos, Mariana Alfonso, Laura Ripani, David Kaplan, Manuel Urquidi, Alex Bowen, and David Evans for their valuable comments and suggestions.

This paper is part of a series of publications by the **IDB Social Sector** and **Climate Change and Sustainability Division** highlighting the role of social themes in the process of adaptation to the impact of climate change and decarbonization in Latin America and the Caribbean.

Editing: Ellen Cooper (Cristaliza Global).

Design: Lorena Acosta León and Jesús Rivero (Cristaliza Global).

Labor Markets and Climate Change: How to Adapt Labor Market Policies and Improve Employment Opportunities?

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After a robust recovery in 2021 and 2022 following the economic downturn caused by the COVID-19 pandemic, Latin America and the Caribbean (LAC) is facing a less promising growth outlook for 2024. While the economic recovery of 2021 and 2022 brought poverty numbers back to pre-COVID levels, the region's leading social indicators are on a deteriorating path. Employment growth during 2022, which contributed to poverty reduction, is now slowing down, particularly in the informal sector. Inflation, particularly in recent years, has emerged as a key concern, and although it has eased over the past year, it still leaves lingering effects, such as impacting poverty through reduced disposable incomes and real wages (IDB, 2024).

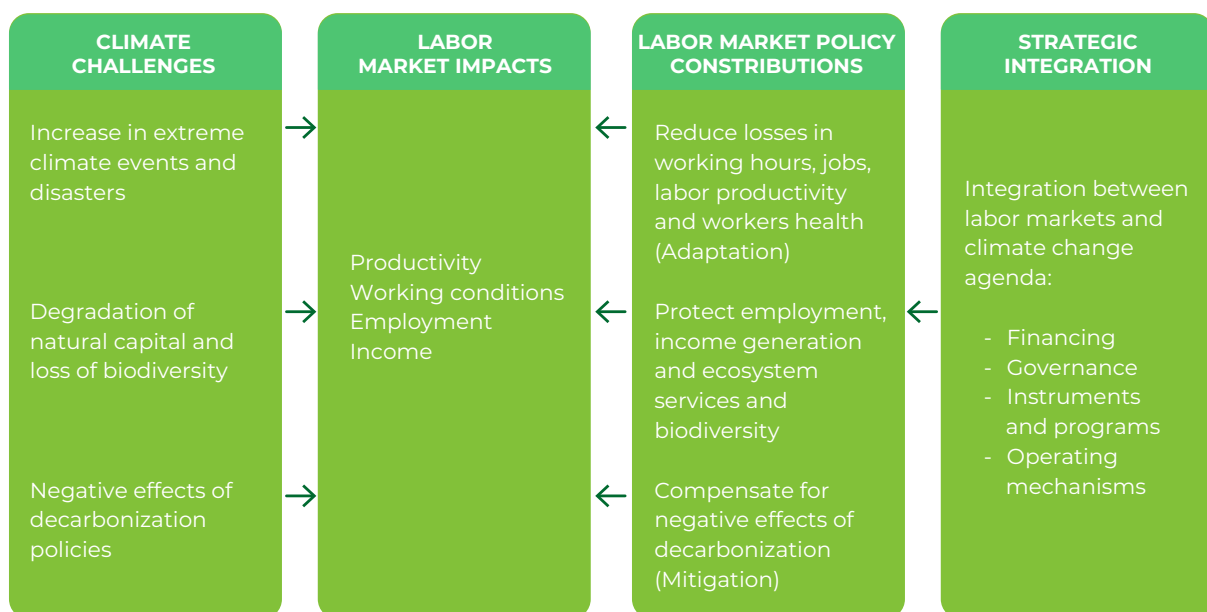
In this challenging context, climate change is increasingly affecting the region's labor markets.

Climate change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere over the long term. The primary cause of climate change has been the steady rise in greenhouse gas (GHG) emissions linked to human activity. Since the 19th century, global temperatures have risen by 1.1 °C and projections suggest further increases (IPCC, 2022). Negative impacts of climate change in terms of job losses, hazardous labor conditions and lower productivity have the potential to affect an important part of the population of our region. Considering that jobs and labor markets are the main source of income for workers in LAC countries, the lack of access to quality jobs has important consequences on our societies, since this could further deepen poverty and inequality, hinder the increase in labor productivity, social cohesion and, ultimately, the achievement of climate change goals. People fearful of losing their jobs may oppose policy measures aimed at combatting climate change.

Nevertheless, the overall scenario for workers does not need to be so gloomy. While some jobs may be lost, adaptation and mitigation to climate change can open opportunities for [job creation](#), skills development, and an increased productivity if the right set of labor market policies are in place. Boosting the positive effects and mitigating the negative effects of climate change in the labor markets cannot be done without government intervention and labor market policies can play a key role.

The purpose of this paper is to identify the main effects of climate change on the region’s labor markets, and the potential role of labor market policies in this context. To that end, we propose an analytical framework (see Figure 1) to identify the main mechanisms through which climate change impacts labor markets and possible policy options to respond to them. Climate change-related phenomena like extreme weather events and disasters, natural capital degradation and biodiversity loss will have increasingly significant impacts on labor markets (IDB/ILO, 2020). At the same time, decarbonization policies can add complexities to this landscape. Decarbonization can affect labor markets by creating new jobs in low carbon and sustainable activities and causing job losses in high-emission industries. Displaced workers will have to learn new skills that are in demand in growing green sectors. Vulnerable populations may be disproportionately affected, raising concerns about income inequality. Beyond short-term negative impacts, it can also lead to medium and long-term effects, especially if there is no support available for people to transition to a low-carbon and sustainable economy, which could inadvertently undermine their future economic well-being. In addition to helping people who lose their jobs transition to new ones, skills formation in “green” jobs may have the impact of accelerating the adoption of green technologies, complementing other measure to combat climate change (den Nijs and Tyros, 2023).

FIGURE 1. CHALLENGES OF CLIMATE CHANGE AND THE ROLE OF LABOR MARKET POLICIES: A THEORETICAL FRAMEWORK



In this context, labor market policies can play an important role in adaptation and mitigation of climate change. This paper focuses on the role that labor market policies can play mitigating negative effects and accelerating adjustment to climate change effects. **In the face of extreme climate events and disasters, labor market policies can mitigate the adverse effects and facilitate economic recovery afterwards. Integrating environmental goals into labor market policies can help to boost employment and income and contribute to conservation and restoration of environmental degradation and biodiversity. In the face of decarbonization policies, labor market policies can facilitate a just transition to a green economy.**

These labor market policies can help moderate the potential damage caused by climate change thereby supporting countries' adaptation agenda. Additionally, they contribute to efforts towards a just transition as our region undergoes decarbonization processes, thus supporting mitigation agendas. However, while there are important opportunities for labor market policies, there are also significant knowledge gaps and relevant challenges related to their coverage, quality, effectiveness, and efficiency. The following sections will examine the mechanisms through which climate change affects labor markets (Section I), explain the possible contributions of labor market policies in mediating negative effects (Section II), and propose alternatives to close the existing gaps and adapt labor market policies to the new challenges (Section III).

I. THE CHALLENGE: CLIMATE CHANGE AND LABOR MARKETS

Climate change affects labor markets in a number of important ways. First, **rising temperatures, extreme weather events and pollution** can negatively affect labor conditions and encourage labor migration. Second, **degradation of natural capital and loss of biodiversity** may affect the provision of vital ecosystem services, which negatively affects activities and jobs related to natural resources. Third, **decarbonization policies** impact the structure of an economy: jobs in sustainable and low carbon activities are often created while jobs in resource intensive and high emission activities are destroyed. Finally, climate change has heterogeneous effects and disproportionately affects vulnerable groups like migrant workers and the poor increasing inequality. This section discusses how these three mechanisms affect labor markets in the region in the short, medium, and long-term.

Rising temperatures, extreme weather events, and pollution: impacts on jobs, working hours, the health of workers and labor productivity

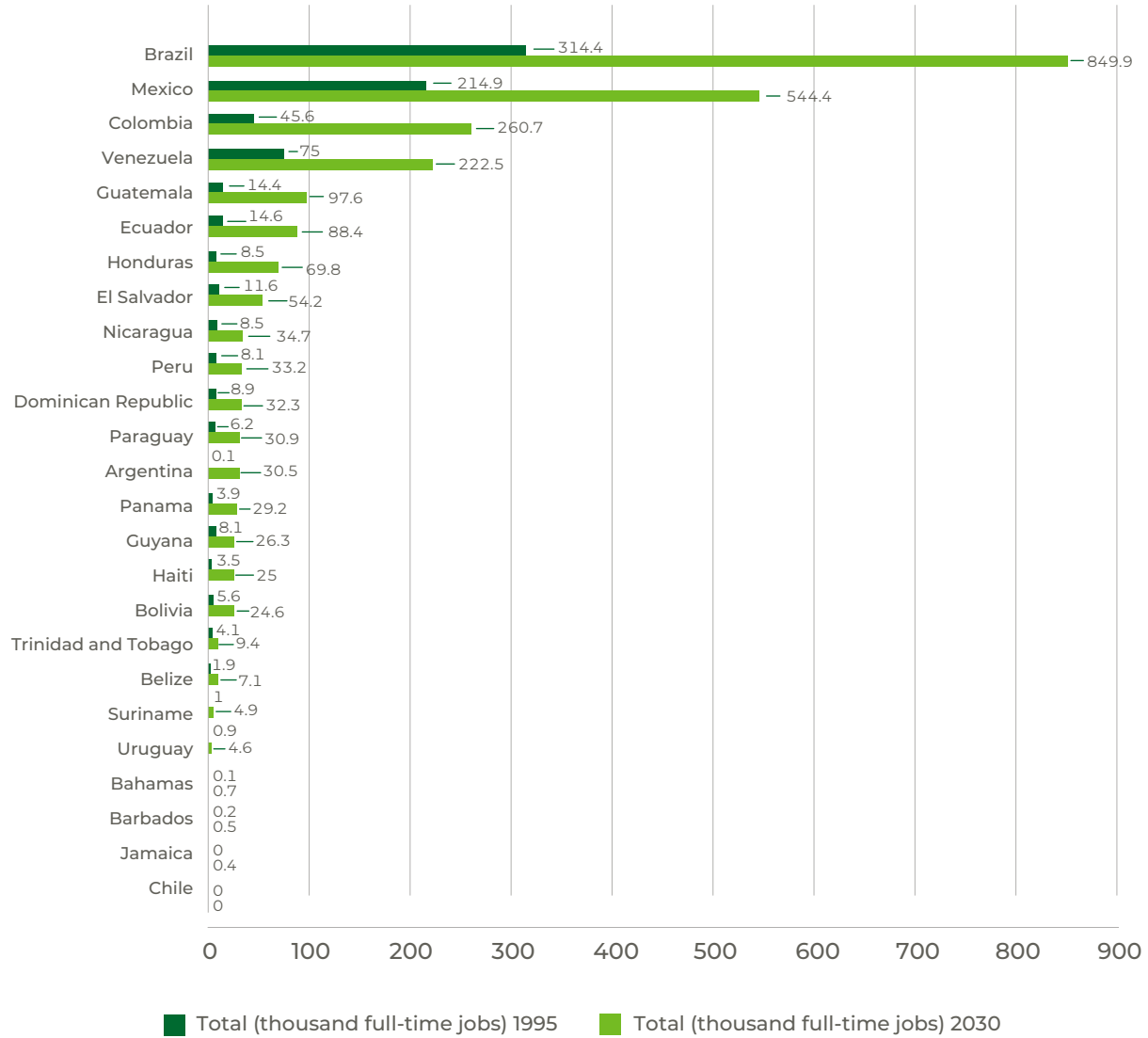
Rising temperatures make heat stress more common, leading to significant losses in working hours, jobs, and labor productivity, especially for the most vulnerable. Projected temperature increases will make heat stress more common, reducing working hours globally by 2% by 2030 and affecting, above all, workers in agriculture, in vulnerable conditions (e.g., outdoor workers, informal workers)¹ and in developing countries (ILO, 2018). Heat stress could cost 2.5 million jobs in LAC by 2030 (Kjellstrom et al. 2019). Due to its large population, South America is expected to lose 1.6 million full-time jobs, followed by Central America and Mexico at 800,000 and the Caribbean at 100,000 (IDB & ILO, 2020). There is also evidence that labor productivity in various cognitive tasks drops by about 2% per degree Celsius over a threshold of 25°C (Seppanen et al., 2003), and by 9% when temperature rises from 23°C to 30°C (Seppanen et al., 2006).

1. For instance, workers on sugar cane plantations across Central America are exposed to heat stress and heat-related illnesses by working long hours under direct sunlight and amidst high humidity with only short breaks and limited access to clean drinking water (Crowe et al., 2010).

Increases in the frequency and intensity of extreme weather events lead to job and productivity losses through the destruction of physical capital. Natural disasters resulted in a global loss of working life years equivalent to 0.8% of a year's work annually between 2000 and 2015 (ILO, 2018). In LAC, working-life years lost from environment-related hazards increased from 138 to 197 per 100,000 workers from 2000-07 to 2008-15 (IDB & ILO, 2020). Increases in extreme weather events may increase unemployment, decrease productivity, proliferate dangerous and informal work, and lead to climate-induced migration.

An increase in pollution reduces working hours and productivity by harming the health of workers. Soil and air pollution led to nine million deaths in 2015, over 15 times the deaths related to armed conflict and violence and three times the number of deaths attributed to AIDS, tuberculosis, and malaria combined (ILO, 2018). Air pollution is the main environmental risk for public health in LAC, where more than 150 million individuals live in cities that exceed the World Health Organization Air Quality Guidelines (WHO, 2019). In the U.S., air pollution negatively impacts the productivity of workers, reducing average earnings by 6%. If extrapolated to all U.S. manufacturing workers, the reductions in labor productivity placed between 1999 and 2008 would have generated \$19.5 billion in labor cost savings (Chang et al., 2016).

FIGURE 2. WORKING HOURS LOST TO HEAT STRESS, BY SECTOR AND COUNTRY, 1995 AND 2030 (PROJECTIONS)



Source: Own elaboration from ILO estimates from “Working on a warmer planet: The impact of heat stress on labour productivity and decent work”, International Labour Office – Geneva, ILO, 2019.

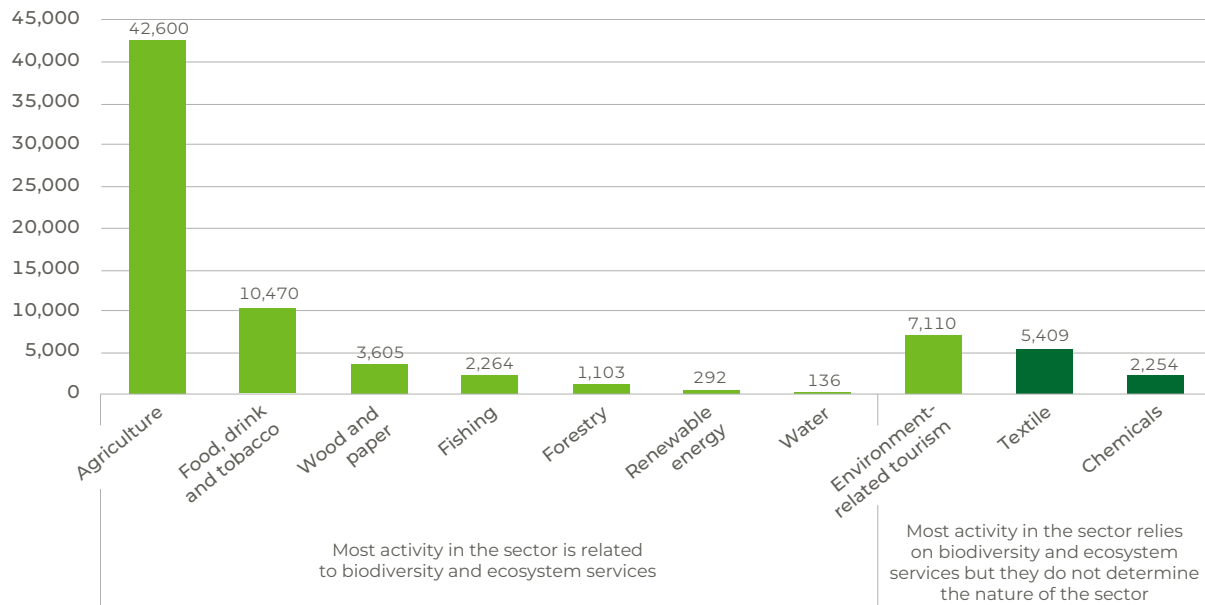
Degradation of natural capital and loss of biodiversity: threats to jobs that rely on natural resources

A healthy environment creates opportunities for good quality jobs.² It is estimated that 1.2 billion jobs globally depend directly on the effective management of healthy ecosystems, particularly jobs in farming, fishing, and forestry, that depend on natural processes. These processes include air and water purification, soil renewal and fertilization, pollination, pest control, the moderation of extreme temperatures, and protection against storms, floods, and strong winds. In the Americas, about 17% of total employment depends directly on ecosystem services (ILO, 2018). Most of these jobs are in the agriculture (57%); food, drink, and tobacco (14%); environmental-related tourism (9%); and textile (7%) sectors.

However, many ecosystems are under stress (TEED, 2010), threatening jobs that, directly and indirectly, rely on natural resources. Environmental degradation limits the ability of ecosystems to provide services, damaging health, well-being (WHO, 2005), and economic activities (Kumar, 2010), and puts jobs at risk (GHK, 2007; Rademaekers et al., 2012). Climate change will exacerbate environmental degradation and biodiversity loss, resulting in direct negative effects on jobs, worker's safety, health productivity and income (ILO, 2018). In the United Kingdom, it is estimated that increased pressure on ecosystem services would lead to productivity losses for crops and livestock, translating into a 0.2% reduction in GDP and the loss of 66,000 jobs by 2050 (White et al., 2017).

The relationship can also work in reverse, i.e., lack of full, productive, and good-quality employment can itself lead to environmental degradation. Developing economies are characterized by low diversification, low levels of innovation, high levels of employment in low productive activities, and the presence of important market failures. When individuals are confronted with insecurity in terms of food and energy, they may resort to overgrazing, excessive land use, deforestation, or other forms of unsustainable resource extraction as desperate measures to cope with the challenges. In this way, the lack of good jobs and income security can directly contribute to environmental degradation in these regions (ILO, 2018).

2. In LAC, quality jobs are strongly associated with salaried formal, full-time jobs.

FIGURE 3. JOBS RELYING ON ECOSYSTEM SERVICES IN LAC, 2014 (THOUSANDS)

Source: Own elaboration from ILO estimates from “World Employment and Social Outlook 2018: Greening with jobs”, International Labour Office – Geneva: ILO, 2018.

Policies to decarbonize the economy: impacts on the labor market

The transition to net-zero will have large impacts on the region’s labor markets, with four key impacts on jobs³: **creation, substitution, elimination, and transformation/redefinition**. First, the expansion of greener products, services, and infrastructure will translate into higher labor demand across many sectors of the economy, therefore new jobs will be **created**. Second, some of the existing jobs will be **substituted** due to shifts in the economy from less energy efficient to more energy efficient, from high-carbon to low-carbon, and from more to less polluting technologies, processes, and products. Third, certain jobs may be **eliminated**⁴—either phased out or massively reduced—without being directly replaced. This may happen when polluting and energy and resource-intensive economic activities are reduced or phased out entirely. Fourth, many, and perhaps most existing jobs will simply be **transformed** and **redefined** in the process of greening day-to-day workplace practices, skill sets, work methods, and job profiles (OECD 2018; ILO 2015).

³. Another possible mechanism that can affect employment is job creation in sectors that are inherently less carbon-intensive (e.g., education, finance, R&D) rather than in sectors that need to be decarbonized. This trend has already been observed in developed countries.

⁴. Changes resulting from policies on climate and the environment are only one of several factors leading to job losses. In fact, greening has, to date, been a minor factor. The principal causes of declining employment in industries such as mining, fossil energy, and iron and steel have been relative and absolute price changes, increasing automation, and rising labor productivity, which have been occurring over several decades (ILO, 2021).

The transition to a more sustainable economy can create up to 15 million net jobs in LAC by 2030. This includes 22.5 million more jobs in plant-based food systems, renewable electricity, construction, manufacturing, and forestry, and 7.5 million fewer jobs in animal-based food systems, fossil fuel extraction and mining, and fossil fuel-based electricity generation. The creation of new jobs could benefit the 66 million people who are currently unemployed, including nine million unemployed youth (IDB & ILO, 2020). Over the longer term, most fossil fuel jobs are at risk. Moreover, more than 80 percent of the new jobs created by the decarbonization agenda will be in today's male-dominated sectors. Occupations currently employing mostly men will gain 18.5 million jobs and lose six million by 2030, while occupations currently employing mostly women will experience a gain of four million jobs and a loss of 1.5 million (Saget et al., 2021). **Most of the jobs created are likely to be concentrated among occupations at the medium- and low-skills levels, while net job destruction is expected at the high-skills level.** Of the 22.5 million new jobs, 13.5 million fall into the **medium-skill** category, while 8.2 million will be for **low-skill** workers and only 820,000 for **high-skill** workers.⁵ Many new jobs will require workers with a new set of skills, for instance, entrepreneurial skills to apply and adopt new technology, or technical skills to install and maintain electrified processes.

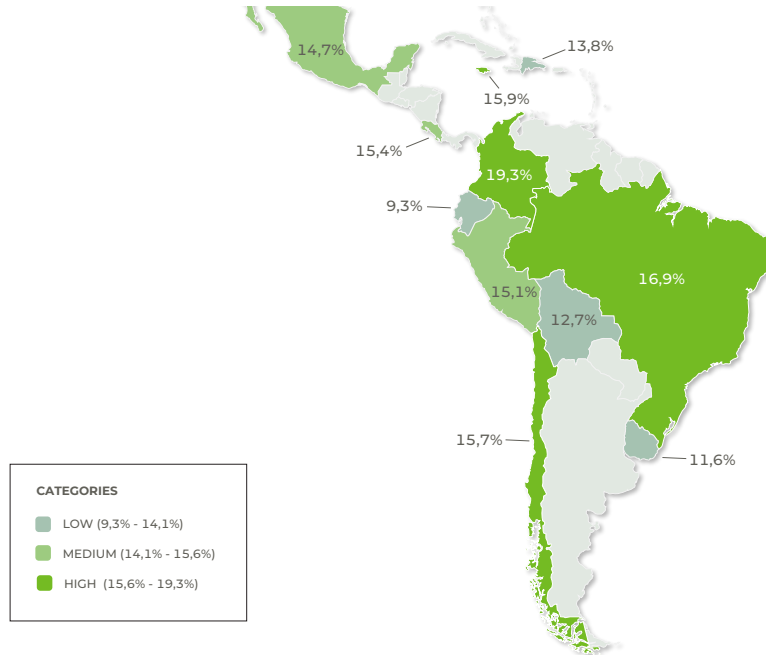
Currently, 13% of the workers in LAC could be part of the green economy, ranging from 19% in Colombia to 9% in Ecuador, according to estimates for green-task jobs in 11 countries (Colombia, Brazil, Jamaica, Chile, Costa Rica, Peru, Mexico, Dominican Republic, Bolivia, Uruguay and Ecuador) (Figure 3).⁶ However, if policy interventions do not keep pace, the green transition could further exacerbate current inequalities. For example, green jobs are currently concentrated among male workers (40%) aged 25 to 49 years (80%) and living in urban areas (40%) (IDB, 2024). Certain countries in the region such as Uruguay, Bolivia and Ecuador where there is a higher concentration of non-green jobs (Figure 4) are likely to be particularly affected.

Upskilling and reskilling policies will be particularly important to ensure a just transition in the region. More than 80% of the workers in non-green jobs highly similar to green jobs in LAC will have to make three or more transitions to move into a green job. A very different context than the U.S. where 8 out of 10 workers on non-green jobs can transition directly to a green job. Non-green jobs appear to differ from green jobs in many skill-specific aspects, so most re-training will require structural mid and long-term interventions.

5. High-skills include occupations listed under codes 1, 2, and 3 of the International Standard Classification of Occupations (ISCO-08); intermediate level skills consider codes 4, 5, 6, 7 and 8 of the ISCO-08; and low-level skills encompass code 9 of ISCO-08. For more information regarding ISCO-08 refer to ILO (2012).

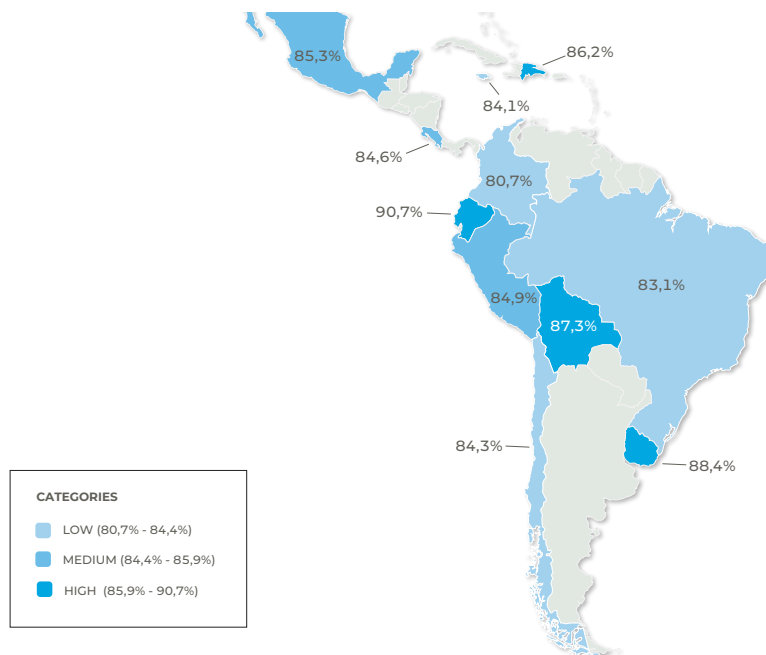
6. See [Annex 2](#) for a discussion on green jobs estimates using task approach.

FIGURE 4. DISTRIBUTION OF GREEN JOBS IN LATIN AMERICAN AND CARIBBEAN COUNTRIES (% OF THE EMPLOYED POPULATION IN EACH COUNTRY)



Source: Authors' own calculations from household and employment surveys of respective countries.

FIGURE 5. DISTRIBUTION OF NON-GREEN EMPLOYMENT IN LATIN AMERICAN AND CARIBBEAN COUNTRIES (% OF THE EMPLOYED POPULATION IN EACH COUNTRY)



Source: Authors' own calculations from household and employment surveys of respective countries.

II. THE OPPORTUNITY: COMBINING LABOR MARKET POLICIES WITH THE CLIMATE CHANGE AGENDA

In this section, we propose a conceptual framework for the potential contribution of labor market policies to address the negative impacts of extreme climate events and disasters, the degradation of natural capital and biodiversity loss, and the implementation of decarbonization policies. While there are opportunities for labor market policies within climate change action, there remain major challenges and gaps in knowledge about the best policy options that can be implemented. These options will be explored in the following section.

Conceptual framework - Labor market policies and climate change

Labor markets, like other markets, face market failures (information asymmetries, externalities) that generate inefficient resource allocations. Firms and workers do not always make decisions in an optimal way, thus generating cases of excess or shortage of labor, allocation of people to the wrong jobs, unskilled workers, or very low wages. In developing countries, the lack of well-functioning markets and economic systems exacerbate these market failures, contributing to greater welfare losses in these societies (Jackson and Jabbie, 2020). As a result, public policies are extremely important to achieve a balance in the labor market.

There are two types of labor market policies that can be used to mitigate the negative effects of climate change in the labor markets.

- ▶ **Active labor market policies:** policies that seek to increase the employability of workers through measures such as labor intermediation, training, employment subsidies, and entrepreneurship programs.
- ▶ **Passive labor market policies:** which aim to protect incomes of workers through social benefits or income transfers to unemployed workers looking for a job. These include unemployment insurance, temporary employment programs, and unemployment support policies.

Since the 1990s, passive labor market policies have been linked to active labor market policies through activation measures by providing incentives to the unemployed to increase job searches or participate in employment programs (Salvini and Bolits, 2021). [Annex 1](#) provides a more detailed description of labor market policy options.

The capacity to implement these policies will depend on the situation in each country. In order to facilitate the selection of policies that are relevant in each particular context, the following criteria are considered:

- 1. Type of mechanisms affecting labor markets:** what is the mechanism⁷ through which climate change affects labor markets?
 - Extreme climate events and disasters;
 - Degradation of natural capital and biodiversity loss;
 - Implementation of decarbonization policies.
- 2. Reaction time:** what labor market policies would be more effective to implement given the reaction time required? For example, extreme climate events and disasters require immediate action because social and economic infrastructure destruction causes losses of employment, productivity, and income. Conservation and restoration of natural capital and biodiversity as well as protection of workers from the negative effects of decarbonization policies have longer reaction times because the effects on the economy are not immediate.
- 3. Heterogeneity of the effects:** are the effects on the labor market similar between...
 - ... different geographical areas;
 - ... different economic sectors;
 - ... different population groups (e.g. youth, men and women, formal workers, informal workers, micro and small enterprises)?
- 4. Existence of policies and programs:** Do countries already have programs or institutional arrangements (e.g. registry of workers or enterprises, social programs targeted at certain populations) that can be easily expanded and/or improved to address the effects on the labor market?
- 5. Fiscal capacity.** Considering the number of people affected, implementation of these policies could be costly.

⁷ This follows Costela et al. (2021).

Table 1 presents a **categorization of the labor market policies** that could support countries to advance their adaptation, conservation and decarbonization policies, considering the nature of the policies, the relevance for a given mechanism through which climate change affects labor markets and the timing of the intervention. Active and passive labor market policies can be combined to respond to the effects of climate change on labor markets. The reaction time required by these environmental strategies determines which labor policies can be most effective to implement as indicated above. The bolded text highlights the most relevant labor market policy tools to be used in response to each event. **In response to extreme climate events and disasters**, several active labor market policies can be used proactively. However, the most relevant policy for immediate action is a temporary employment program, as it would both mitigate job losses and facilitate the recovery of social and economic infrastructure. **In response to both environmental degradation and biodiversity loss as well as decarbonization policies, training and labor intermediation are the most relevant policies.** These policies enable a smoother transition to new occupations, given the complexity of re-training for new green occupations, and help facilitate matching between vacancies and job seekers.

TABLE 1 LABOR MARKET POLICIES TO TACKLE CLIMATE CHANGE CHALLENGES

Type of policies	Main Strategies		
	Extreme climate events and disasters	Degradation of natural capital and biodiversity loss	Decarbonization policies
Active policies (PAML)	<ul style="list-style-type: none"> - Labor intermediation - Training - Subsidies for employment in companies - Entrepreneurship programs 	<ul style="list-style-type: none"> - Labor intermediation - Training - Subsidies for employment in companies - Entrepreneurship programs 	<ul style="list-style-type: none"> - Labor intermediation - Training - Subsidies for employment in companies - Entrepreneurship programs
Passive policies (PPML)	<ul style="list-style-type: none"> - Temporary employment - Unemployment insurance - Other passive labor market policies (tax credits, moratorium on social security payments, etc.) 	<ul style="list-style-type: none"> - Temporary employment - Unemployment insurance 	<ul style="list-style-type: none"> - Temporary employment - Unemployment insurance

Source: Own elaboration. Text in bold indicates the most relevant policy tool to be used for each type of event.

Labor market policies and responses to extreme climate events and disasters

It is important to focus on good quality employment creation in the context of disaster prevention, mitigation, preparedness, and recovery to improve long-term resilience. However, governance mechanisms between disaster management and labor market policies tend to be lacking or weak. Most post-disaster frameworks for assessing needs do not account for labor market effects, limiting countries' ability to understand how climate events reduce labor supply and increase labor demand in specific sectors (e.g., construction), which affects disaster preparedness and climate adaptation strategies. Countries in LAC must adapt their labor market policies to respond to extreme weather events and disasters, and to include emergency response objectives. Integrating crisis-sensitive design features into labor market policies can improve climate shock response and shorten response times. Also, quick-onset disasters (hurricanes, floods) require different operational mechanisms than slow-onset crises (droughts), which must be managed before they become emergencies. Emergency relief and recovery can require a combination of different policies. During the emergency phase, labor is required to construct temporary shelters and distribute relief aid. During the recovery phase, a well-managed clean-up and reconstruction can create jobs, sustain livelihoods, reduce inequalities, and close skills gaps.

Labor intermediation can help following climate events. Public Employment Services (PES) can help conduct rapid livelihood assessments to understand labor markets and social protection demands (ILO, 2021). They can also support internal migration to relocate workers from climate-affected areas to jobs in emerging green sectors or in less climate-affected regions (Rigolini, 2021).⁸ Temporary migration programs, like those in place for agricultural workers from Mexico to the US⁹ and Canada¹⁰, could help increase earnings of climate-affected workers without them having to leave their communities. In the US, the Disaster Dislocated Worker Grants program provides labor intermediation to workers affected by natural disasters who relocated elsewhere.¹¹

Training supports resilience-building by helping workers move to sectors where there is employment growth and by facilitating the adequate implementation of adaptation strategies (e.g., the development of climate-smart infrastructure) (ILO, 2021). In the case of short-term extreme climate events and disasters, training programs can help displaced workers move to sectors with higher labor demand. For example, U.S. states can use the Disaster Dislocated Worker Grants to upskill or reskill natural disasters victims who moved away from disaster areas. Training can help build resilience during long-term events like droughts.

8. One example is the implementation of temporary employment programs through bilateral labor mobility agreements between Spain and Colombia signed in 2001. Likewise, several Small Island States (such as Papua New Guinea) and New Zealand and Australia have integrated considerations for the development of climate-affected areas into their seasonal worker programs.

9. [H-2A Temporary Agricultural Workers | USCIS](#)

10. [Programa de Trabajadores Agrícolas Temporales México-Canadá](#)

11. <https://sgp.fas.org/crs/misc/R45182.pdf>

TRAINING FOR THE WATER SECTOR

Argentina, Chile, and Uruguay are experiencing historically dry weather, threatening agriculture, livestock, food, sustainable tourism, and the forestry industry. These three countries are rethinking how to use water more efficiently in water sector jobs. With the support of the IDB, they are creating a three-pillar road map to address these challenges in the medium and long run. First, developing a method to identify and diagnose economic subsectors with green development potential through human capital development. Second, implementing virtual and presential training and skills certification. Third, producing guides and manuals for pre-feasibility studies, training modules, skills anticipation, development, and certification to ensure sustainability and scalability.

Employment subsidies may protect employment and boost demand in the aftermath of natural disasters (ILO and World Bank, 2012) when firms must reduce or suspend operations but are expected to remain in business.

In some countries, these programs are permanent. In Japan, after natural disasters employers are reimbursed a percentage of leave compensation paid to workers who promise to return to work after a temporary suspension of business through the Employment Adjustment Subsidy.^{12,13} In Australia, the Disaster Recovery Allowance¹⁴ provides short-term allowance for up to 13 weeks to people whose incomes have been reduced because of a major disaster.¹⁵ Other countries opt for event-driven programs. After the 2011 earthquake in New Zealand, the Earthquake Support Subsidy was created for a limited time. The subsidy was payable for six weeks, plus a further two weeks if needed.¹⁶

Entrepreneurship programs can also help in identifying and promoting a variety of opportunities to generate income during and after climate related events.

Because employment opportunities in the formal sector frequently decrease during an emergency, self-employment opportunities typically emerge. Support to entrepreneurship can be provided through programs that include the identification of business development opportunities, techniques for starting a business, and micro-credit schemes (ILO, 2011).

12. [wcms_754424.pdf \(ilo.org\)](#)

13. <https://www.oecd-ilibrary.org/docserver/5k8zk8pn2542-en.pdf?expires=1671129165&id=id&accname=quest&checksum=2C9C97C-488409FC223148803167105D0>

14. <https://business.gov.au/grants-and-programs/Disaster-Recovery-Allowance-DRA#:~:text=The%20Disaster%20Recovery%20Allowance%20provides,Australia%20website%20for%20application%20deadlines>

15. https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1920/Quick_Guides/IncomeSupportNaturalDisastersUpdate

16. Helping Displaced Workers Back Into Jobs After a Natural Disaster: Recent Experiences in OECD Countries | READ online (oecd-ilibrary.org), [Job Loss Cover extended for Christchurch individuals - New Zealand | ReliefWeb](#)

Emergency, labor-intensive temporary employment programs can create post-disaster employment minimizing job losses and increasing productivity (ILO, 2021).

These programs include activities such as debris and beach cleaning, roofing, rebuilding schools, hospitals, roads, and bridges, etc. They can also boost labor demand through community contracting and asset rehabilitation and construction using environmentally friendly methods.

These programs have been used on a temporary basis to respond to natural disasters in low- and middle-income countries such as Haiti, Indonesia, and Nepal, often with donor funding (ILO, 2013). In the Philippines, a labor-based community asset rehabilitation program was implemented after Typhoon Haiyan in 2013. In Peru, the government established *Trabaja Perú*, a temporary employment program that provides immediate assistance during natural disasters or emergencies. Basic, social, and economic infrastructure projects as well as immediate intervention activities are funded by the program.¹⁷

In high income countries, temporary employment programs are frequently part of the comprehensive support package offered to disaster-affected workers. Permanent programs available to support workers who involuntarily lose their jobs usually include provisions of additional support to workers in geographic areas affected by disasters. In the U.S., National Dislocated Worker Grants (DWGs) are part of a set of permanent programs financed with general taxes to provide resources to states to respond to large, unexpected layoff events. Funding is primarily allocated to create temporary employment opportunities assisting with clean-up and recovery efforts, when an area impacted by disaster is declared eligible for public assistance by the Federal Emergency Management Agency.¹⁸

Unemployment protection programs help people to adapt to climate shock-induced natural disasters and avoid income and food insecurity.

Sometimes countries have permanent disaster relief programs that can be activated after a natural disaster, such as the U.S. and New Zealand which have earmarked funds managed by federal or state agencies and funded by general taxation. Funds are made available through public calls and grants. In Chile and Japan, unemployment protection for natural disaster relief is provided by modifying ongoing social programs, usually financed by payroll taxes, to provide social benefits to disaster victims.

Finally, temporary tax credits/exemptions and a moratorium on social security payments, (un)employment insurance, severance, and job-sharing arrangements can also help to attenuate liquidity restrictions firms may be facing during the emergency.

In many countries, including the U.S., special tax law provisions help individual taxpayers and businesses recover financially

17. <https://www.trabajaperu.gob.pe/descripcion-del-programa/>

18. <https://sgp.fas.org/crs/misc/R45182.pdf>

from the impact of a natural disaster, especially when the federal/central government declares their location to be a major disaster area. An alternative is the use of short-term business grant funds and micro-finance initiatives (ILO, 2018).

Labor market policies and the conservation and restoration of natural capital and biodiversity

Labor market policies can contribute to the sustainable management of natural capital and biodiversity. Labor market policies can boost job creation and income generation opportunities from natural resources and ecosystem services. Sustainable use of natural resources and ecosystem services can create jobs, sustain livelihoods, and reduce poverty and inequalities. LAC countries must incorporate environmental goals into their labor market policies to maximize their potential to contribute to conservation and restoration of natural capital and biodiversity. Various types of labor market policies can be scaled up (or down) seasonally or if economic conditions and labor markets change (Dasgupta, 2021; ILO, 2018). However, this will also require new institutional and operational arrangements.

Labor Intermediation can help workers to find green job opportunities that protect the environment and biodiversity. One example of a promising intervention is the Swedish PES, which formed partnerships to match labor demand and supply in conservation and restoration sectors. The PES, the Farmers' National Association (LRF) and employers created Gröna Jobb, a web portal that shares labor market information and facilitates recruitment and mobility of workers in agriculture, forestry, gardening, and land use.¹⁹ The PES implemented the Green Jobs Initiative with the Swedish Forest Agency, the Geological Survey of Sweden, and the Swedish Environmental Protection Agency to promote nature-based jobs. The program has trained 680 unemployed workers in occupations with skills shortages such as nature conservation and forest management. During the COVID-19 pandemic, the program combined social and economic inclusion with nature conservation to help newly arrived migrants integrate and find work.²⁰

Training for upskilling or reskilling will be needed to prepare workers to jobs in conservation and restoration of natural capital and biodiversity. These programs usually combine in-class training and work experience, often targeting vulnerable groups like youth and the long term unemployed. In the U.S., the Maryland Conservation Corps offers two training programs on conservation and restoration of State Parks' public lands and waterways. The Conservation Job Corps targets youth and offers a six-week program, covering invasive species removal, trail

19. <https://www.gronajobb.se/jobb/>

20. [Green jobs for nature across the country - Government.se](#)

maintenance and construction, and reforestation.²¹ The Veterans Conservation Corps prepares post-9/11 U.S. Military Veterans for careers in conservation through training, hands-on experience, and certification for 52 weeks.²² In Australia, the National Green Job Corps trained long-term unemployed youth on bush regeneration, planting of native trees, wildlife and fish habitat protection, walking and nature track construction, and restoration for 26 weeks in close collaboration with private sector employers.²³

Employment subsidies can help incentivize employers in conservation and restoration of the environment to hire workers who may be struggling to enter the labor market, particularly for youth.

In Canada, the Youth Employment and Skills Strategy of Natural Resources Canada provides wage subsidies to employers to hire and mentor youth in natural resource sectors. The initiative Project Learning Tree Canada placed 3,500 youth in forest restoration and tree planting jobs between 2018 and 2021.^{24, 25} In Australia, the Job Subsidy Program provided 26 weeks of wage subsidies to employers on environmental protection and rehabilitation to help 10,000 youth from 17 to 24 years enter the workforce.²⁶

Entrepreneurship programs support innovative business opportunities involving the conservation and restoration of the environment and biodiversity.

In Colombia, the program Sustainable Metropolitan Entrepreneurship in the Aburrá Valley supports business development in several conservation areas including sustainable tourism, integrated waste management, biodiversity, and ecosystem services, and biocommerce. Support includes entrepreneurship workshops, pre-incubation, incubation, and acceleration of businesses. Since 2012, more than 4,600 individuals received entrepreneurship training, 138 businesses were developed, and 2,406 direct and indirect jobs were created through this program.

Unemployment protection can provide income support for workers who lose their jobs or incomes due to environmental laws, regulations, and policies like forest exploitation bans or fishing or hunting moratoriums (Sherekenbert et al., 2010).

Unemployment protection schemes also reduce poverty, vulnerability, and pressure to engage in asset-depleting strategies that directly degrade the environment by providing income security to unemployed workers and their families (ILO, 2018). For example, Brazil's "*Seguro Defeso – Pescador Artesanal*," unemployment insurance is provided to fishermen during the Paraguay River drainage basin's

21. <https://dnr.maryland.gov/publiclands/pages/cjc.aspx>

22. <https://www.thesca.org/serve/program/maryland-conservation-jobs-corps>

23. <https://www.oecd.org/els/emp/Chap%204%20Web%20Annex.pdf>

24. <https://pltcanada.org/en/>

25. <https://www.newswire.ca/news-releases/government-of-canada-s-youth-employment-and-skills-strategy-employs-youth-in-the-conservation-of-nature-and-forests-885304085.html>

26. The initiative was implemented on a temporary basis in 2010 as part of a broader green growth program, the Clean Sustainable Skills Package.

fish reproduction season. This promotes the sustainable use of natural resources. However, **in LAC, unemployment protection coverage is low due to high informality.** In this context, other compensation mechanisms can be used. Lessons from China show that cash transfers and consumptions subsidies for those without formal employment are one way to offset this issue. This was China's strategy after the Natural Forest Protection Program banned logging in natural forests, affecting informally employed forestry sector works who did not have access to social security benefits like retirement and unemployment insurance (Schaffitzel et al., 2020; ILO & ADF, 2019; Györi et al., 2021).

Temporary employment programs can go beyond income protection and help conservation and restoration of natural capital and biodiversity if the works performed have environmental objectives. These could be done through works in afforestation, reforestation, water, and soil conservation as well as anticipatory adaptation measures, through infrastructure work to improve irrigation and drainage systems (ILO, 2018). There are several examples of large temporary employment programs with environmental objectives, including Mexico City's program focused on ecosystem protection and recovery and cleaning of riverbeds and ravines; India's Mahatma Gandhi National Rural Employment Guarantee Act; and South Africa's Expanded Public Works Program, targeted protection of biodiversity, water, and natural-resource management. Additionally, temporary employment programs for carbon capture can have significant impact: in Ethiopia the Productive Safety Net Program promoted soil conservation and afforestation (Györi et al., 2021), capturing and reducing emissions by 3.4 million tons of CO₂ per year due to increased biomass and organic soil carbon, and reduced livestock greenhouse gas emissions (Woolf et al., 2015).

Lastly, labor market policies can promote conservation and restoration of natural capital and biodiversity by supporting firms. Targeted and temporary technical assistance, micro-credit or small grants, or subsidized employment to create green jobs for micro-and small businesses can complement skills development by targeting specific constraints faced by the low-skilled and poor. Micro-entrepreneurs can provide environmental services but need business skills training to create a sustainable business model. In Ecuador, the IDB and the *Agence Française de Développement (AFD)*, supported collaboration between the Ministry of Labor and the Ministry of Agriculture to develop technical assistance and a tailored training program to support small and medium businesses. The initiatives were used to help businesses include more sustainable practices in banana cultivation to counteract the negative environmental effects associated with certain cultivation practices. This training program began by identifying the need in the labor market for qualified labor and skills that include sustainable practices in banana cultivation. Thus, a 200-hour training course was designed (60 theoretical hours, 140 practical hours), in which 45 businesses owners were trained in person and virtually, of which 15 were female business owners. The training was composed of 3 modules: (i) planning and procedures; (ii) disease prevention and control; and (iii) harvest and post-harvest work. It included

a transversal module for the development of socio-emotional skills (Rigolini, 2021). Importantly, this training considered harvesting time as well as implementing a hybrid approach to reach out to beneficiaries in rural areas that are sometimes remote and lack connectivity.

Labor market policies and policies to mitigate the negative effects of decarbonization

Labor market policies can protect workers from negative effects of decarbonization. The transition towards low carbon and sustainable economies can create good quality jobs, lift people out of poverty, and reduce inequalities if the right set of measures are in place to ensure a transition that is just and inclusive. Decarbonization policies must include a good quality job creation dimension to be more just and socially acceptable. Environmental policies combined with well-designed subsidies, fiscal incentives, sector promotion, and labor market policies can improve labor market outcomes. State intervention is needed to help people to transition to a low carbon and sustainable economy. When designing labor market programs, each government must consider short-term measures, such as income protection, skills development, and labor intermediation, to address acute sector-specific issues, as well as medium- and long-term measures that affect labor offer, labor demand and income. Labor market policies could be effective to support the reallocation of displaced workers from GHG intensive jobs towards green jobs. To do so, the region will need to transform their labor market policies, increasing coverage, quality, integration, and coordination of labor market policies with the climate change agenda.

Labor intermediation services can help the green transition by supporting the allocation of workers, particularly those displaced by the closure of carbon intensive industries, towards emerging or growing green sectors. First, these services must offer accurate and timely information on green jobs. Second, they must form alliances and serve as training brokers by helping employers and training centers to identify short and effective reskilling modules. Third, and perhaps most importantly, PES can help vulnerable groups, who often lack the skills in high demand in green sectors, to enter the labor market (Duell et al., 2021).²⁷ In Ecuador, the IDB supported the PES strategy to promote green jobs with a gender focus based on three pillars: i) the dissemination of information on green jobs through events and a web portal with job and training opportunities in green sectors; ii) an engagement strategy to encourage employers and training centers to identify short and effective retraining modules; iii) implementing strate-

²⁷ Other PES have focus on specific green sectors. The Federal Employment Agency promotes jobs in e-mobility, environmental engineering, and renewable energy to the people in Germany and abroad. The PES also offer outreach programs for 14-year-olds to close the information gap in green sectors with skills shortages well as specialized services to reallocate workers displaced during the green transition.

gies to place young people, women, migrants, and ethnic minorities in good quality green jobs. Ecuador's PES is the first in the region with a specialized service offer to connect employers and job seekers from the green economy, including a [web portal](#) to share information on vacancies and training offers in energy, construction, transport, water, and waste management, agriculture, and forestry.²⁸

Training programs can help displaced workers transition to green jobs and give firms the human capital they need to be more productive and competitive during the green transition. Most training programs focus on one or two specific green sectors, typically those sectors that have the greatest potential to create green jobs or that are key to decarbonization. Large-scale, permanent training programs, funded by general or pay-roll taxes are usually part of decarbonization strategies in developed countries, like Austria, Australia, Belgium, France, Germany and the U.S. However, low- and middle-income countries often have pilot programs or training programs funded by international donors to address specific circumstances, raising concerns about their long-term sustainability. This is the case in Argentina, Fiji, and Thailand. To support the green transition, some countries are strengthening their technical and vocational education and training (TVET) systems. In LAC, the IDB is supporting Uruguay to develop a TVET program based on the collaboration of training organizations and the private sector to develop human capital associated with transport electrification and the use and management of batteries. Innovative elements include micro certifications and hybrid training methods that combine online self-paced distance learning with presential learning.

Employment subsidies can also incentivize the hiring of groups experiencing difficulties in the labor market during the transition to a decarbonized economy. Older workers are often overrepresented in polluting industries, making placement and reskilling policies more challenging (OECD, 2017). In Singapore, the strategy for developing the environmental services sector includes a program to hire older workers. The Senior Worker Early Adopter Grant initiative and Part-Time Re-Employment Grant Employers provide funding for employers if they hire eligible older workers or if they raise their internal retirement and re-employment ages above minimum statutory requirements (Government of Singapore, 2022). Evidence for firms in other sectors shows that receiving subsidies translates into higher levels of employment (Koski & Pajarinen, 2013).

Entrepreneurship programs can be used to enable workers with entrepreneurial potential to create sustainable business ideas that solve local and global environmental challenges. Some programs target specific sectors. The Green Construction Entrepreneurship program in Zambia responds to the country's growing housing demand. This program prepares local

28. France and Malaysia also have web portals dedicated to green jobs.

entrepreneurs for green construction and green building for both goods and services sectors. They receive targeted business development services and enhanced framework conditions for improved productivity (ILO, 2014). Other programs are multi-sector and target specific populations. The Indonesian Green Entrepreneurship Program targets youth in creative industry, renewable energy, tourism, waste management, food, and agriculture.²⁹ The Youth Entrepreneurship Facility trained 19,000 youth in green entrepreneurship in Kenya, Uganda, and Tanzania. The program included several approaches, such as a green business plan competition, green entrepreneurship education in school, green grant competition, and green business mentoring course.

Unemployment protection will also be key while LAC countries undergo a structural transformation in the context of the green transition and must be used in combination with the active policies described above.

There are four mechanisms to protect workers' income during periods of unemployment: (i) severance pay; (ii) individual unemployment savings accounts; (iii) unemployment insurance; and (iv) temporary employment programs, including traditional public works programs as well as a new generation of public employment schemes and employment guarantees (IDB, 2021; Rigolini, 2021; ILO, 2018). However, in LAC, only 1 out of every 3 workers benefits from some sort of unemployment protection scheme. Informal workers often lack unemployment protection and will need alternative strategies for income support such as temporary employment programs. As discussed before, this type of arrangement has been incipient or lacking in LAC countries. An example that could be replicated is that of Spain, which developed a comprehensive unemployment protection package in collaboration with affected workers. The country developed a Just Transition Strategy that outlines a structured, participatory process to protect coal miners and power plant workers, supporting employment in areas at risk from the phase-out of coal, with specific implementation timelines. This plan considers early retirement schemes for elder workers, severance payment for younger workers, local re-employment in environmental restoration work and reskilling programs for green industries. Through investments of 250 million of euros, the Just Transition Strategy will cover over 1,500 current jobs, giving miners over the age of 48 or with 25 years' service (about 60% of miners) early retirement, and a 10,000 euro redundancy payment for younger workers.

29. https://www.ilo.org/asia/projects/WCMS_375160/lang--en/index.htm#:~:text=IGEP%20is%20a%20set%20of,in%20Indonesia%20through%20green%20entrepreneurship.

ENVIRONMENTAL TAXES AND THE DOUBLE DIVIDEND

Policies to mitigate against the impacts of climate change, especially environmental taxes, can generate significant tax revenues that can be redirected towards labor market initiatives. Cushioning or compensating for any adverse impacts of green growth policies on the distribution of income is important for their political acceptability. There is a possibility of improving both environmental and economic conditions by imposing an environmental tax and recycling revenues obtained to reduce other pre-existing and distortionary taxes, including labor taxes, and alleviate the negative impact of carbon pricing on workers (Sartzetakis and Tsigaris, 2007; Goulder, 2013; Freire-Gonzalez, 2018). Thus, environmental taxes can help to reduce unemployment, increase aggregate labor supply, and improve the allocation of labor across sectors.

The double dividend (DD) hypothesis of environmental tax reforms (ETR) considers the possibility that existing tax regimes and environmental policies are not optimal and could be improved. The argument for the efficiency of the DD of environmental taxation assumes that under this system, it would be possible to reduce pollution through the taxation of the polluter while generating environmental welfare. Revenue generated through environmental taxation would enable the government to make a more efficient tax system by reducing other distortionary taxes, such as income tax, consumer tax, and labor tax, producing the secondary benefit of higher economic welfare. This second dividend can manifest in the form of growth in the gross domestic product (GDP), an increase in employment, fiscal benefits, and an overall improvement in economic welfare (Pearce, 1991).

Employment double dividend (EDD) driven revenue-neutral environmental tax reforms can effectively solve two problems: (i) improve the environment by putting a cost on pollution; and (ii) curtail payroll and other distortionary taxes that impact employment (Pearce, 1991, Repetto et al., 1992, Oates, 1993). To create EDDs, it is important to ensure that a balance is maintained between the economic losses of ETR, and the welfare created by revenue recycling (Patuelli et al., 2005). The conditions in the labor market also play an important role, such as the extent of an informal labor market (that is not taxed) alongside the formal labor market that is taxed, the degree to which labor with different levels of skill can be substituted for each other, the substitutability between energy and different kinds of labor, and the extent to which supply of labor rises under collective bargaining in each group as the real wage increases.

III. RESHAPING LABOR MARKET POLICIES TO RESPOND TO THE CHALLENGES AND OPPORTUNITIES OF THE TRANSITION TO A MORE SUSTAINABLE REGION

The labor market policies discussed in the previous section are a key element to support LAC in achieving its climate goals. Despite the importance of connecting labor market policies to the climate change agenda, these two policy domains remain disconnected. Countries set the strategies that guide their adaptation and mitigation goals in their Nationally Determined Contributions (NDCs) and Long-Term Strategies (LTS). NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change by defining how to reach the targets and establishing systems to monitor progress. LTS are tools to evaluate and demonstrate the socio-economic benefits of measures implemented to mitigate climate change. However, **both NDCs and LTS in LAC have limited reference to the role of labor market policies when facing climate change challenges and supporting workers and firms in their adaptation, restoration, and mitigation efforts.** For example, three countries in the region have no skills development in their NDCs and fifteen countries include only generic mentions to it, without specifying sectors, actions, or timeframes for skills development. Even the ten countries that make more specific mentions, by identifying individual sectors or specific actions, have no information supporting the type of skills gaps they are facing, the size of these gaps and the actions that must be taken to close them.

At the same time, the region's labor market policies lack strategies, policies, financing, governance mechanisms and the operational tools necessary to articulate actions that align labor market conditions with the climate agenda. In this section, we propose various options to adapt labor market policies and move towards greater integration between the labor market agenda and the response to climate-change. Below, for each of the three areas analyzed, we propose several recommendations to strengthen labor market policies' strategic and operational dimensions and align them with the region's climate goals in terms of: i) financing; ii) governance; iii) instruments and programs; iv) operational mechanisms (Table 2).

Building stronger labor market policies in the face of rising temperatures, increased extreme weather events and pollution

Financing: countries must allocate an adequate budget to regular labor market policies and create new financing mechanisms to make labor policies available during climate shocks and disasters. This may involve exploring ways to increase domestic revenue collection to reach the budget level needed to maintain regular labor market program coverage. To this end, reforming environmental taxes is one option: recycling environmental tax revenues to reduce labor costs could offset the financial burden of environmental policies by the benefits accrued in the labor market. Another option is to improve the spending efficiency (reduce costs) of labor market policies. Emergency contingency funds will also be needed to respond to climate shocks and disasters. More frequent and intense crises and the deterioration of labor markets and working conditions induced by climate change will increase the need for labor market policies. These new demands will require additional financing in a resource-constrained environment, and it will be imperative for countries to forecast the costs of labor market policies based on projected climate profiles.

Governance: LAC countries must create mechanisms for ongoing coordination with national disaster organizations to develop regulatory frameworks, processes, and procedures to enable planned and orderly responses to shocks and disasters. These organizations have expertise in disaster preparedness, response, and recovery and can help ministries of labor to ensure that labor market policies consider potential impacts of climate-related disasters and support affected workers and communities. Good governance with clear mechanisms for articulation and coordination with risk and disaster management and humanitarian aid actors involved in shock response interventions can lead to more timely, effective, and efficient efforts to address the challenges posed by climate change. **It is also important to integrate information and tools on labor markets on post disaster assessment frameworks.** While many post-disaster needs assessment frameworks include estimates of GDP losses caused by climate crises, evidence of labor market effects is less common. Displacement of workers, migration to seek better living conditions and loss of life can reduce labor supply. LAC countries cannot assess the effects of these indicators on national and regional disaster preparedness and climate adaptation strategies without tangible metrics.

Instruments and programs: LAC countries must also invest in instruments and programs that help to strengthen labor markets' responses to climate shocks as well as improving existing policy and institutional frameworks. Coverage of labor market policies needs to be extensive enough to serve people affected by climate shocks. Considering the particular nature of climate-related emergencies, countries need to adapt and strengthen existing labor market policy tools by defining ex-ante the rules and criteria that trigger emergency services for public

employment services, temporary employment programs, unemployment insurance, severance, job sharing arrangements, short term businesses grants, temporary tax credits/exemptions and moratorium on social security payments. Timely and effective shock response requires defining ex-ante beneficiary groups, the types of support, their intensity and duration and conditions for program's suspension. **It is also strategic to assess the effectiveness of shock-responsive labor market policy investments.** This is essential for evidence-based decision-making as currently there is a knowledge gap regarding how climate emergencies affect employment in LAC as well as on the effectiveness of labor market policies that support the recovery after such events. The region requires more research on the ability of its labor markets to resist, withstand or quickly recover from climate shocks. Generating evidence will help influence policy decision-making and support the design of labor market programs that are more responsive to climate shocks (ILO, 2021).

Governments also have a key role in creating instruments and programs the incentivize workplaces to become more adaptable to rising temperatures and pollution levels. Employers' and workers' organizations will play a critical role in the effective execution of adaptation strategies, but governments can support them through institutional and legal frameworks that encourage changes in workplace behavior. International labor standards, like the Occupational Safety and Health Convention, 1981 (No. 155), can be used as a reference when developing national legislation to address the risks to occupational safety and health posed by heat stress and pollution. In addition to enforcing occupational safety and health regulations, additional steps need to be taken to guarantee that social protection is available and to enhance early warning systems in the case of extreme heat events (ILO,2019).

Operating mechanisms: for the instruments and programs mentioned above to work effectively, operating mechanisms need to be strengthened and adapted, including social-information systems, targeting mechanisms and payment-transfer mechanisms. Given the nature of climate shocks, it is essential to expand the coverage of registries beyond the traditional beneficiary groups of social security programs (formal workers) and cash transfer programs (e.g. conditional cash transfers, non-contributive pensions) who are easy to identify. Informal workers, the self-employed and the unemployed (without income) need to be included but represent a challenge as they are not included in traditional coverage registries. To that end, programs will need to develop innovative mechanisms to actively search for beneficiaries, especially within the economically active population working in the informal sector. One strategy is to cross-reference different administrative databases (e.g. tax revenue data, social security data and public services payment data), social networks as well as platforms of the "gig" economy. The information from these platforms would enable transfers to groups that are usually excluded like migrant workers (e.g. a high proportion of delivery workers from Rappi and Glovo in the region are migrants). This could be implemented very quickly, as all workers in these platforms are financially included and the platforms have consolidated databases. It is also important to integrate the information of labor and social security registries with social registries and other informa-

tion sources related to the geographical exposure to natural threats and providing ongoing updates. Finally, to guarantee prompt delivery of support in emergency contexts, the coverage and flexibility of mechanisms for payment of subsidies and income support must be expanded with the possible combination of digital and in-person payments.

Building stronger labor market policies in advancing the conservation and restoration of natural capital and biodiversity

Financing: countries must articulate it with existing climate funds at the international and national levels for conservation and restoration of natural capital and biodiversity.

Several international organizations and countries have developed funds to this end, for example the Global Environmental Facility and the International Climate Initiative. Tapping into these resources could enable LAC governments to design and implement pilots of labor market policies that contribute to conservation and restoration. Additionally, if environmental goals are included in existing temporary employment programs, employment subsidies, or on-the-job training, these programs could directly contribute to the country's conservation and restoration goals. It is important to ensure sustainability of these programs through the actions detailed in the previous section.

Governance: strengthen coordination between ministries of labor and agencies in charge of labor market policies and relevant sectoral agencies in charge of environmental conservation and restoration.

Labor market policies can be more clearly integrated into national and local conservation and restoration plans and require closer collaboration across environmental, natural resource and agriculture sectors to ensure technically and operationally sound design, implementation, and evaluation. Collaboration with actors in water, environment, forestry, agriculture, and rural development is essential to identify synergies and avoid duplication or isolated actions. The Green Jobs Coordination Committee in Ecuador is an example of this type of effort to promote a multi-sectorial and integral approach and facilitate the integration of labor markets and environmental objectives. This committee includes the Ministry of Labor; Ministry of Environment and Ecological Transition; Ministry of Agriculture; Ministry of Production; the Secretariat of Higher Education, Science, Technology, and Innovation, as well as representatives of the private sector and civil society.

Instruments and programs: countries must implement pilot programs and evaluate interventions that combine labor and environmental objectives.

These approaches, whether in the form of labor intermediation, training, employment subsidies, entrepreneurship, temporary employment programs or unemployment protection can be difficult to design and implement, given the multiple objectives and relatively high technical complexity, so careful consideration of the desired objectives is required when designing the programs. Given the limited experi-

ences in the region, robust evidence is needed to better inform key design issues, such as clear identification of labor market failures, targeting and selection of beneficiaries, prioritization of environmental assets, gender and diversity considerations, and the sustainability of program objectives. Rigorously evaluated pilot interventions can be an appropriate strategy to close knowledge gaps and build the technical capacities needed to implement these programs.

Operating mechanisms: it is necessary to develop and test new operating mechanisms to make it possible to scale up (or down) labor market policies seasonally or as economic conditions and labor markets change. On the one hand, it is important to improve information systems for identification and delivery of support to informal workers and the self-employed, as they constitute most workers in jobs that directly depend on the environment, by cross-referencing different administrative data bases (e.g. tax revenue, social security, and public utilities payment data). On the other hand, it is key to design mechanisms to identify geographical areas at risk of degradation or biodiversity loss to better target actions, their seasonality and to identify and select workers in these areas. These tasks are often complex, challenging, and require spatial data and analysis. This involves leveraging advanced technologies like remote sensing, GIS, and satellite imagery to map ecosystems and monitor biodiversity. Data from diverse sources should be integrated, standardized, and made readily accessible to ensure comprehensive coverage.

Building stronger labor market policies in support of decarbonization processes and facilitating a just transition to net-zero

Financing: compensation for the impacts of decarbonization policies can be financed with the savings generated by reforms, in particular through environmental tax reform. This approach involves recycling revenues from environmental taxes to reduce labor costs, thereby ensuring that the financial burden of environmental policies is offset by the benefits accrued to the labor market. This not only promotes sustainability but also helps create a more balanced and equitable economic environment.

Governance: it is important to develop governance mechanisms to coordinate environmental, economic, and employment goals for design and implementation of labor market policies to ensure a [just transition](#). To ensure labor market policy effectiveness and integrate various public agendas, public institutions, social partners, and the private sector must be included within these institutions and in the development of decision-making mechanisms. For example, participation of employers and workers' organizations is crucial in effectively identifying necessary skills and training provisions. Employers can enhance the efficiency of skills development policies by identifying trends in required competencies while workers' organizations ensure equitable access for workers of different backgrounds.

Instruments and programs: labor market policies should be positioned as an effective tool for the just transition.

Negative impacts of decarbonization policies will affect the economic well-being of an important part of the population in LAC. The lack of access to quality jobs affects society as a whole as it prevents the reduction of poverty and inequality, decreases labor productivity, jeopardizes social cohesion and, ultimately, hampers climate change goals. Mitigating the risks of job losses, to which so many citizens in LAC could be exposed during the green transition, cannot be done without government intervention. Labor market policies can play the role of automatic stabilizers of demand and mitigate against negative impacts of economic transformations. In addition, they increase labor productivity because people can devote time to finding a job that matches their qualifications. The development of labor market interventions in response to decarbonization is quite recent, and it is necessary to evaluate existing initiatives, share best practices, identify gaps, and further develop and evaluate innovative approaches.

Operating mechanisms: LAC countries need access to the information and mechanisms required to deliver labor market policies that enable a just transition. It will be fundamental to develop and strengthen green labor market information systems to guide workers and employers navigating the green transition.

People joining the workforce will need training to be able to work in green occupations. A just transition will require also supporting adversely affected workers to move towards occupations in increasing demand through upskilling and re-skilling, furthering life-long learning. Planning up-skilling and re-skilling and learning pathways requires understanding of which occupations will be positively and negatively impacted and where workers can transition. Proactively anticipating changing requirements in occupations and skills at the national and regional levels will require a comprehensive approach to skills governance, including labor force surveys, skill surveys, administrative data, and data from job postings (Cedefop, 2022).

At the same time, information systems for identification and delivery of support to affected individuals must be expanded and strengthened.

As with conservation, many people affected by decarbonization measures are not necessarily part of the group generally targeted by the contributory social security and non-contributory social protection systems. Just as with responses to shocks, implementation of labor market policies also requires expanding coverage of social information systems and payment mechanisms to informal workers, self-employed and the unemployed (without income), who are not easy to identify. Processes for beneficiary selection and identification, which were first developed to target interventions for formal workers, should also be modified to identify workers vulnerable to restructuring processes brought about by decarbonization policies. Finally, to ensure that support is available during the green transition, the methods for income support and subsidy payments must be expanded using the most effective mix of in-person and digital payments.

TABLE 2: SUMMARY OF THE KEY POLICY OPTIONS

	Stronger labor market policies in the face of rising temperatures, extreme weather events, and pollution	Stronger labor market policies in the face of degradation of natural capital and loss of biodiversity	Stronger labor market policies in support of decarbonization policies
Financing	Develop quick and actionable contingency funds for labor market policies in the event of emergencies.	Finance innovative labor market interventions through existing international and national climate funds supporting conservation and restoration of natural capital.	Finance compensation measures through environmental tax reform and recycling revenues to reduce labor costs.
Governance	Create governance mechanisms with organizations with expertise in disaster preparedness, response, and recovery to develop frameworks and processes that enable planned and orderly use of labor market policies in response to shocks and disasters.	Enhance governance mechanisms to promote coordination between ministries of labor, employment agencies, and environmental agencies to integrate conservation and restoration plans with labor market policies.	Establish governance mechanisms with public institutions, social partners and private sector to coordinate decarbonization, economic, and employment goals as well as various public agendas in labor market policy design and implementation ensure just transition.
Instruments and programs	<p>Integrate information and tools on labor markets on post-disaster assessment frameworks.</p> <p>Invest in adapting and strengthening labor market policies and improving institutional frameworks that can be used to respond to climate shocks.</p> <p>Assess the effectiveness of shock-responsive labor market policy investments.</p>	<p>Pilot and evaluate interventions that combine labor and environmental objectives.</p> <p>Develop skills training programs for sustainable resource management.</p>	Labor market policies are crucial in addressing decarbonization challenges. This involves broadening coverage, utilizing both passive and active policies, creating analytical tools for informed decision-making, conducting ex-post evaluations, and assessing the impact of investments in labor market policies.
Operational mechanisms	Strengthen and adapt operating mechanisms to respond to climate emergencies, including social-information systems and payment-transfer systems, broaden the coverage of beneficiary registries, incorporating informal workers and unemployed. Implement innovative strategies and utilize social networks for rapid and inclusive delivery of support in climate emergencies.	<p>Strengthen labor market information systems to identify and promote job opportunities that prioritize natural capital and biodiversity conservation.</p> <p>Develop new operating mechanisms to scale up labor market policies seasonally and with the flexibility required to adapt to changing economical and labor market conditions.</p>	<p>Strengthen labor market information systems to guide workers and employers navigating the green transition.</p> <p>Ensure that support is available during the green transition, the methods for income support and subsidy payments must be expanded using the most effective mix of face-to-face and digital payments.</p>

ANNEX 1. AVAILABLE LABOR POLICY OPTIONS: WHAT TYPE OF LABOR MARKET POLICY INSTRUMENTS CAN BE IMPLEMENTED?

Climate change and mitigation policies for climate change will have social and economic impacts that will not be socially beneficial unless accompanied by labor market policy instruments. Labor market policies comprise a range of policies that influence labor demand and supply and the interaction between the two. Below we discuss some of the most promising instruments.

1. Active labor market policies

- **Labor Intermediation:** Specialized labor intermediation services to support the reallocation of labor towards emerging or growing green sectors. Public Employment Services (PES) can offer accurate and timely information on green jobs (through events or web portals with job and training opportunities). They can also form alliances and serve as training brokers, for example by facilitating collaboration between employers and training centers to identify short and effective reskilling modules. The most important role of the PES, however, is to promote the insertion of women, ethnic groups, youth, migrants, and other vulnerable groups who often do not have the necessary skills to access quality jobs. For this, it is key to have services adapted to the needs of the different groups and, in specific cases, labor insertion subsidies for companies to hire vulnerable people. In the early stages of natural disasters or a crisis period, PES can play a key role in maintaining employment levels by managing unemployment insurance and/or social assistance programs for vulnerable people affected. PES help in the crisis response by alleviating the income loss through receiving, processing and paying benefits and transfers. Timely information is even more important in a crisis period, during which PES can provide information on: (i) alternatives for flexible work arrangements (e.g., promotion of telework; use of alternative work schedules to manage crowds on public transportation); (ii) transfers available during the crisis period; (iii) labor rights; (iv) consolidated statistics on employment, unemployment, benefit applications, dismissals, etc. PES can also carry out placement activities in professions that are the subject of strong mobili-

zation in the management of the crisis. However, measures aimed at facilitating formal labor recruitment tend to be ineffective immediately following the crisis. In stages of economic recovery, subsidy programs (temporary public or private employment) as well as job training and labor certification programs can be managed.

- **Training:** The transition to a green economy entails changes in production systems and processes by the adoption of low carbon and sustainable technologies. The adoption of new technologies will have important implications for the skills demanded by firms. Hence, anticipating and monitoring the skills needed, but also providing the right set of skills is fundamental to enable the green transition and ensure firms have the necessary human capital to be more productive and competitive as well as to support people to take advantage of the jobs in growing sectors. Skills mismatches could aggravate the negative impacts that climate change mitigation strategies could have on labor markets. Skills development programs should target groups such as women, adult workers, individuals with disabilities, and Indigenous. While important efforts to integrate economic growth and green transition have been made in key green sectors, all sectors have greening potential. Therefore, skills development should also entail introducing “core skills”, which are non-vocational and non-technical competencies that promote “environmental awareness and willingness to learn about sustainable development”. The target population is composed of dependent workers or people with or without formal work experience, with low levels of qualification, or vulnerable.
- **Employment subsidies:** A successful transition towards green growth can create new opportunities for workers if the associated challenges are managed well regarding the jobs that will be destroyed in the sectors with high environmental footprints. Employment subsidies can help those groups experiencing difficulties in the green labor market to increase their employment/income by offering employers in green sectors an incentive to hire them for a period. Although employment subsidies could include measures to protect jobs, like work share schemes, interventions that promote hiring in the green sector, such as social security subsidies and one-off payments for hiring long-term unemployed workers are more relevant for the transition to the green economy. Funding is at least partly provided via the government, whereas hiring and firing decisions remain in the hands of employers. The longer the possible duration, the more likely the subsidy will succeed in affecting employers' hiring decisions in favor of the targeted group, and the less is the risk of firms laying off workers to replace them with new (subsidized) hires, because the workers will improve their skills sufficiently to make them fully productive tends to increase over time. Subsidies can be paid either as a direct transfer to employers or through the tax system as a Reduction of tax or social security contribution obligations. Any employment subsidy program requires a specification of what workers do, and with what employers are eligible for subsidization. These choices are typically guided by value judgments about who deserves public support and concerns.

- **Entrepreneurship programs:** As LAC countries shift towards low carbon and sustainable economies, emerging green markets present new opportunities for entrepreneurs to launch businesses in green sectors and offer a potential solution for access to employment while also advancing green economic growth. Entrepreneurship programs aim to enable potential entrepreneurs to develop sustainable business ideas and therefore promote the creation of green jobs while defining practical business solutions to environmental challenges brought by climate change. These programs usually consist of facilitating access to employment through a combination of entrepreneurship training and credit, including microcredit, focusing primarily on micro and small-scale green business development. Green entrepreneurship can be defined from two perspectives related to the output (products and services) as well as its economic activity. Entrepreneurs can provide green and environmentally friendly products and services, or they can provide their products or services through environmentally friendly processes or technologies. By integrating social, environmental, and economic impacts around the core value proposition of the enterprise, green entrepreneurs can create a shift in peoples' mindsets towards greener thinking and increased demand for green products and services, boosting the dual effect of employment and environmental gains.

2. Passive labor market policies

- **Individual unemployment savings accounts:** The individual accounts system consists of each worker saving a portion of his or her salary income in savings accounts earmarked for unemployment benefits. If the individual loses his/her job, he/she uses this fund until it is exhausted and stops using it if the individual finds a job. This mechanism makes it possible to reduce the moral hazard that workers have during the self-funding stage (Feldstein y Altman, 2007).
- **Severance pays:** Compensation provided by employers to laid-off workers who generally have been working for more than a year (Holzmann & Vodopivec, 2011).
- **Unemployment insurance:** A policy designed to provide income to unemployed people on the condition that they are seeking employment or participating in an active labor policy developed by the state. This type of policy has certain characteristics such as eligibility (only a group of workers are eligible to receive this type of benefit), the duration of the benefit (generally the term is no longer than two years) and the rigorousness of the job search (in many cases there are penalties if a job is denied). In periods of natural disasters or emergencies, countries can increase their coverage and the duration of the subsidy. This measure can be complemented by other measures such as labor intermediation and job training. As with temporary employment, these programs need to be already in operation to be effective.
- **Temporary Employment Programs:** Temporary employment programs can also provide income support for the unemployed, particularly the most vulnerable, during the green

transition. They include traditional public works programs as well as a new generation of public employment schemes and employment guarantees. The concept of temporary employment programs covers any government program that directly creates employment without expanding the regular civil service. Temporary employment programs target multiple objectives simultaneously, which makes them attractive policy tools. These programs are usually aimed at: (i) employment creation and income security; (ii) poverty reduction; and (iii) the provision of public and/or social goods and services, such as infrastructure or environmental assets. Many of these environmental programs, often described as Green Works, are also contributing to building more climate-resilient adaptive infrastructure contributing to disaster risk reduction. Most of these programs, particularly in low- and middle-income countries, have focused on the most vulnerable groups. Temporary employment programs are social protection tools with the objectives of providing temporary employment and investing in labor-intensive infrastructure in support of the provision of social services. At the same time, they are extending social protection schemes in countries where there is insufficient or inexistent social protection coverage. As measures to respond to natural disaster or emergency, as with unemployment insurance, these programs must already be in operation to be effective and cost efficient and must not target complex projects as they take time to start.

ANNEX 2.

WHAT ARE GREEN JOBS AND GREEN SKILLS AND HOW TO MEASURE THEM?

Green jobs are defined as jobs that contribute directly to environmental sustainability, either by producing environmental goods or by making more efficient use of natural resources. There is a lack of consensus on the definition of green jobs at the global level. Most definitions used today in academic literature and public policy define green jobs in terms of output and process, industry and effect of greening (Bowen, 2018). Below are some definitions used to describe green jobs.

HOW TO MEASURE GREEN JOBS?

The most traditional method for measuring green jobs is primarily descriptive and based on calculating indicators, such as the number of green jobs, and exploring their distribution by geographic areas, economic sector, etc. The number of green jobs is often used as an input for the creation of relative indicators such as the proportion of green jobs to the total employed population or the proportion of green jobs to the formal employed population (Parrilla, 2022). An example of this is the green employment indicator of the Green Production Indicator System developed by the Economic Commission for Latin America and the Caribbean (ECLAC). The IPV46 indicator called “proportion of green jobs” measures the proportion of jobs that perform tasks related to resource management or environmental protection, following the definition provided by the ILO. Parrilla (2022) reports the existence of other indicators for measuring green employment, such as the growth rate of green jobs, proportion of green jobs in the environmental sector, hours worked in the environmental sector, among others.

Alternatively, authors such as Valero et al. (2021) and Parrilla (2022) identify two large groups of methodologies for measuring green employment. The first is called the sectoral or “top-down” approach and the second is known as the occupational or “bottom-up” approach. The sectoral or “top-down” approach considers the analysis at the aggregate level of industries. This approach identifies “green” subsectors in which “green” employment is potentially found. Under this approach, industries that are driving the transition to a green economy are known as the environmental goods and services sector (EGSS), including industries related to the use of renewable energy, waste management, among others.

Under the “bottom-up” view there are two approaches, one related to the type of organization where employment is generated (Organization level) and the other linked to the occupational level (Occupation level). In the case of the organization level approach, green employment is identified as part of the productive scheme of a firm whose purpose is the production and provision of green goods or services. On the other hand, the occupational-level approach takes into consideration the “green” skills and tasks that an occupation can perform. The classification of skills and tasks is based on the O*NET system developed by the U.S. Department of Labor, specifically the “Green Task Development Project” developed in 2010.

An important challenge to this approach of counting the number of green jobs is that it is focused on just one aspect of the transition to low carbon and sustainable economies, the production of goods and services of environmental sectors. The definition of environmental goods and services do not consider expansion of employment in industries that knowledge intensive, key for the green growth in the long run, but there are more neutral, neither green nor brown, in the restrictive sense of the definition. Disadvantaged groups also have problems accessing jobs in these ‘neutral’ sectors already (Bowen, 2021).

MAIN APPROACHES TO DEFINING GREEN JOBS

Approach	Criteria	Examples
Output and process (US Bureau of Labor Statistics)	‘Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources’, and ‘workers’ duties involve making their establishment’s production processes more environmentally friendly or use fewer natural resources’ (Bureau of Labor Statistics, 2013).	Workers in a factory that produces solar panels, workers in a retail shop that uses solar panels.
Industry (Eurostat)	Products and services that are directly related to natural resource protection and conservation (Eurostat, 2009).	Workers in a factory that produces solar panels, but not workers in the retail shop that uses solar panels.
Effect of greening (O*NET)	Any occupation affected by greening, whether via increased demand, changes in work or worker requirements, or the creation of unique worker requirements (National Center for O*NET Development, 2015).	Workers in a factory that produces solar panels, workers in a retail shop that uses solar panels.
Preservation and conservation (ILO)	Jobs that contribute to preserving or restoring the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency. Green jobs help to improve efficiency in the use of energy and raw materials, limit greenhouse gas emissions, minimize waste and pollution, protect, and restore ecosystems, and support adaptation to the effects of climate change.	Workers in a factory that produces solar panels, but not workers in the retail shop that uses solar panels.

Source: Own elaboration based on Bowen at al. (2018)

MAIN APPROACHES TO DEFINING GREEN SKILLS

Approach	Definition
CEDEFOP	The knowledge, abilities, values, and attitudes needed to live in, develop and support a sustainable and resource-efficient society. (CEDEFOP, 2012)
OECD	Skills needed in a low-carbon economy will be required in all sectors and at all levels, in the workforce, as emerging economic activities create new (or renewed) occupations. (OECD, 2014)
ILO	Skills that are necessary for the successful performance of tasks for green jobs (see the definition above) and to make any job greener. That includes both core and technical skills and covers all types of occupations that contribute to the process of greening products, services, and processes, not only in environmental activities but also in brown sectors. (ILO, 2015b)
O*NET	It does not include a definition of green skills per se but uses the approach of “greening” of occupations (i.e., occupation refers to a group of jobs, found at more than one establishment, in which a common set of tasks are performed or are related in terms of similar objectives, methodologies, materials, products, worker actions, or worker characteristics) to refer to the extent to which green economy activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed for occupational performance, or generate unique work and worker requirements.

Source: Own elaboration.

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