

Employment in the Circular Economy

*Leveraging circularity to
create decent work*

December 2025

In collaboration with



International
Labour
Organization



WORLD BANK GROUP

THE WORLD BANK IFC International
IBRD - IDA Finance Corporation



PAGE

Behind the cover

A carpenter constructs pallets from discarded wood in a recycling facility, illustrating the practical skills and value creation at the heart of the circular economy.



Circle Economy is driving the transition to a new economy. In this economy we help businesses, cities and nations leverage business opportunities, reduce costs, create jobs and inspire behavioural change. As a global impact organisation, our international team equips business leaders and policymakers with the insights, strategies, and tools to turn circular ambition into action.

Circle Economy has been at the forefront of the circular economy transition since 2012. Our annual Circularity Gap Report sets the standard for measuring progress and we manage the world's largest circularity database, encompassing data from over 90 nations, 350 cities, and 1,000 businesses.



The World Bank Group works to create a world free of poverty on a livable planet through a combination of financing, knowledge, and expertise. It consists of the World Bank, including the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA); the International Finance Corporation (IFC); the Multilateral Investment Guarantee Agency (MIGA); and the International Centre for Settlement of Investment Disputes (ICSID). For more information, please visit www.worldbank.org, ida.worldbank.org/en/home, www.miga.org, www.ifc.org, and www.icsid.worldbank.org.



The International Labour Organization is the United Nations agency for the world of work. It was founded on the conviction that universal and lasting peace can be established only if it is based on social justice. The ILO brings together governments, employers and workers of 187 Member States to set labour standards, develop policies and devise programmes promoting decent and productive work in conditions of freedom, equity, security and human dignity.

The unique tripartite structure of the ILO gives an equal voice to workers, employers and governments to ensure that the views of the social partners are closely reflected in labour standards and in shaping policies and programmes.



The Partnership for Action on Green Economy is a joint initiative of five UN agencies – UN Environment Programme, International Labour Organization, UN Industrial Development Organization, UN Development Programme and UN Institute of Training and Research - that supports countries in advancing inclusive green economy transitions aligned with the 2030 Agenda for Sustainable Development.

Since 2013, PAGE has worked with partner governments and institutions to reframe economic policies and practices around sustainability, aiming to promote growth, create jobs, reduce poverty and inequality, and strengthen ecological resilience. PAGE has its entry points at the level of macroeconomic policy such as industrial, trade, labour and fiscal policies, and subsidy reforms.

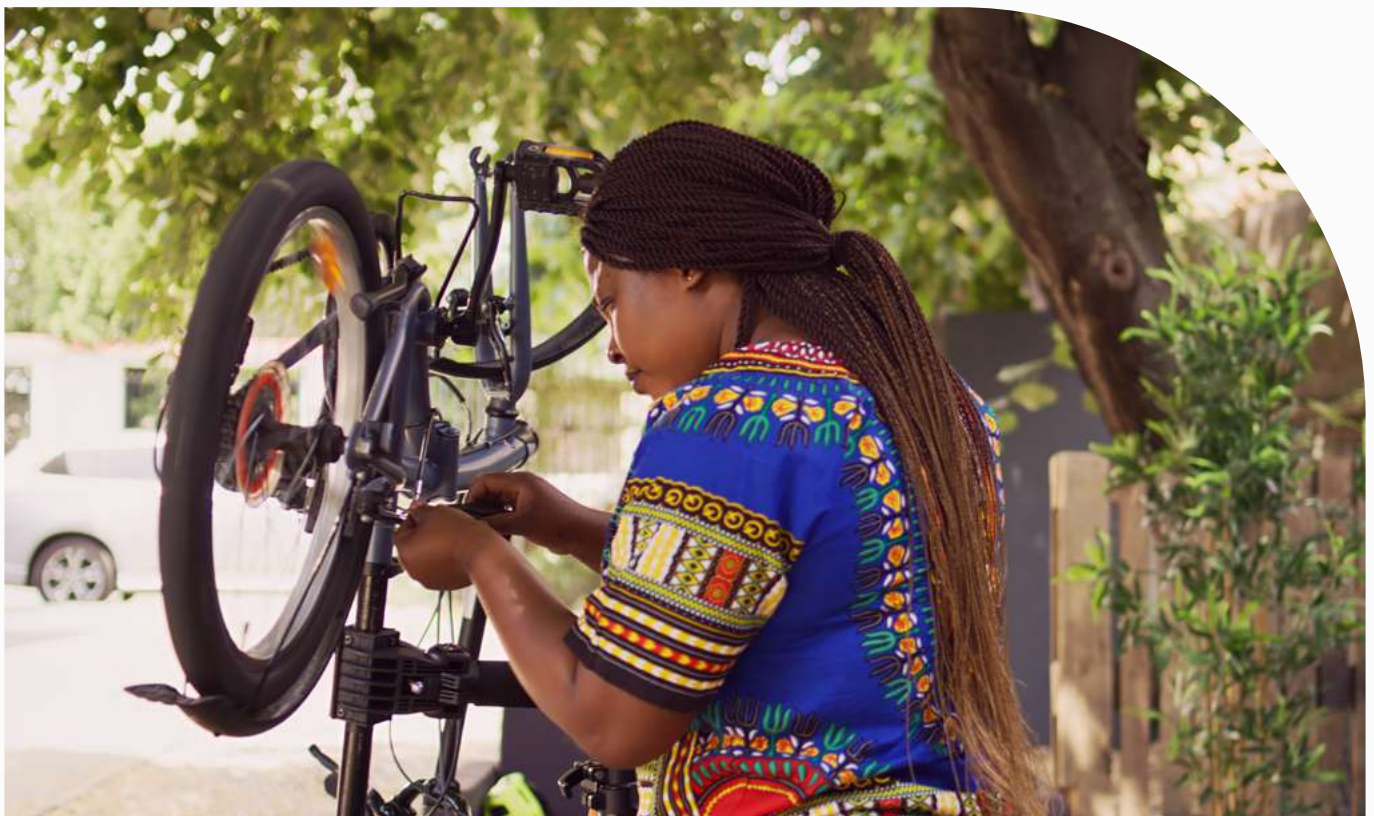
Foreword

The imperative to transition towards more sustainable, circular and just economies and societies has never been more urgent. The “take-make-waste” linear model has pushed planetary boundaries to their limits and exacerbated social inequalities around the world. Meanwhile, global circularity rates continue to fall, from 9.1% in 2018 to 6.9% in 2025.

At the same time, there is growing evidence that the transition to the circular economy presents an opportunity to generate much-needed employment. This first comprehensive global baseline reveals that between 121 to 142 million people are employed in the circular economy. This is equivalent to 5-5.8% of total employment globally, not including employment in agriculture. Women constitute 26 per cent of the circular workforce. However, these numbers are most likely just the tip of the iceberg. Official statistics, on which this baseline relies, do not yet fully capture the millions that work in the informal segments of the circular economy.

This report demonstrates that circularity is firmly embedded across all countries, sectors and value chains. By quantifying both formal and, to the extent possible, informal employment, it provides the first and most comprehensive picture of employment in the circular economy today. It sets the foundation for evidence-based policies and investments to unlock the immense potential of circular practices to create sustainable enterprises and transform existing livelihoods.

Workers employed in the circular economy range from craftpersons repairing, maintaining or upcycling products to extend their life, to waste pickers working day and night, to micro, small and medium enterprises and multinational companies adopting circular business models. By shedding light on their critically important activities, this report is also a call for a greater recognition of the skills and contributions of the women and men who make the circular economy work, including the workers in the informal economy who have been marginalised historically.



The transition to the circular economy will not be just or job-rich by default. Without evidence-based interventions, there is a risk of further marginalising vulnerable groups and of unintended negative impacts, particularly on enterprises and workers in low and middle-income countries. As global markets face increasing uncertainty and the impacts of climate change intensify, this baseline provides decision-makers with evidence needed to better integrate circular economy employment into environmental and economic development plans.

The recommendations put forward in this report seek to harness the opportunities and mitigate the risks of transitioning to greater circularity, and are aligned with the ILO Guidelines for a just transition towards environmentally sustainable economies and societies for all. We hope that this report can be a catalyst for more and better statistics and research and for integrating decent work into circular economy policy-making and implementation. This requires social dialogue with employers and workers, alongside investments that can leverage untapped potential to scale up circularity – and with it decent jobs – in key economic sectors, such as manufacturing, construction and agriculture. By embracing the circular economy with a commitment to social justice, we can build a future that is not only environmentally sustainable but also supports social and economic development and is equitable for all.

Together as partners in the Jobs in the Circular Economy Initiative, the International Labour Organization, the World Bank Group and Circle Economy are proud to present this groundbreaking report: *Employment in the circular economy: leveraging circularity to create decent work*. This effort is the culmination of three years of collaboration between three agencies working to advance data, statistics and evidence on circular economy employment.

We are grateful to the Partnership for Action on Green Economy, whose close collaboration and support have made this pivotal step in understanding the social dimension of the circular economy possible.



Ivonne Bojoh
CEO, Circle Economy



Frank Hagemann
Director, Sectoral Policies
Department, International
Labour Organization



Namita Datta
Gender & Economic Inclusion
Thought Leadership Head,
International Finance
Corporation, World Bank Group

In support of this report

Diana Junquera Curiel

Director for Energy Industry and Just Transition, IndustriALL Global Union



'On behalf of the International Trade Union Confederation (ITUC) and IndustriALL Global Union, we endorse this first global baseline of employment in the circular economy as a valuable and timely contribution. The report provides essential data for evidence-based policies and highlights the role of workers in both formal and informal employment in building a circular economy. We welcome its alignment with just transition principles and look forward to using its findings to support decent work, rights protection and formalisation across all sectors impacted by circular transformation.'

Dr Anthony Nyong

Director, Climate Change and Green Growth, African Development Bank



'This foundational report provides significant insights into the circular economy as a driver of employment and green industrialisation. For Africa, it highlights vast opportunities for inclusive growth and job creation across diverse sectors. The African Development Bank commends this important contribution and remains committed to advancing data insights and conducive policy to realise the circular economy's transformative impacts across the continent and globally.'

Steven Stone

Chair of the PAGE Management Board, Deputy Director Industry and Economy Division, UNEP



'What will the circular economy of the future look like? To better imagine the future possible, it helps to understand the contours of the economy we have today – and this report sets the baseline for understanding employment in today's nascent circular economy. By examining the link between informality and circularity, and bringing a wealth of data to this exercise, this report makes an important contribution in showing how the move to more circular economies can be paired with better and more decent work. Higher resource productivity and circularity with more and better jobs is possible – but will require creativity, innovation and robust policy guardrails as this new report makes clear.'

In support of this report

Rachna Arora

Director, Climate Change
& Circular Economy,
GIZ India



'The report underscores the urgent need to align labour markets with a mapping of circular economy goals in order to accelerate just transition and support social equity. The data, evidence and recommendations in this report provide a practical roadmap for integrating informal employment across circular economy strategies like repair, reuse, redesign, remanufacturing, and not only strengthening recycling systems. By placing circularity in a socio-economic framework, this report supports stakeholders in converging action on social equity, climate and resource efficiency goals.'

Robert Marinkovic

Adviser for Climate
Change and Just
Transition, International
Organisation of Employers



'Despite the challenges facing our economies and societies to become more circular, this report takes the very important step of analysing the jobs that make up the circular economy. It is an important piece in developing the expertise needed for effective supportive policies and frameworks which can enable enterprises to become more circular and productive. I commend the Jobs in the Circular Economy Initiative and look forward to further collaboration.'

Esmat Zaidan

Vice Dean, College of
Public Policy, Hamad Bin
Khalifa University



'I am pleased to endorse the Employment in the Circular Economy: leveraging circularity to create decent work global baseline report and commend the valuable work undertaken by the team. The report provides a rigorous and policy-relevant foundation for understanding circular economy employment worldwide, combining clear definitions, transparent methodology (including treatment of informal employment), and actionable insights for governments, social partners, development agencies, and industry. Its evidence-based approach will meaningfully inform skills development, workforce transitions, and green industrial policy—making it a timely contribution to advancing decent work through circularity.'

In support of this report

Joaquim Bento de Souza Ferreira Filho

Senior Professor, Escola Superior de Agricultura, Department of Economics, Management, and Sociology, Universidade de São Paulo



'This research report makes an original and important contribution to the field of circular economy employment. Innovative and comprehensive, it introduces new analytical frameworks, refines existing methods, and provides valuable insights that will shape academic and policy debates. Its emphasis on novelty and methodological rigour sets a new benchmark for future research. I fully endorse the report and strongly support the continuation of efforts to advance methodology, data collection, and results.'

Heather Grabbe

Senior Fellow, Bruegel



'This report stands out for its comprehensive scope, going beyond previous studies in covering circular economy employment in lower-income countries and the informal economy, plus partially circular sectors. It provides an invaluable guide for policymakers and researchers in understanding the potential for the circular economy to generate decent jobs in many sectors, which would increase both labour and resource productivity.'

Kirsten Svenja Wiebe

Senior Research Scientist, SINTEF Industry



'The report carefully analyses and evaluates the available data and literature for circular economy employment. The analysis shows that there are substantial data gaps, not only for the estimation of circular economy employment, but for green and/or sustainable jobs in general. In the future, statistics need to be collected differently from today, classifying whether economic activities and their upstream and downstream value chains are designed sustainably.'

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Executive summary

The circular economy is increasingly recognised as essential to achieving both environmental and socio-economic objectives, yet little is known about how many people work in circular economy activities and under what conditions.

Circular economy employment spans all countries and sectors and includes both formal and informal settings. However, definitions, classifications, and methodologies for measuring such employment remain unaligned. Current evidence is largely focused on industrialised countries, while data on workers in the informal economy in developing countries is especially scarce. These data gaps hinder the development of inclusive policies capable of unlocking the circular economy's full potential for decent work and sustainable development. This report—produced by Circle Economy in collaboration with the International Labour Organization (ILO) and the World Bank Group, with the guidance from an international advisory board and in close collaboration and with support from the UN Partnership for Action on Green Economy (PAGE)—addresses these gaps by developing and applying an internationally applicable methodology for measuring circular economy employment. The approach builds on existing labour and environmental frameworks and expert consultation, providing the first global baseline covering 177 of 187 ILO Member States.

Realising the potential for a just and job-rich transition requires a shift from informal, low-skilled, and low-paid activities towards productive, formal, and decent work. For billions of people living and working in poverty, circularity is a necessity rather than a choice. Their everyday activities to earn a living and care for the planet often go unrecognised in official statistics. Consequently, this report likely only captures part of the informal circular economy. More research is needed to fully understand how the twin transitions to circularity and formality can generate full, productive, and freely chosen employment for all women and men alike.

The analysis finds that an estimated 121 to 142 million people are employed in the circular economy worldwide, representing 5 to 5.8% of total global employment, excluding agriculture.

Most of this employment is in fully circular sectors such as repair, recycling, second-hand trade, waste management, and urban transit (121 million people or 5% of global employment under consideration). Another 21 million (0.8%) are found in partially circular sectors, such as mining, manufacturing and construction. Separate estimates by the ILO and the International Renewable Energy Agency (IRENA) indicate that 16.2 million people are employed in the renewable energy sector. Combined, employment in the circular economy and renewable energy sectors may reach as many as 157.7 million, underscoring their growing significance as interconnected drivers of sustainable development and the future of work.

Although the agricultural sector represents a substantial share of global employment, it has been excluded from the scope of this study due to the lack of an agreed-upon conceptual framework, definition or classification of circular agricultural activities. This exclusion preserves the global applicability and methodological robustness of the current baseline, while also highlighting the development of a suitable model as a priority for future research to capture the scale, characteristics and decent work implications of circular and regenerative practices within the agricultural sector.

Circular economy employment exists in all regions and country income groups, but remains unevenly distributed across them. Asia and the Pacific account for more than half of global circular employment (77.6 million people), followed by the Americas (27.5 million), Europe and Central Asia (20.8 million), Africa (12.9 million), and the Arab States (2.7 million). Excluding the agricultural sector, circular economy employment represents 6.4% of total employment in the Americas, 5.8% in Asia and the Pacific, 5.6% in Africa, 5.4% in Europe and Central Asia, and 4.9% in the Arab States.

By income group (also excluding agriculture), lower-middle-income countries record the highest share of circular economy employment (6.4%), followed by high-income (5.9%), upper-middle-income (5.5%) and low-income countries (5%). Lower figures in low-income countries likely reflect underreporting of informal employment and multiple jobholding in circular economy sectors such as repair, waste collection or recycling. The relationship between national income levels and the share of circular economy employment is therefore complex, influenced by economic structure, policy choices, technological capacity, and the prevalence of the informal economy.

A small number of sectors dominate global circular economy employment. Repair and maintenance activities (including those in manufacturing) account for nearly half (46%) of total circular economy employment, providing work for at least 65.2 million people. Waste-related activities employ 11 million workers (8%), while the manufacturing sector employs 34.8 million people (24.6%), which includes repair and maintenance jobs within the sector. The construction sector employs 7.7 million people (5.4%). In most regions, the mining sector remains largely disconnected from the circular transition, contributing 0.2% to total circular economy employment.

Informality is a defining feature of the circular economy. More than half of all circular economy employment—over 74 million, or 52%—is informal in nature. While this rate is lower than the economy-wide informality rate, it likely underestimates the true extent of informal circular economy activities, especially among those holding secondary or seasonal jobs. The informal circular economy is most prevalent in lower-income countries and in sectors such as repair and urban transit. Asia and the Pacific host over half of all workers employed in the informal circular economy (50 million), followed by Africa (10.3 million) and the Americas (9.7 million). Within the Americas, informality ranges from 11% in high-income countries to over 85% in lower-middle-income countries. Productivity growth and formalisation are mutually reinforcing transitions: as enterprises improve efficiency and expand their capacity to recover, reuse, and remanufacture materials, they gain incentives to formalise. Formalisation, in turn, enables access to finance, technology, and skills development that enhance productivity and working conditions.

Women account for 26% of circular economy workers, totalling 36.4 million, with the highest shares in upper-middle income countries (32.1%). Their participation is lowest in Arab States, followed by Africa and relatively higher in Europe and Central Asia, Asia and the Pacific, and the Americas. Women are concentrated in manufacturing, second-hand retail, repair services, libraries and archives, with limited representation in construction and urban transit. Given women's overrepresentation in the informal economy, improved data coverage would likely raise these estimates. Persistent gender disparities reflect broader labour market inequalities, highlighting the need for rights-based approaches and gender-responsive policies to women's equal participation in the circular economy.

The findings point to clear policy directions. Circular economy policies must integrate social and labour dimensions, and should be informed by national and local data baselines. Governments should promote circularity in high-potential sectors beyond fully circular industries, leveraging public procurement and investment to create employment-rich opportunities. Support for sustainable enterprises, including cooperatives, micro-, small-, and medium-sized enterprises (MSMEs), and community-based initiatives, is essential—alongside financing, business services, and capacity building. Skills systems must anticipate emerging circular transitions and provide greater access to women, youth and workers in the informal economy. Extending social protection, improving occupational safety and health, and upholding fundamental labour rights are all essential to ensuring that the circular transition creates quality employment.

Effective policymaking depends on robust data ecosystems at local, national, and international levels. These should be strengthened to better capture informal, part-time, and subsistence employment that remains largely undercovered by existing labour and sectoral statistics. Strengthened collaboration among national statistical offices, international agencies, and social partners will be vital to produce consistent, inclusive, and policy-relevant data on circular economy employment worldwide. By combining strong evidence, social dialogue, and inclusive policymaking, countries can harness the circular economy to advance environmental goals while generating decent work, reducing inequalities, and strengthening resilience in the face of economic and ecological transitions.

1

The circular economy and decent work

1.1 Circularity in the world of work: a growing understanding with gaps to fill

The circular economy has the potential to address the key challenge of our time: improving human well-being, economic productivity and social equity while operating within the ecological limits of the planet. It contributes directly to the attainment of decent work, responsible consumption and production, and many other Sustainable Development Goals.

At its core, the circular economy is based on a set of strategies to rethink and optimise how we use resources, reduce waste and emissions, and curb the pressures driving the triple planetary crisis of climate change, pollution and biodiversity loss. Rising to this challenge and successfully transitioning away from the current 'take-make-waste' linear economy requires engagement from actors at all levels, from workers and micro-, small- and medium-sized enterprises (MSMEs) or cooperatives and other social and solidarity economy entities to multinational enterprises operating across global value chains.

As circular economy strategies gain traction, policymakers, business leaders, and workers at all levels seek to understand how the circular economy can generate new investment and business opportunities and create sustainable and decent livelihoods. With circularity becoming a core pillar of economic, social, and environmental policy worldwide, the need for robust, evidence-based, and comparable estimates of employment in the circular economy is more important than ever.



The emphasis that the circular economy places on business models and the work involved in reducing waste, optimising resource use, and regenerating natural systems underscores the importance and value of both the materials and the people that drive circularity forward. This includes MSMEs, cooperatives and workers in the informal economy, who perform much of the world's circular economy activity yet remain underrepresented in official statistics and national policy frameworks, despite accounting for roughly 60% of the global workforce and 80% of all enterprises.^{1,2}

The twin transitions to circularity and formality

The transition from a linear to a circular economy entails a transformation of enterprises, employment, and systems of production and consumption. To ensure a just transition, current low-productivity, low-skilled and low-paid informal circular economy activities must gradually evolve toward more productive, decent, and formal work in the future.

For billions of people living and working in poverty, circularity is a necessity, not a choice. Today, much circular activity remains concentrated in primary, subsistence, and informal economies, where jobs are often precarious, earnings are low,

and productivity is limited by insufficient access to tools, capital, and technology. These informal activities remain uncovered in official statistics and are therefore not fully reflected in these first global estimates of employment in the circular economy.

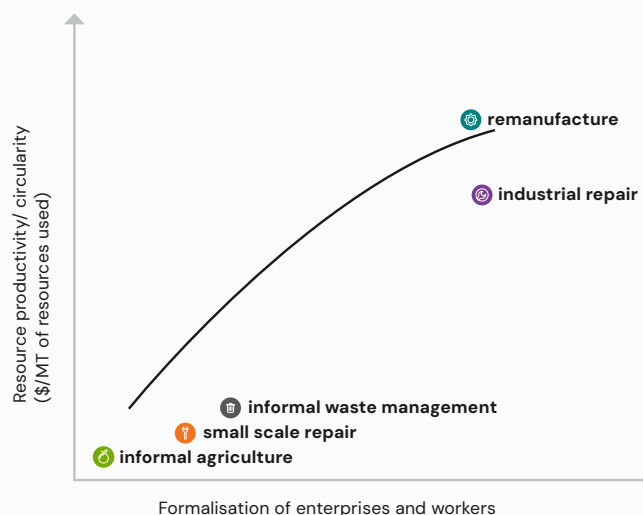


Figure one: Formalisation and productivity are mutually reinforcing, and the benefits of formalisation emerge progressively

Box one: The transition from the informal to the formal economy

ILO's *Transition from the Informal to the Formal Economy Recommendation, 2015 (No. 204)* provides guidance on how to: facilitate the transition of workers and economic units from the informal to the formal economy; promote the creation of enterprises and decent jobs in the formal economy, and prevent the informalisation of formal jobs. The Recommendations' 12 guiding principles for supporting a transition out of informality include the promotion and protection of human rights, the promotion of gender equality and non-discrimination, and a call for special attention to those most vulnerable to decent work deficits. The Recommendation

calls on Member States to undertake a range of strategies including: Legal and policy frameworks to ease and promote access to formal systems; Employment policies that favour formalisation; Enforcement of fundamental principles and rights at work for those in the informal economy, including freedom of association, elimination of forced labour, abolition of child labour and elimination of discrimination in employment and occupation; Promotion and enforcement of Occupational Safety and Health in all workplaces; and Extension of social protection to all.

Advancing a just and inclusive transition to the circular economy requires pathways that raise productivity and enable greater value capture, leading to higher incomes, safer working conditions, and progressive integration into formal value chains. Such pathways must reflect national contexts and ensure no one is left behind. In this process, formalisation and productivity growth reinforce one another: as enterprises and workers become more productive and efficient in cycling materials, they gain the capacity and incentives to formalise; in turn, formalisation improves access to finance, technology, and markets that sustain further productivity gains.³ Over time, these dynamics can translate into higher wages and improved livelihoods for workers employed in the circular economy.⁴

As the circular economy activities of millions of workers remain invisible today, the full potential and benefits of creating more and better-quality jobs in the transition to circularity are often overlooked. The estimates of circular economy employment in this report are conservative, due to data limitations, and do not fully capture all those working in the informal economy. By pursuing a twin transition to circularity and formality, the result will be an increase in formal employment and livelihoods, productivity and decent work for more men and women in the circular economy.

Gaps in understanding the actual world of work in the circular economy

In 2023, Circle Economy in collaboration with the ILO and the World Bank Group, conducted a review of over 30,000 academic papers on the circular economy, which found that less than 2% of papers covered topics related to decent work. Furthermore, 84% of this research was focused on understanding employment in the circular economy in the context of industrialised countries, with lower-income countries and the informal economy largely overlooked.⁵

This growing but nascent evidence base was dominated by macro-level analyses and modelling the impacts of future scenarios for the circular economy on employment, but with persistent geographic, decent work and gender-related blind spots.^{6,7} The research was particularly limited in its understanding of the diverse and informal activities that characterise circular practices in low- and middle-income countries, constraining the ability of researchers and policymakers to design evidence-based strategies for a just transition towards greater circularity, productivity and formality in these countries. These evidence gaps pose significant risks and challenges to formulating and implementing effective circular economy policies and initiatives, particularly when universal assumptions about how formal labour markets and circular economies operate are applied to markets with high levels of informality.⁸

Despite the circular economy's potential to support the twin transition to circularity and formality, key policy areas vital for an inclusive transition—such as workers' rights, gender equality, promoting sustainable enterprises or economic units in the informal economy, trade policy and international cooperation—are rarely included in the growing number of circular economy roadmaps around the world.^{9,10} Progress has, in part, been hindered by the weak evidence base, a narrow focus on the number of jobs that can be created, and diverging approaches for defining employment and sectors involved in the circular economy today.

Without stronger evidence on circular economy employment in the world of work, especially in countries with large informal economies or weak enforcement of labour regulations, circularity policies, strategies, and roadmaps risk falling short of their ambitions. In particular, momentum towards circular economy regulation and legislation in higher-income countries could lead to unintended negative impacts on local businesses and workers in trading partner, low and middle-income countries.^{11,12,13} It is therefore vital that labour ministries, workers' and employers' organisations have access to better statistics and are fully involved in designing national circular economy policies, strategies and roadmaps to ensure labour protections and social justice are embedded within them. Against the backdrop of persistent global deficits in decent work, increasing uncertainty in global markets, and climate- and environment-related impacts on workplaces—such as heat stress and floods—it is more important than ever to ensure that decision makers are armed with evidence to guide a path to greater social and environmental sustainability.^{14,15}

1.2 Partnering for better evidence and data on employment in the circular economy

The ILO, Circle Economy, and the World Bank Group are committed to creating evidence and tools to improve understanding and unlock the potential of the circular economy, advancing innovation, generating sustainable enterprises, and ensuring decent work for all. Their joint initiative—[Jobs in the Circular Economy](#)—was born from the need for better data and evidence to understand how the circular economy can lead to a more just and inclusive world of work. This concerns both global progress towards this goal and the challenges and opportunities posed in specific countries, sectors and policy domains.

As such, the Initiative aims to put data and practical tools in the hands of policymakers and decision-makers to inform and support pathways towards a just transition towards environmentally sustainable economies and societies for all.

This first comprehensive global baseline of employment in the circular economy is the culmination of three years of collaboration among three agencies, resulting in three outputs aimed at advancing data and evidence on circular economy jobs. This initiative began with efforts towards understanding the research gaps and key themes that represent crucial opportunities for and challenges to creating a more just and inclusive society through the transition to a circular economy, as outlined in *Decent Work in the Circular Economy*.¹⁶ It was followed by a review of definitions, databases, methods and models that have been used to measure or model employment in the circular economy, which included recommendations for developing statistics, research and data coverage to better reflect current employment in circular economy activities and thereby support more equitable pathways, in *Measuring and modelling circular jobs: A review of definitions, databases, methods and models for understanding employment in the circular economy*.¹⁷ This report picks up where the previous review left off, particularly following up on three priority recommendations:

1. Create greater international alignment on which jobs can be defined as contributing to the circular economy, building on existing efforts to define and classify circular economy employment towards an internationally applicable approach in close coordination with bodies currently leading processes to create alignment on circular economy definitions and indicators.
2. Develop coefficients that can better estimate the extent of circular activity taking place in broader sectors of the economy.
3. Build a more accurate picture of current circular economy employment through a baseline study, which can lay the groundwork for future data initiatives and modelling studies that better reflect regional contexts and differences.

This global baseline of employment responds directly to these recommendations. The first of its kind, it serves as a starting point for ongoing monitoring of global employment in the circular economy, as well as a basis for future studies that track and model trends in the circular economy across time and geography. It aims to provide a basis for assessing and modelling the impacts of circular economy policy scenarios on employment, including on working conditions, employment status, and employment in the informal economy, alongside their impact on materials flows and Gross National Income. Such policy assessments, both of current and future policies, are essential for informing just transition policies, shaping social protections in the face of job loss and transformation, and policies to promote women's participation, as well as feasible approaches to formalisation.

Working together with partners from around the world, *Employment in the circular economy: leveraging circularity to create decent work* aims to create a comprehensive and global picture of work in the circular economy. This review and the global baseline presented in this report were led by Circle Economy, with technical inputs from teams at the ILO and World Bank Group in close partnership and with support from PAGE, an interagency programme that brings together the expertise of five UN agencies: United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), ILO, United Nations Industrial Development Organization (UNIDO) and United Nations Institute for Training and Research (UNITAR). This report has also benefited from the guidance of an international advisory board of experts from leading research institutions, policy organisations and statistical agencies working on labour and circularity related issues. Members include representatives from the IndustriALL Global Union, the International Organisation of Employers (IOE), Statistics Finland, United Nations Economic Commission for Europe (UNECE), European Commission (Eurostat and DG Employment, Social Affairs and Inclusion), the University of Cape Town, the African Development Bank, Tsinghua University, The United Nations Economic Commission for Latin America and the Caribbean (ECLAC), Bruegel, GIZ India, Hamad Bin Khalifa University, Stiftelsen for Industriell og Teknisk Forskning (SINTEF), University São Paulo and Gesellschaft für Wirtschaftliche Strukturforchung (GWS), as also outlined in the acknowledgements.



1.3 Methodological approach

The methodology underpinning this first global baseline provides a data-driven framework for measuring employment in the circular economy worldwide. In accordance with [Jobs in the Circular Economy's](#) mission to support greater international alignment on the classification and appropriate methods for estimating current levels of employment in the circular economy, the methodology takes a building block approach.

The main criteria applied to develop this building block approach were:

- To align closely and, where possible, build directly on existing efforts to define, categorise and measure circular economy employment;
- To develop an approach that is internationally applicable and can support global estimates, as well as national applications.

Defining the circular economy and circular economy employment

While there is no single agreed-upon definition of the circular economy, multiple organisations have developed frameworks describing the key strategies and activities that underpin the circular economy. These include those from the Ellen MacArthur Foundation,¹⁸ Circle Economy,¹⁹ the IFC,²⁰ and the Bocken Framework²¹, which have similarities in terms of the strategies they identify, as summarised in Table one. While their terminology and emphasis vary, they converge around a set of strategies often expressed through the R framework—a hierarchy of circular actions including Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, and Recover. The R framework provides a unifying structure for defining what constitutes circular activity across sectors, see figure two.²²

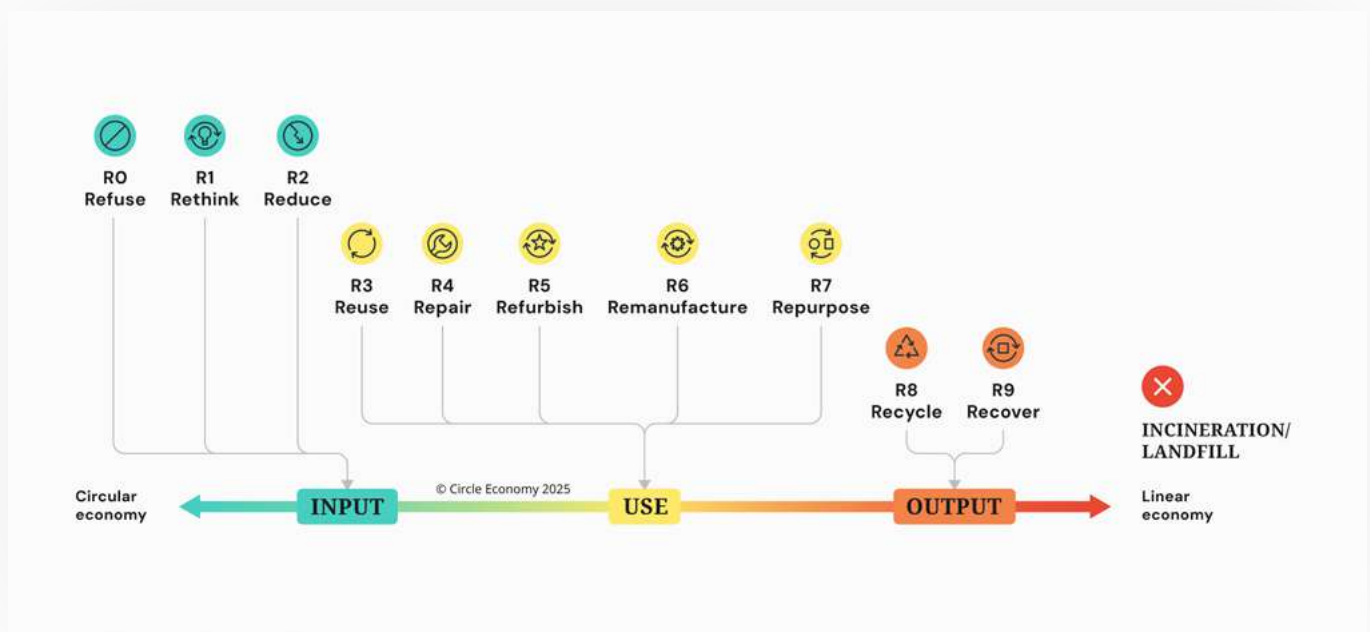


Figure two: Depiction of the R framework

The methodology for this report builds directly on these established frameworks and the approaches of agencies that have sought to classify and estimate circular economy employment, such as Eurostat,²³ Circle Economy and UNEP,²⁴ and the French Agency for Ecological Transition (ADEME).²⁵ A detailed mapping of how these frameworks and their R-based strategies align with this report's approach is provided in Annexe one.

These frameworks mentioned above are broadly aligned on key economic activities that comprise the core of the circular economy, with the main differences being in the approach they recommend for estimating circular economy employment in sectors that may be partially engaged in circular activities. The Technical Annexe outlines how the pillars of the methodology used in this report compare with existing circular economy employment frameworks.

These frameworks were reviewed extensively as part of the methodological development for this report, and the producers of each existing circular economy employment classification and estimation methodology were engaged throughout this process. This included coordination with members of the UNECE task force developing Guidelines for measuring the circular economy.³¹

Ellen MacArthur Foundation ²⁶	IFC & Circle Economy Harmonized Circular Economy Finance Guidelines activity categories ²⁷	Key elements framework core strategies, Circle Economy ²⁸	Bocken framework ²⁹	R-framework ³⁰
Regenerate ecosystems, Design out waste	Circular design and production	Prioritise regenerative resources	Regenerate flows, Narrow flows	R0: Refuse, R1: Rethink, R2: Reduce
Keep products in use for longer	Circular use	Stretch the lifetime	Slow flows	R3: Reuse, R4: Repair, R5: Refurbish, R6: Remanufacture
Design out of waste	Value recovery	Use waste as a resource	Close flows	R7: Repurpose, R8: Recycle, R9: Recover

Table one: Overview of existing circular economy frameworks and R-strategies

Building block approach to estimating circular economy employment

The current methodology was developed by drawing on the existing efforts described above to identify a set of economic activities within the International Standard Industrial Classification (ISIC) of all economic activities Rev. 4. By building on existing efforts, the UN's' classification system, and official, publicly available labour statistics, this methodology contributes to greater harmonisation of approaches that can be adopted and refined by others. In the building block approach, the economic activities of ISIC Rev. 4 are grouped into two categories: fully circular sectors and partially circular sectors. Figure three provides a visual depiction of these building blocks.

- **Fully circular sectors** are economic sectors in which all employment is considered to contribute directly to the circular economy by virtue of occupational functions in this sector. By contributing to the generation of circular products and services, all employment in these sectors is counted as circular. As such, employment in these sectors is not determined through the material or economic circularity of the sector itself. Fully circular sectors includes repair and maintenance activities; waste management services and remediation activities (excluding landfill and incineration); wholesale of waste, scrap, and other products;

renting, leasing and library activities; sewerage; waste collection; retail sale of second-hand goods; materials recovery; and urban and suburban passenger land transport, hereafter referred to as urban transit.

- **Partially circular sectors** are material-intensive sectors where circular practices are present but not readily discernible in employment datasets. Partially circular sectors include mining, manufacturing, and construction. In these sectors, circularity is estimated or proxied through modelling approaches that capture both material reuse³² and economic linkages to recycling and recovery activities.³³ The relative contribution of these two dimensions is balanced to avoid overestimating circular employment. Detailed sectoral coefficients and weighting assumptions, and a sensitivity analysis are provided in the Technical Annexe.
 - » Material circularity, or the use of secondary inputs over total inputs, is proxied by the share of technical cycling rate as a proportion of total raw material input (measured in kilograms);
 - » Economic circularity, or the contribution to the recycling sector, proxied by the share of the sector's (monetary value) contribution to domestic and export intermediate demand to downstream sectors, specifically the recycling/materials recovery sector³⁴ over the sector's total economic output.



Figure three: Building blocks of the circular economy employment methodology

Employment in partially circular sectors is proxied using these circularity coefficients, depending on which type of circularity applies. For manufacturing and construction, equal weighting is applied to material and economic circularity to balance the representation of secondary material use (by weight) with the economic value generated through recycling. In the absence of universally agreed-upon criteria favouring one measure, equal weighting provides a neutral baseline. For the mining and quarrying sector, only economic circularity coefficients—such as tailings reprocessing and mineral recovery—are used, to avoid overstating circular economy employment in primary extraction.

The list of partially circular sectors, the rationale for their inclusion, their alignment with existing approaches, and the types of circularity coefficients applied are detailed in Annexe one and discussed further in the Technical Annexe.

Data approach

To ensure global consistency, this methodology relies on internationally available datasets:

- Employment data is sourced from the ILO's ILOSTAT database, which provides official labour statistics classified under ISIC Rev. 4. Where possible, data are disaggregated by gender and informality.³⁵
- The informal employment rate is the share of persons who are in informal employment as a percentage of total employment, as captured in ILOSTAT and according to the resolution adopted by the 21st International Conference of Labour Statisticians.³⁶
- Economic linkages and intermediate demand flows between sectors are modelled using input-output tables from the Eora database, aligned to the same base year as the employment data.³⁷ These tables underpin the estimation of economic circularity in partially circular sectors such as manufacturing, construction, and mining.
- Material circularity is proxied using the technical cycling rate, as provided in the *Circularity Gap Report (CGR®) 2025*, which quantifies the share of secondary materials in total inputs.

Additional information on the data adjustments, harmonisation techniques, and conversion methods used across datasets is provided in the Technical Annexe.

Geographic coverage and reference year

The global baseline covers 177 countries for which sufficient employment and economic data are available. The reference year is 2023, aligning with the latest year for which input-output (IO) data are available in the Eora database. Where national employment data predate 2023, employment figures were nowcasted based on sectoral changes in gross output from the Eora multi-regional input-output (MRIO) framework.

Findings are presented using the ILO's regional groupings: Africa, Arab States, Asia and the Pacific, Europe and Central Asia, and the Americas, as well as the World Bank's income group classifications for fiscal year 2025, which is based on the Gross National Income per capita of the previous full calendar year (2023).³⁸ The full list of countries included in the study, their distribution across regions and country income groups, as well as the resolution of employment data available, is included in the Technical Annexe.

Considerations and limitations

While this methodology provides a globally applicable approach to estimating circular economy employment, its estimates are shaped by several data and conceptual limitations:

- Data coverage and granularity: The resolution and completeness of employment data vary significantly across countries. Gaps in time-series coverage, inconsistencies in gender and informality disaggregation, and limited sectoral granularity required the use of alternatives to ensure global coverage. In cases where such disaggregated data by gender and informality is not available, methods outlined in the Technical Annexe are applied.
- Direct employment only: The estimates capture direct circular economy employment and do not include induced or indirect circular economy employment or effects.

- Partially circular sectors: Input-output data, while valuable, aggregate diverse activities within broad sectors and may not fully capture the nuances of circular practices, which can be obscure, in particular the extent of informal economic activity and the complexity of diverse production systems.
- Urban transit: The inclusion of certain sectors, such as public transport, varies across existing frameworks. In this report, urban and suburban passenger transport (ISIC H4921) is treated as fully circular due to its role in promoting shared mobility and reducing private car dependence.³⁹ At times urban transit is discussed in addition to other fully circular sectors in this report, due to divergent methodological interpretations across circular economy frameworks on whether to include public transport as a circular economy sector. For instance, the Harmonized Circular Economy Finance Guidelines, Eurostat and the ADEME do not classify public transport as circular.
- Agriculture: The agriculture sector employs around 26% of the global workforce.⁴⁰ Circular practices in agriculture and forestry—such as crop-livestock integration, nutrient cycling, composting, and regenerative soil management—are recognised but not yet systematically classified within circular economy employment. Owing to the absence of a harmonised definition or recognised classification of circular agricultural activities, the baseline methodology does not currently measure circular economy employment in agriculture. See the Technical Annexe for a detailed discussion of methodological and data extensions identified for future refinement and incorporation into subsequent editions of this global baseline.
- Capturing circularity in existing statistical systems: Many of these limitations demonstrate that current statistical systems are insufficiently set up to isolate and disaggregate circular or informal activities, thereby limiting the inclusion of activities and actors vital for driving the circular economy. The results in this report should therefore be interpreted within the context of the sectoral scope and its data availability limitations, and should be broadly considered as an underestimation of global circular economy employment.

Overall, this methodology represents an important step toward harmonised global measurement of circular economy employment. It builds on existing frameworks, applies consistent international data sources, and introduces a modular structure that enables countries to expand or refine their estimates over time. Further refinements—particularly in accounting for informal, agricultural, and indirect circular economy employment—will continue to improve the comprehensiveness of future editions of this global baseline. For further details on the limitations and assumptions of the methodology, please refer to the Technical Annexe.



2

Global baseline of employment in the circular economy

2.1 Circular economy employment: headline findings

The global baseline assessment finds an estimated 121 to 142 million people are employed in the circular economy. This represents 5 to 5.8% of the total employed workforce under consideration in this study, which stands at 2.4 billion, excluding employment in the agricultural sector. The sectors under consideration include workers in the formal and informal economy across 177 countries.

Of these, 121 million people are employed (86%) in fully circular sectors, including repair, maintenance, and remediation activities; material recovery; waste, sewage, and scrap management services; urban transit, rental, and leasing activities; second-hand retail; and library and archives activities. The remaining 20.5 million (14%) are employed in partially circular sectors such as mining, manufacturing and construction.

Employment in the renewable energy sector is not accounted for in this study. This employment is provided in the *Renewable Energy and Jobs – Annual Reviews* by the International Renewable Energy Agency (IRENA) and the ILO, which estimates 16.2 million people employed worldwide in 2024. When combined with the circular economy employment estimated in this study, total employment in the circular economy may be as high as 157.7 million jobs, highlighting the growing significance of both the circular economy and renewable energy as interconnected transitions shaping the world of work.



Throughout this report, unless otherwise specified, the job numbers presented refer to employment in the circular economy, encompassing both fully and partially circular sectors, and represent both the formal and informal economies, as summarised in Table two.

Sectoral distribution and transformation

Not all sectors that contribute to circular economy employment have undergone substantial transformation towards circularity.

The transition to circularity within sectors⁴² remains highly uneven. The manufacturing sector (ISIC Section C) employs 34.8 million people in the circular economy, representing about 24.6% of global circular economy employment. However, the circular economy employment share within overall employment in the manufacturing sector remains low at 7.6%. This signals scale without deep circular transformation and indicates a significant potential

for policy action and investment to promote upstream circular innovation in manufacturing through rethinking production processes and social dialogue with employers and workers, including collective bargaining and labour agreements.

Other sectors lag behind, both in terms of size and circular transformation. The construction sector employs 7.7 million people in the circular economy, representing 3.1% of the sector's total employment. The mining sector, with 0.3 million people employed in the circular economy (1.3% of the sector's total employment), remains largely disconnected from the circular economy transition.

This imbalance between sectors that generate large numbers of circular economy employment and a limited number of jobs in fully circular sectors, where circularity is deeply embedded, underscores the need for an economy-wide approach to accelerate the transition to a circular economy.

	Scope	Circular economy employment (2023)	Share of total circular economy employment	Proportion of global workforce (excluding agriculture)
I	Fully circular sectors	121 million	85.5%	5%
II	Partially circular sectors (excl. agriculture)	20.5 million	14.5%	0.8%
III	Renewable energy employment	16.2+ million ⁴¹	-	0.7%

Table two: Estimated global employment in the circular economy by scope of sectoral inclusion (2023)

⁴² Here onwards, unless specified otherwise, sectors refer to ISIC Rev. 4 classification and are defined as follows: B – Mining (all divisions); C – Manufacturing (all divisions); E – Waste & Sewerage (E37, E381, E383); F – Construction (all divisions); G – Wholesale & Retail; Vehicles repair (G4669, G452, G4774); H – Transport (H4921); N – Leasing & Rentals (N771–773); R – Libraries & Archives (R9101); and S – Repair Services (S95).

Table three provides fully circular and partially circular subsector inclusions, each sector's circular economy employment and its contribution to global circular economy employment.

ISIC code	Sector name	Fully circular sector inclusion	Partially circular sector inclusion	Circular economy employment (CEE)	Sectoral CEE as a share of total cee
B	Mining	-	All divisions included	297,000	0.2%
C	Manufacturing	Repair of fabricated metal products, machinery and equipment (C331)	All other divisions included, excl. repair	34,789,000	24.6%
E	Water supply; sewerage, waste management and remediation	Sewerage (E37), Waste collection (E381) and Materials recovery (E383)	-	7,502,000	5.3%
F	Construction	-	All divisions included	7,665,000	5.4%
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	Includes wholesale of waste and scrap and other products n.e.c. (G4669), Maintenance and repair of motor vehicles (G452), and Retail sale of second-hand goods (G4774)	-	35,386,000	25%
H	Transport and Storage	Urban and suburban passenger land transport (H4921)	-	31,471,000	22.2%
N	Administrative and support services	Renting and leasing of motor vehicles; personal and household goods; other machinery, equipment and tangible goods (N771, 772, 773)	-	5,380,000	3.8%
R	Arts, entertainment and recreation	Library and archives activities (R9101)	-	1,205,000	0.9%
S	Other service activities	Repair of computers and personal household goods (S95)	-	17,793,000	12.6%

Table three: Distribution of circular economy employment across economic sectors (2023)

Repair and maintenance: the core of circular economy employment

Repair jobs drive the bulk of circular economy employment globally, and sectoral diversification within the circular economy is still in its infancy.

Employment in the repair and maintenance sector accounts for a staggering 46% of all circular economy employment worldwide, employing at least 65.2 million people. These jobs range from repair in the manufacturing sector (ISIC C331), maintenance and repair of motor vehicles (G4520), repair of computers, personal and household goods (S95), and maintenance of textiles (S9601). This is in line with existing research from the EU indicating that circularity in the manufacturing sector is heavily skewed towards maintaining and preserving existing assets rather than upstream circularity in redesign and secondary material use, and downstream circularity such as recycling.⁴³ Repair is a crucial pillar of the circular economy, providing a more resource-efficient and often less capital-intensive alternative to recycling. Furthermore, in many lower-income countries, repair and maintenance activities are more necessity-driven due to low purchasing power and lower repair costs compared to buying a new commodity.

Globally, waste-related sectors, which include collection of hazardous and non-hazardous waste (E3811 and E3812), remediation activities and other waste management services (E3900), and wholesale of waste and scrap and other products (not elsewhere classified, G4669),⁴⁴ account for at least 11 million in circular economy employment. Sewerage (E3700) and material recovery (E3830) each contribute at least 1.5 million and 1.3 million in circular economy employment, respectively. Together, these sectors account for approximately 9.7% of total circular economy employment, demonstrating that, where evidence is available, end-of-life circular activities employ a relatively lower share of workers in the circular economy, as compared to use-extension strategies.

Figure four illustrates the distribution of workers across different circular economy sectors. Employment in the repair in the manufacturing sectors is grouped under the repair and maintenance sector.

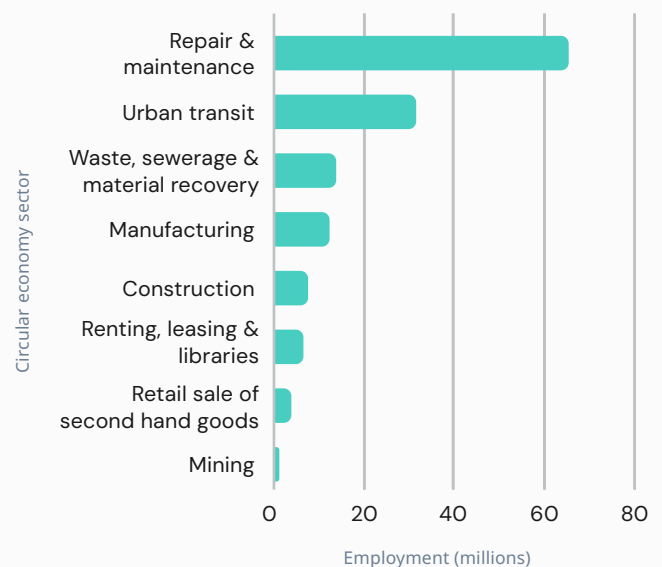


Figure four: Estimates of workers employed in various sectors of the circular economy (2023)

Social vulnerabilities

The above-mentioned numbers likely mask huge swaths of workers, especially women workers in the informal economy, who are often not captured in household surveys and labour statistics. Existing studies and workers' rights organisations have indicated that the informal waste sector alone stands at 40 million workers.^{45,46}

Across and within countries, economic and social structures dictate the labour market in the circular economy, and in many cases, compound existing vulnerabilities. In South Asia, for instance, marginalised groups are disproportionately confined to informal recycling and waste management roles.⁴⁷ In Latin America, informal recycling is similarly dominated by indigenous and Afro-descendant populations who often remain excluded from formal labour protections and experience heightened precarity.⁴⁸ In sub-Saharan Africa, stark gender divisions exist within the waste sector; women are predominantly occupied in

waste sorting, which pays less and is inconsistent, compared to men's roles in waste collection and transportation, which are characterised by more steady pay. However, both kinds of occupations are usually characterised by insecure conditions and limited labour rights.⁴⁹ Child labour, prevalent in informal circular activities like textiles waste recycling, e-waste dismantling and waste-picking, particularly in South Asia and West Africa, exposes children to hazardous conditions and exploitation, further entrenching poverty and inequality.⁵⁰

These regional patterns of vulnerability and labour informality are further reflected in more detailed, sector-specific studies, which reveal employment dynamics not fully captured in global surveys and labour statistics. Insights from a study on employment in the post-industrial textile value chain in Bangladesh reveal many employment dynamics and decent work considerations that are not yet visible in employment surveys and labour statistics, including those presented in this baseline (see Box two).

Box two: Evidencing data gaps in understanding employment in the post-industrial textile value chain in Bangladesh

The Switch to Circular Economy Value Chains (SWITCH2CE) project is an initiative that supports EU multinational companies and their suppliers from developing countries in transitioning to more circular economy approaches. SWITCH2CE is co-funded by the EU and the Government of Finland, and implemented by UNIDO, in collaboration with Circle Economy, Chatham House, and the European Investment Bank. To support the SWITCH2CE project's overall objective of promoting a just transition to a climate-neutral and circular economy, Circle Economy conducted a study on circular economy employment in the textile value chain in Bangladesh.⁵¹ The study applies the Global Circular Economy Employment Baseline methodology put forward in this report, to generate a national baseline for Bangladesh. In addition, bottom-up rapid assessments were conducted directly with workers and employers in partnership with Labour at the Informal Economy to better understand the extent and nature of these jobs, as well as the conditions in which they occur.

When applied to Bangladesh, the Global Circular Economy Employment Baseline methodology identified 69,500 people employed informally in the Manufacture of textiles (ISIC C13), Manufacture of wearing apparel (C14) and Waste collection, treatment, and materials recovery (E38). In contrast, the rapid assessments mapped 18,000–22,000 informal and semi-formal enterprises across 12 major SME clusters, employing an estimated 195,000–214,000 workers in the jhut (post-industrial textile waste) value chain.

The difference between the findings of the baseline and bottom-up research for the same sector (textile manufacturing and recycling) clearly demonstrates that a substantial share of circular economy employment, especially in the informal economy in developing countries, is not captured in official labour statistics. This highlights the need for locally relevant bottom-up corrections in the baseline methodology and complementary field research to discern the dynamics of circular economy employment at the national or value chain levels.

2.2 Distribution of circular economy employment around the world

Employment in the circular economy is unevenly distributed across regions and country income groups, mirroring broader patterns in economic structure and development. Countries in Asia and the Pacific account for at least 77.6 million people employed in the circular economy, contributing more than half of global circular economy employment, a reflection of both the region's vast labour force and its centrality to global production systems. Circular economy employment in the Americas, Europe and Central Asia, and the Arab States stands at 27.5 million, 20.8 million and 2.7 million, respectively. African countries report 12.9 million people employed in the circular economy.

When circular economy employment is expressed as a proportion of total regional employment, shares show moderate variation across regions: the Americas (6.4%), Asia and the Pacific (5.8%), Africa (5.6%), Europe and Central Asia (5.4%), and Arab States (4.9%). These differences demonstrate varying but limited integration of circular economy activities into the wider economy.

These regional employment trends also reveal that circular economy employment correlates strongly with industrialisation and global market integration. This is further evidenced by understanding circular economy employment as a proportion of total country income-group employment.

Employment by country income group

Through this lens, low- and middle-income countries represent 6.4% of circular economy employment, 40.3 million workers. High-income countries follow with 5.9% (38.6 million), and upper-middle-income countries with 5.5% (57.9 million). Low-income countries hold a share of 5%, equivalent to 4.1 million workers.

The relatively low proportion of circular economy employment recorded in low-income countries may seem counterintuitive, given the widespread presence of reuse, repair, and resource-efficient practices among economically disadvantaged communities. Research indicates that circular activities such as repairing vehicles and electronic goods, trading in second-hand markets, and informal recycling are extensive in these regions. However, because these practices are largely informal and community-based, they are mostly absent from official employment statistics, which this study relies upon.⁵²

Employment in the circular economy exists in every region and country income group, but its presence is unevenly captured in data and not equally supported by enabling conditions. Figure five illustrates the distribution of circular economy employment across country income groups, disaggregated by region.

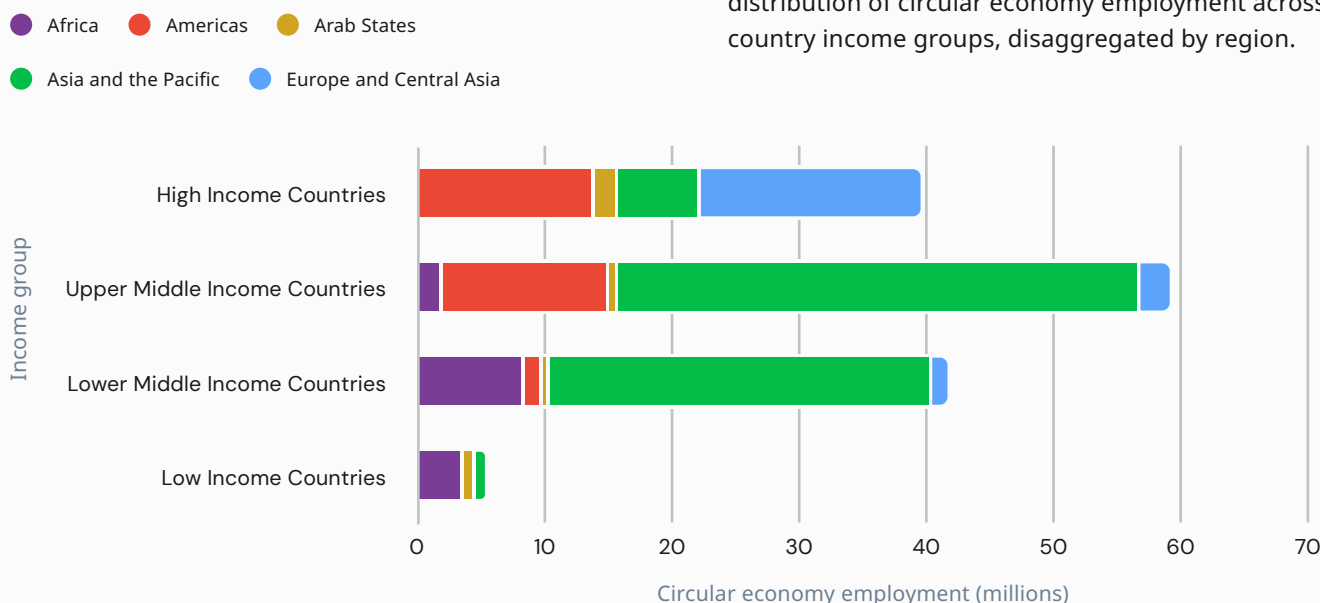


Figure five: Circular economy employment (in millions) across country income groups stacked by region (2023)

Relationship between income group and circle economy employment

The relationship between circular economy employment and country income is complex and mixed. Some lower-income countries have built sizable circular economy workforces, while some high-income countries have lower levels, as shown in Figure six. This suggests that country income alone does not automatically translate into more circular economy employment. Instead, country-specific factors matter, such as economic structure, informality, policy choices and technological capacity, amongst others. Higher product volumes and values in wealthier countries can also make circular economy activities more economically viable.

At the same time, necessity-driven practices such as repair and reuse, lower labour costs, and cultural norms related to extending the useful life of products contribute to higher levels of circular economy employment, although they are still largely invisible in data in lower-income settings. Policy makers should consider how to leverage country-specific factors and sectoral comparative advantage towards developing circular economy strategies and inclusive circular economy policies, including by considering how income-related gaps in circularity also reflect inequalities in workers' access to decent and stable employment.

Necessity-driven versus service-intensive circular activities

High-income countries tend to support service-intensive, institutionalised circular activities, enabled by higher consumer spending and specialised repair infrastructure, while lower-income settings rely more on necessity-driven practices. In high-income countries, 77% of circular economy employment is concentrated in fully circular sectors, such as waste and sewerage, repair, and materials recovery. This share is even higher in Europe and Central Asia, at 88%. In low-income countries, fully circular sectors account for 95% of circular economy employment. Urban transit is particularly significant in Africa (32.4% of circular economy employment) and Asia and the Pacific (24%).

The repair sector exemplifies different approaches to a circular economy, influenced by socioeconomic factors. For example, in many lower-income countries, repair and maintenance activities are a necessity, not a choice, due to low purchasing power and generally lower repair costs compared to those in higher-income countries. However, higher purchasing power, combined with the high costs of repair services in higher-income countries, can also lead to more frequent purchases of new products. In general, circular economy employment in low-income countries is largely driven by urban transit, highlighting the very limited maturity of circularity in both fully circular repair and waste sectors, as well as in partially circular sectors such as manufacturing.

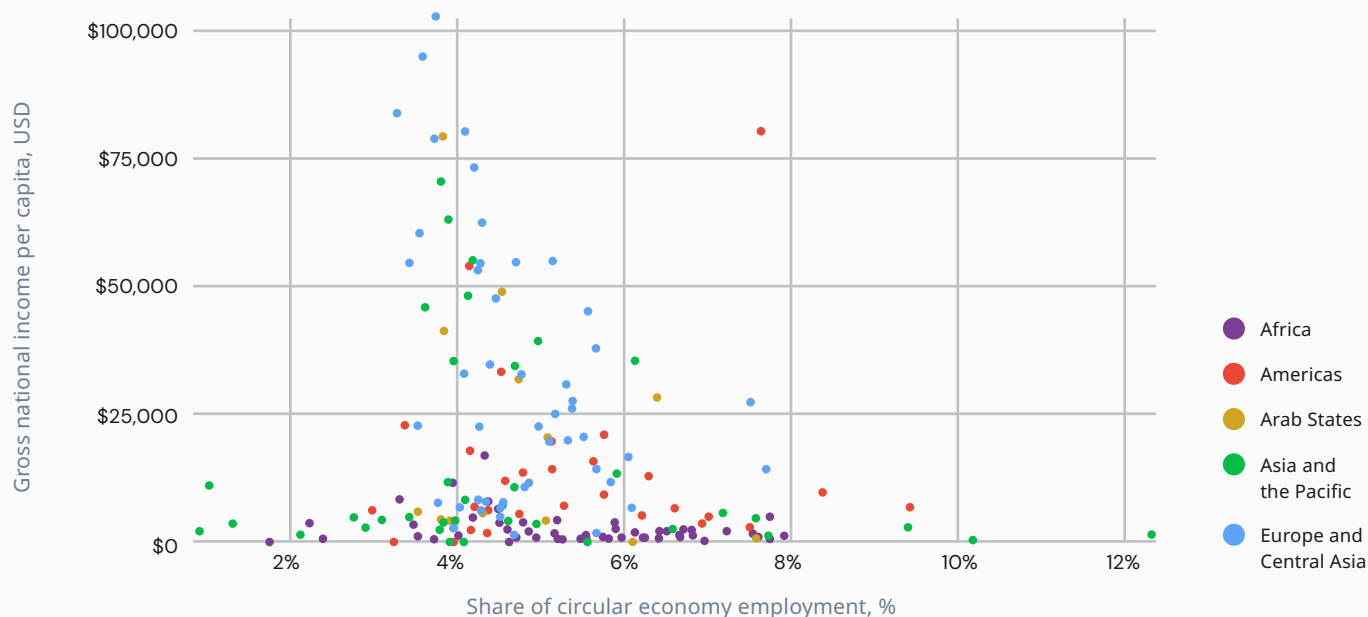


Figure six: Distribution of share of circular economy employment for countries as per gross national income per capita in USD (2023)

Sectoral distribution across income groups

Upper-middle-income countries in Asia and the Pacific power the global circular economy, employing 40.8 million people—nearly a third of circular economy employment worldwide. Circular economy employment in the region is heavily concentrated in second-hand retail and repair of motor vehicles (G), manufacturing (C) and urban transit (H), with 15.3, 14.7, and 13.7 million workers, respectively. These sectors are closely linked to the logistics, retail and circular production and industrial repair systems of emerging market economies. These countries combine scale with increasing formalisation and evolving gender dynamics, making the circular economy a dynamic and growing labour market. When low- and middle-income countries in the region are included, the total rises to 70.7 million workers, representing 50% of global circular economy employment.

In lower-middle-income countries more broadly, out of 40.5 million circular economy workers, urban transit (10 million), computers, personal and household repair (9.4 million), and manufacturing (7.95 million) are the largest employment sectors. In high-income countries, circular economy

employment is distributed across manufacturing (12 million), motor vehicle repair and second-hand retail (10.4 million), urban transit (10 million), and repair of computers and personal and household goods (9.4 million). High-income countries in the Americas demonstrate particularly strong circular economy integration (7%) with 13.6 million people employed.

Similarly, lower middle income countries collectively employ as many people employed in repair of computers, household and personal goods sector (S) as the rest of the world combined in this sector, at 8.3 million. In contrast, high-income countries have a notable share of circular economy employment in the manufacturing sector at 14%, which is more than double the share in upper-middle-income countries (6.3%). This highlights a gap between high-income and all other country income groupings when it comes to employment in value-added, technologically advanced circular economy employment, as well as in the diversification of circular economy activities.

Overall, the geographic arrangement of circular economy employment is shaped by country income levels: high-tech and infrastructure-dependent activities are concentrated in advanced economies, while labour-intensive circular activities dominate in developing countries. Figure seven shows the distribution of circular economy employment across sectors by country income group.

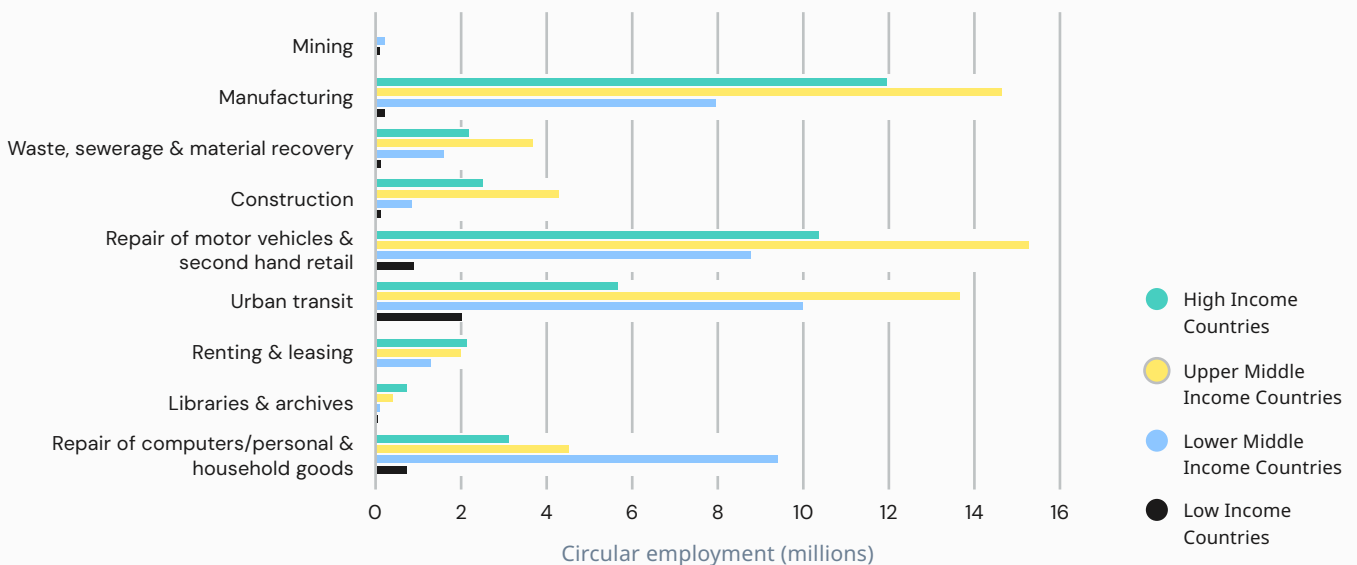


Figure seven: Circular economy employment (in millions) for ISIC sectors across country income groups (2023)

2.3 Informal work in the circular economy

Reflecting broader labour market patterns, more than half of global circular economy employment is informal, highlighting that much of the circular economy operates in low-regulation, low-protection labour markets. Circular economy activities are intertwined with the informal economy to varying degrees across sectors. Of the estimated 121 to 142 million people employed in the circular economy globally, more than 74 million (52%) are in the informal economy. This share is slightly lower than the overall informality rate of 58% across the 177 countries included in the study, likely due to the under-representation of informal circular activities in official statistics, particularly in low- and middle-income countries.

Sectoral distribution across income groups

Figure eight illustrates the number and share of informal circular economy employment across sectors. Informal work is concentrated in urban transit, with 18.4 million workers in informal employment (58.4% of the sector), and in motor vehicle repair and the second-hand goods retail sector, with at least 17.3 million informal workers (48.9%).

In the manufacturing sector (C), one in every two workers in the circular economy is employed informally, amounting to at least 15.3 million workers. In the repair of computers, personal items and household goods, informal employment involves at least 12.9 million workers, representing at least seven out of every ten workers in this sector.

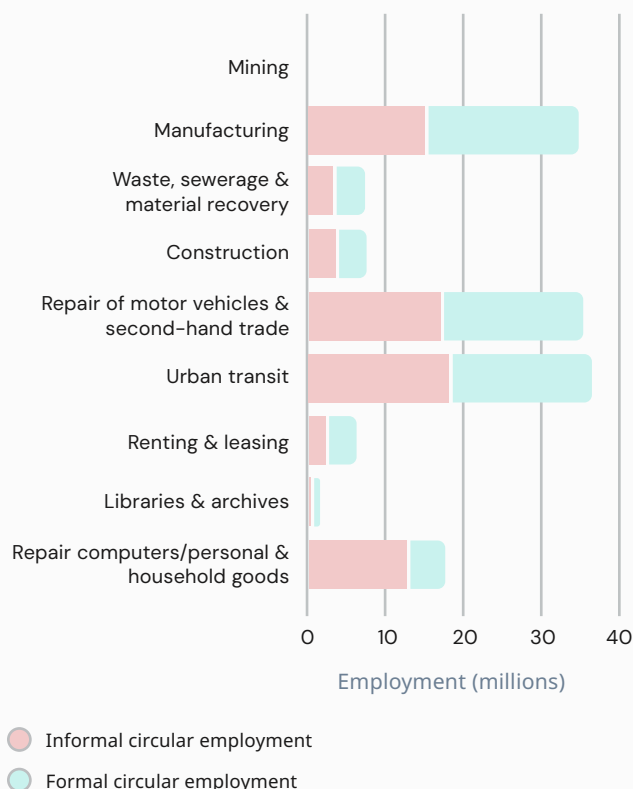


Figure eight: Number of informal circular and total circular economy employment worldwide per ISIC Rev 4 sector, in ISIC Rev. 4 (2023)

These numbers highlight that, without intervention, growing rates of circularity across sectors risk, to some degree, reinforcing informal labour patterns and posing risks to both human health and the environment. Many circular activities in the informal economy are carried out with minimal technological or mechanical aids. Workers and enterprises often lack the technical knowledge, training, and resources needed to reduce harm to the environment and health. For example, unregulated practices such as open burning of waste and improper disposal of hazardous materials may support material circularity but are detrimental to worker safety and environmental protection.

Regional patterns of employment in the informal economy

Formal circular economy employment, like in the formal economy more broadly, is highly concentrated in industrialised countries.

Informal circular economy employment is present in all regions and country income groups, but hotspots skew its geographical spread. Workers in the informal economy in Asia and the Pacific are the backbone of the global informal circular economy, with 49.8 million people, more than informal circular economy employment in all other regions combined. Here, more than 64% of circular economy employment in the region is classified as informal.

Africa and the Americas each contribute at least 10.2 million and 9.7 million workers in the informal economy to the circular economy. In Africa, informal employment accounts for 80% of circular economy jobs, while in the Americas, it represents 35.4%. In Europe and Central Asia, informal circular economy employment is 13%, with 2.7 million people employed.

Formal employment in the circular economy is highly concentrated in Europe and Central Asia, and high-income countries in North America, which together account for 71% of all formal circular economy employment. It is important to note that low informality rates in high-income countries may understate emerging informal dynamics, especially in migrant, gig-based, or platform economy work. In these countries, the mining sector has almost negligible contribution to the circular economy workforce, reflecting both the outsourcing of raw material loops and the limited scope of end-of-life material recovery in high-income labour markets.

Enterprises operating in informal contexts, ranging from microenterprises to small cooperatives, often drive circular economy activities at the grassroots level, creating local livelihoods while extending the lifespan of products and materials.⁵³ Apart from generating employment, these enterprises also support economic inclusion and skills development in areas where the formal economy is unable to provide livelihoods, often in challenging working conditions.



Addressing the gap in formal statistical recognition of these enterprises and workers in the informal economy is crucial for accurately assessing the true scope of circular economy employment and formulating inclusive policies that support sustainable enterprise development and improved working conditions. Limited data on informal, community-based and unregistered circular enterprises obscures the true extent of circular economy employment across regions and country income groups.

Income group patterns and persistent informality

Informal circular economy employment remains high in upper-middle-income countries, showing that even as economies advance, informality can persist within the circular economy—and that formalisation does not automatically follow industrialisation.

Informality is a defining feature of circular economy employment in lower-income settings. Across income groups, the share of informal circular economy employment increases sharply as income levels decrease. In upper-middle-income countries, more than half (55.4%) of the 58.5 million workers in the circular economy—at least 32.4 million—are informal, pointing to the widespread presence of informality in emerging economies. In high-income countries, at least 4.1 million circular economy employment (10.8%) is informal. This contrasts starkly with lower-middle-income countries, where 84% of circular economy employment (33.7 million) is informal, and with low-income countries, where 84.4% (3.5 million) falls outside formal systems. Regional patterns mirror these trends in income groups. Figure nine illustrates the distribution of informal circular economy employment across income groups, disaggregated by region.

Informal circular economy employment is most prevalent in Africa and the Asia-Pacific region. In Africa, 10.2 million people—80% of total circular economy employment—are employed informally. Asia and the Pacific, home to the largest number of circular economy workers globally, records 49.8 million informal circular economy employment, representing 64% of the region's circular economy labour force. The Americas present a mixed

picture, with an overall circular economy informality rate of 35% but sharp contrasts by income group. In high-income countries in the region, 10% of circular economy employment is informal, compared with 89.2% in lower-middle-income countries.

A similar pattern is seen in the Arab States, where the average circular economy informality rate is 48%, but varies widely from 25.5% (0.4 million of 1.5 million circular economy employment (25.2%) in high-income countries to 66% (0.1 million of 0.2 million in lower-middle-income countries to 78.8% (0.5 million of 0.6 million) in low-income countries. These variations reveal how regional averages can mask significant disparities across income groups.

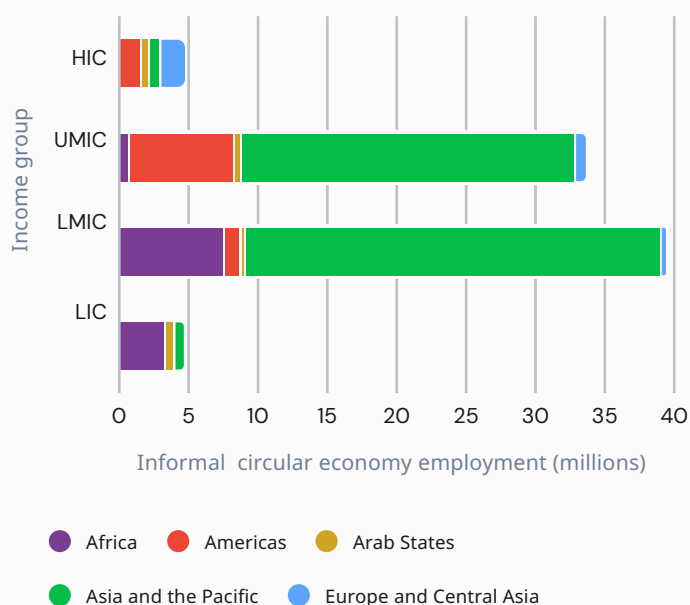


Figure nine: Informal circular economy employment in millions of workers employed in the circular economy by region and country income group (2023)

Sectoral informality by region

Regional comparisons reveal significant disparities in informal employment across circular economy sectors. Informality exceeds 80% in key sectors in Africa, Asia and the Pacific, and the Arab States, while remaining under 30% in much of Europe and the Americas. In the manufacturing sector, informal circular economy employment is concentrated in Africa (79%) and in Asia and the Pacific (75.1%), compared with 6.1% in Europe and Central Asia.

Second-hand trade and repair of motor vehicles is highly informal in the Arab States (86.2%) and Africa (80.9%). Urban transit also shows very high informality rates across Africa (83.1%), Asia and the Pacific (82.2%), and the Arab States (80%). Waste management, sewerage and material recovery activities are predominantly informal in Asia and the Pacific (75.2%) and the Arab States (73.4%). Interestingly, this same sector, along with the repair sector, records the highest levels of informality within Europe and Central Asia (24% and 26.2%, respectively), but lowest of all circular economy sectors in Africa (58.2%).

Informal employment in circular construction activities is high in Africa (91.3%) and in Asia and the Pacific (86%). Activities such as using secondary materials, reusing demolition waste, and retrofitting are often carried out by a fragmented, transient and informally employed workforce.⁵⁴ These workers typically face subcontracting, casual employment arrangements, and low unionisation rates that undermine collective representation and make it difficult to enforce labour standards or ensure access to social protection.

Computer and personal and household repair is also overwhelmingly informal in Africa (91.2%), Asia and the Pacific (89%), the Arab States (78.9%) and the Americas (74.1%). Figure ten shows the share of informal employment in circular economy sectors by country income group and region.



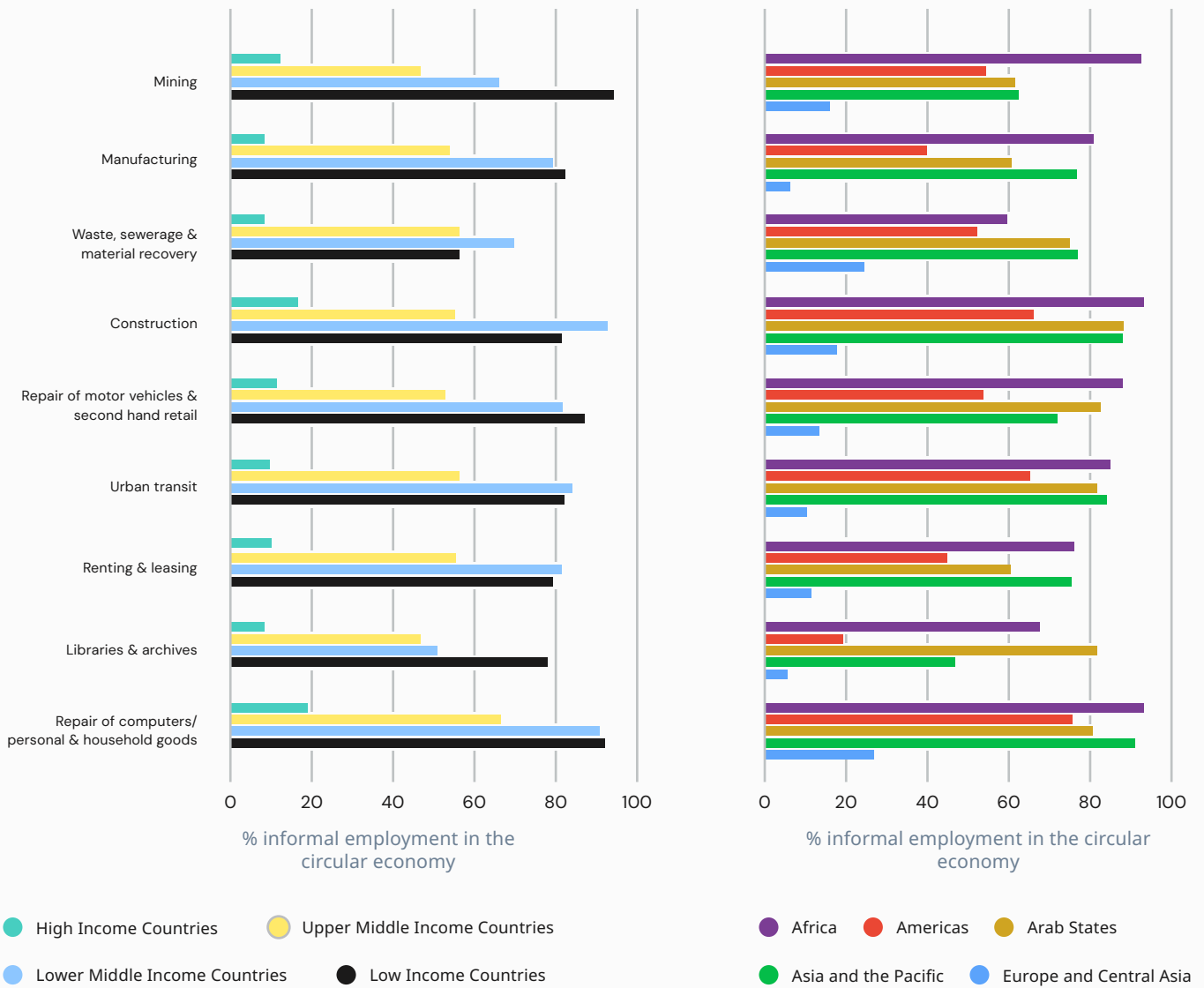


Figure ten: Informal employment rate in circular economy sectors by country income group and region (2023)

2.4 Women working in the circular economy

Women comprise one in four in circular economy employment. Similar to the overall economy, gender disparities are pervasive in the circular economy. At least 36.4 million women contribute to the circular economy, accounting for 26% of all circular economy employment in the baseline year of 2023.

Upper-middle-income countries lead both in the absolute number of women employed in the circular economy (18.8 million) and in women's share of circular economy employment (32%). They are followed by high-income countries, with 11.5 million women (30%); lower-middle-income countries, with 5.5 million (13.8%); and low-income countries, with 0.6 million (15.6%).

Regional distribution of women in the circular economy

By region, Europe and Central Asia employ at least 6.37 million women in the circular economy (30.7%), while the Americas account for 6.5 million (23.6%). The largest concentration of women—more than 21.7 million, or 60% of all women employed in the circular economy—is found in the resource-intensive, middle-income economies of Asia and the Pacific. Here, ongoing industrialisation and rapid urbanisation are expanding circular activities, but women's participation remains uneven despite its growing significance.

Of all regions and country income groups, high-income countries in Asia and the Pacific and upper-middle-income countries in Europe and Central Asia have the highest share of women employed in the circular economy at 43% each, followed by upper-middle-income countries in Asia and the Pacific (41.6%). In both Africa and the Arab States, women's share in circular economy employment is low: 13.7% and 4.7%, respectively. These global shares, especially in Africa and the Arab States, highlight both untapped possibilities and data limitations,

which fail to capture women's full contribution to the circular economy.⁵⁵ This includes examples of women entrepreneurs promoting circular activities in major textile hubs in countries in Asia such as Bangladesh, India, Indonesia and the Philippines.⁵⁶ Figure eleven shows the number of women working in the circular economy by region and country income group.

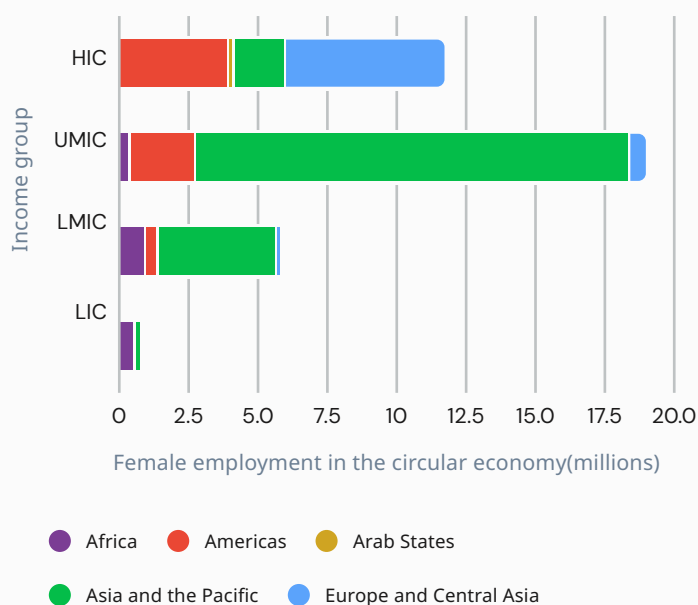


Figure eleven: Estimates of women in circular economy employment by regions and country income groups (2023)

Informality and women’s participation

In many lower-middle-income countries, particularly in the Arab States and Africa, high levels of informality are associated with lower female employment in the circular economy. However, in regions like Asia and the Pacific, informality can also create entry points for women, often driven by economic necessity rather than opportunity.

Asia and the Pacific stand out with 21.7 million women (28% of circular economy employment) engaged in the circular labour market despite high informality (64.2%). In subsistence-driven economies, where formal opportunities are limited, women’s participation in circular activities often reflects economic necessity rather than empowerment.

While informality can provide access to work, it constrains both the quantity and quality of women’s employment. Structural factors, ranging from vertical and horizontal segregation across and within sectors and entrenched social norms—will ultimately determine whether the transition to a circular economy narrows or widens existing gender gaps. Policies must therefore address the intersecting vulnerabilities faced by women in informal circular economy work. This includes access to social protection, childcare, and skills development, and drawing lessons from policies that have successfully supported women in the formal circular economy.

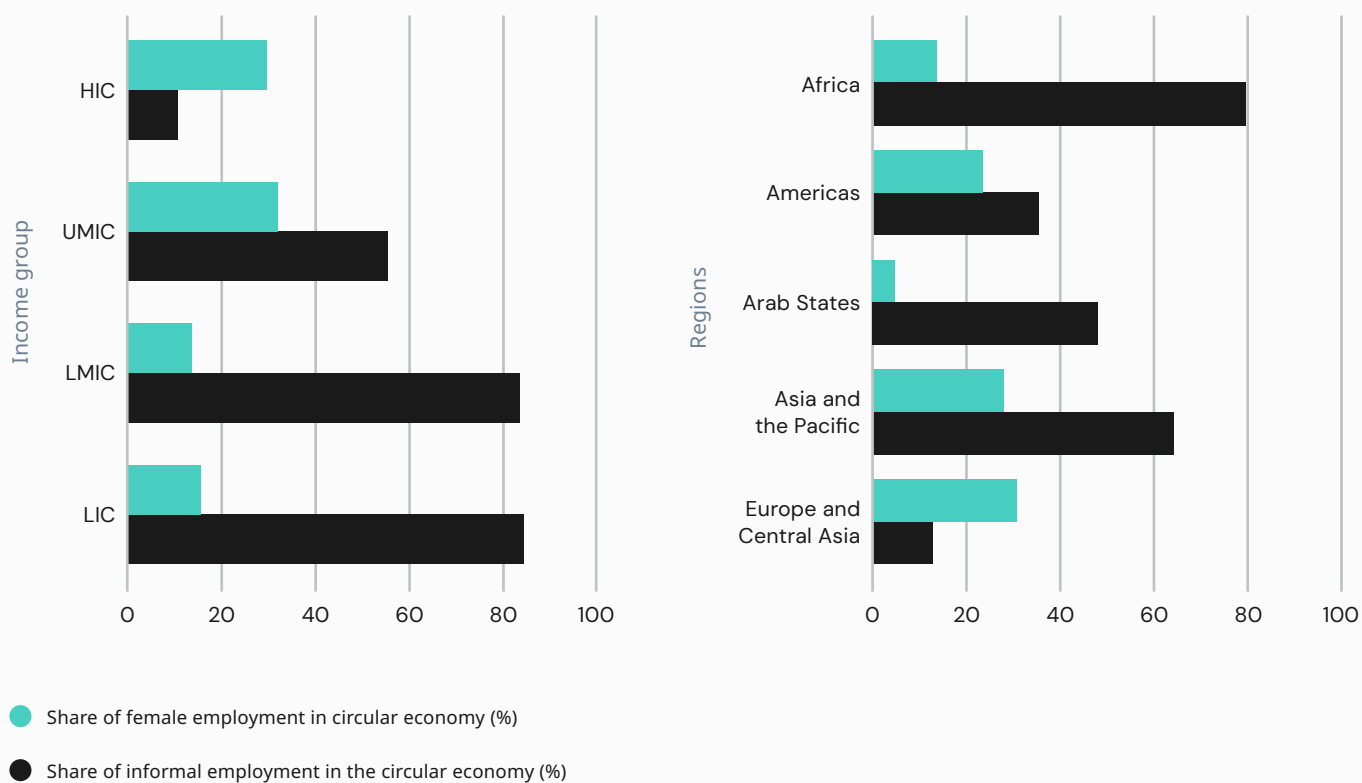


Figure twelve: Comparison of share of women and workers in the informal economy employed in the circular economy (2023)

Sectoral patterns of women’s employment

Women are key enablers of the circular economy in manufacturing, repair, and library and archives activities. Three sectors—manufacturing, computers, personal and household repair services, and second-hand retail and motor repair—collectively employ over 28 million women and feature relatively significant female participation rates of 34%, 31.5% and 31%, respectively. In contrast, libraries and archives, though smaller in size, show high female representation (56.1%, 0.7 million). Gender disparities are evident in sectors such as construction and urban transit, where women comprise 9.3% and 11% of circular economy employment.

Addressing these disparities will require gender-responsive policies to proactively include women in all sectors of the circular economy and improve the working conditions of those already employed in circular economy sectors. In Colombia, for instance, *Asociación de Recicladores de Bogotá* played a pivotal role in securing formal recognition for women waste pickers along with the redesign of the municipal waste management system, which evolved to include contracts for women-led cooperatives and ensured access to health and pension benefits.⁵⁷ Figure 13 shows the share of women’s circular economy employment in each sector under consideration in the study.

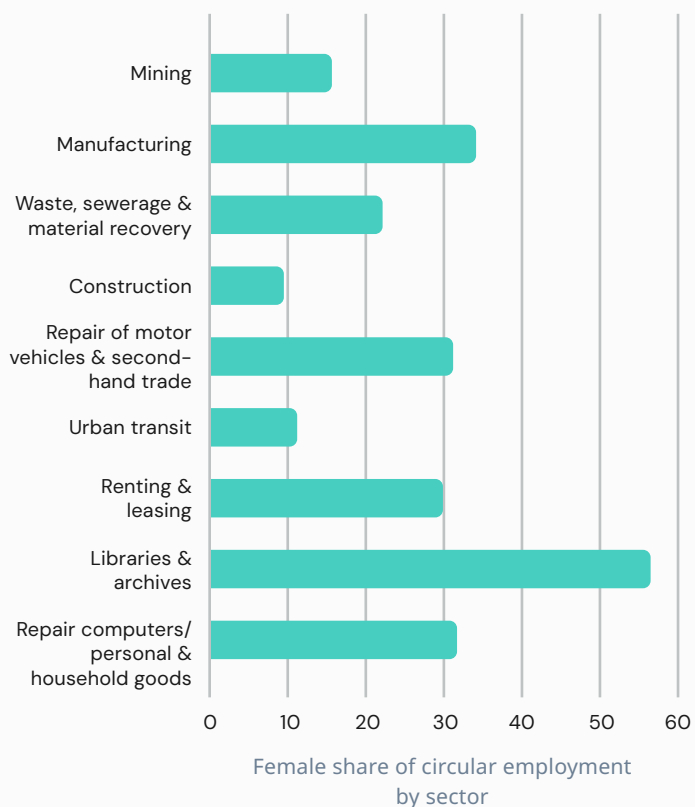


Figure 13: Women’s employment share in circular economy employment across sectors (2023)



3

The way forward

3.1 Conclusions

The circular economy offers a powerful approach to addressing the key challenges of our time: **improving human well-being, economic performance, and social equity while staying within the planet’s ecological limits.** By promoting strategies like resource efficiency and recovery, it can boost productivity in production and create more and decent jobs that foster social benefits and equity. When embraced not only as an environmental but also as a socio-economic agenda, the circular economy encourages us to rethink how we work, produce, live and consume. It can support inclusive economic growth, foster sustainable enterprises, improve working conditions, advance gender equality, and uphold fundamental principles and rights at work. Together, these outcomes can lead to more sustainable models of production and consumption, ultimately contributing to inclusive and sustainable economic development—environmental, economic, and social—that uplifts all people and workers around the world.



The first global baseline of circular economy employment underscores its significant economic and social potential by revealing the scale and diversity of jobs that already exist within the circular economy. At least 121 to 142 million workers—representing 5 to 5.8% of the global workforce—are engaged in circular economy activities. These activities span all regions and income groups worldwide. However, workers in the circular economy face many of the same challenges that affect the broader labour market, including high levels of informality and persistent gender inequality. Circular economy strategies and policies must therefore include provisions to address existing decent work deficits and to promote sustainable enterprise development and quality jobs. For circular economy employment to grow inclusively and sustainably, it is essential to ensure strong participation of employers' and workers' organisations, greater investment in labour administration and inspection capacity, and sound labour legislation driven by international labour standards. This is particularly critical for workers engaged in labour-intensive, low-paid, and hazardous circular activities, who often face multiple and overlapping disadvantages.⁵⁸

Gender imbalances persist, and in many instances are exacerbated, within the circular economy, where women remain underrepresented in both formal and informal roles. Across most country income groups and regions, the share of women employed in the overall economy exceeds their share within the circular economy. This emphasises the need to strengthen evidence on women's contributions to both the overall economy and circular economy in particular, and to foster an enabling environment—guided by the Decent Work Agenda—that expands women's access to decent, safe and fairly paid opportunities. Achieving this requires addressing the structural barriers that limit women's participation, extending social protection, and promoting initiatives that improve access to education and skills development, particularly in rapidly industrialising and urbanising contexts.

The structure of circular economy employment varies significantly by income group and region, with formalisation more common in higher-income countries and informality dominant in lower-income countries. The high degree of informality in lower-income countries, particularly in sectors like construction and repair, indicates that circular activity in these sectors is more necessity-driven and livelihood-oriented, rather than being led by industrial policy. This suggests there is an opportunity to leverage the vast existing knowledge in these sectors among the informal workforce. It also highlights the need for rights-based approaches and context-specific integrated strategies to support the transition to formality, and with it, value-added, industrialised circularity. In this regard, it is important to note that the estimates presented in this report may not fully capture the scale of employment in the informal circular economy, due to limited data and statistics on workers engaged in circular economy activities as a secondary or tertiary source of income.

A small number of sectors currently account for most circular economy employment globally—particularly repair services, waste management, and urban transit. This reflects the fact that today's circular activities are concentrated at the ends of product life cycles, where use-extension and end-of-life management create substantial labour demand. These activities remain central to the circular economy and continue to play an important role in generating employment.

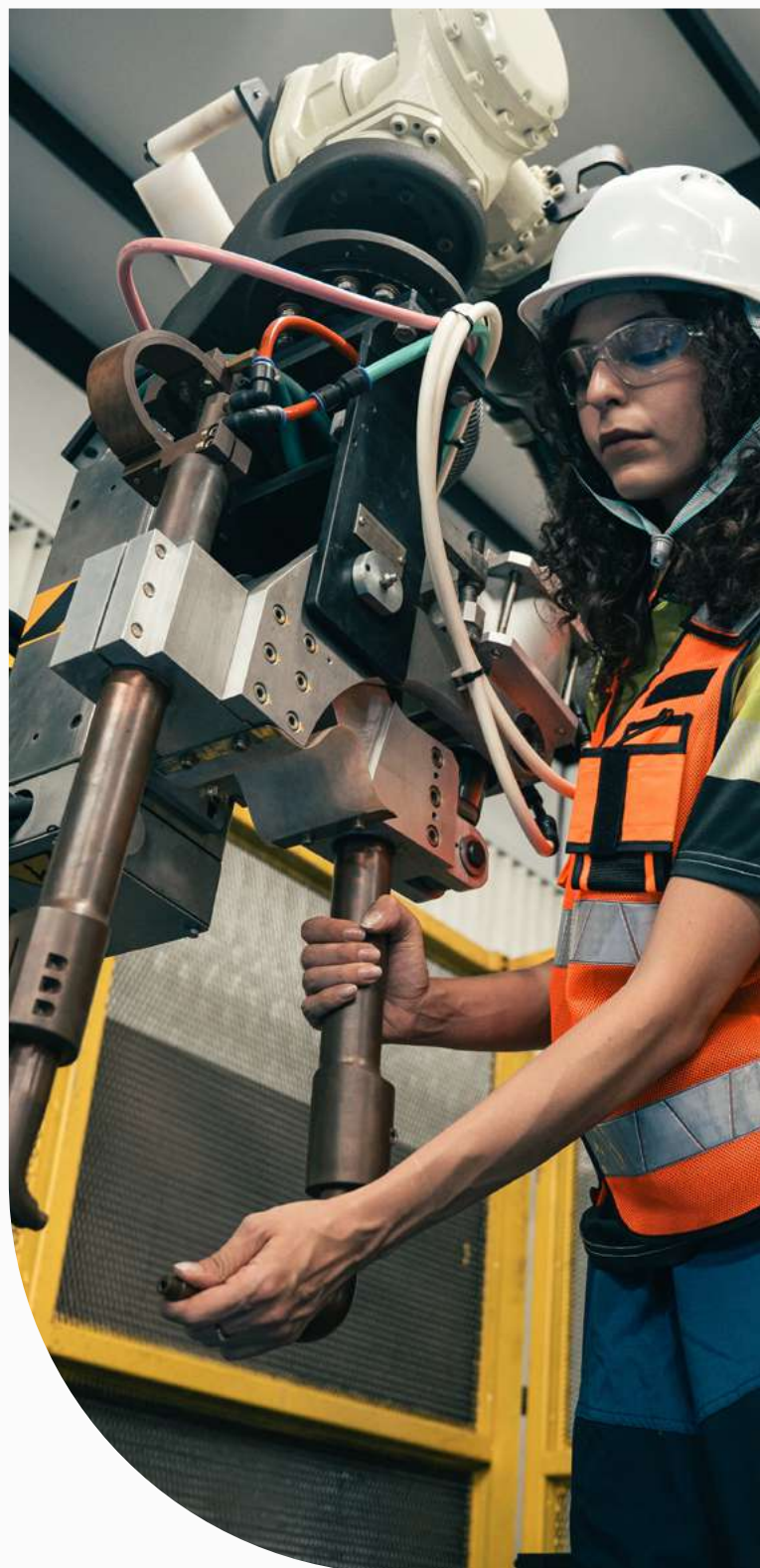
At the same time, the concentration of circular employment in these domains highlights the untapped potential in other parts of the economy. Opportunities exist to expand circular activities in higher value-added sectors—such as manufacturing and construction—where circular design, resource-efficient production, reuse, remanufacturing and advanced materials recovery can support both environmental objectives and job creation. However, many of these sectors continue to face challenges related to gender disparities, informality and broader decent-work deficits. Circular strategies that do not take these realities into account may fail to deliver inclusive outcomes. Ensuring that circular economy expansion in manufacturing, construction and related industries is accompanied by improvements in job quality, skills, safety and equity will be essential for preventing existing inequalities from being replicated or deepened.

Sectoral patterns of employment in the circular economy reflect broader national economic structures, including levels of industrialisation, urbanisation, and the size of the services sector.

However, the persistence of an industrialised country bias within available datasets limits the understanding of circular economy employment in developing and rural contexts, particularly within agricultural and other bio-based sectors. Agricultural activity remains largely unquantified in circular economy statistics due to lack of standardised definitions and indicators that distinguish regenerative or resource-efficient practices from conventional production.⁵⁹

The concentration of low-value circular economy activities in lower-middle-income countries and low-income countries, and high-value circular activities in upper-middle-income countries and high-income countries, highlights how the geographic distribution of circular economy employment is shaped by income levels.

High-tech and infrastructure-dependent activities are concentrated in advanced economies, while labour-intensive activities are concentrated in lower-income economies. This trajectory has implications for both the quality and quantity of employment. In low-income contexts, circular economy concepts such as cost-efficiency (frugality) and extending the life cycle (use) of a product are often enmeshed in their socio-economic functioning.⁶⁰ Workers in these sectors frequently lack access to social protection and a safe and healthy work environment, underscoring the need to extend labour rights in key circular economy sectors. Equally important is the recognition of the economic, social and environmental value of these activities, as well as the dignity of the work carried out within them. Integrating workers in the informal economy into public systems, alongside strengthening statistical and reporting initiatives, is essential to ensure that circular interventions are holistic, evidence-based, and tailored to the realities of both the workforce and the broader economy.



Asia and the Pacific contribute the largest share of circular economy employment in absolute numbers, while the Americas have the highest proportion of circular economy employment relative to total employment. Europe and Central Asia lead in formal circular economy employment. Many regions and country income groups with high informality rates also exhibit reduced women's employment in the circular economy.

Significant differences exist between countries within these regions, depending on their economic arrangement. The regional distribution of circular economy employment reveals distinct trajectories, highlighting the need for region-specific strategies for job creation, formalisation, and gender inclusion within the circular economy.

The current state of circular economy employment highlights significant opportunities for targeted investment, context-specific formalisation strategies, sustainable enterprise development, and inclusive labour market policies supported by social dialogue to enable a just transition to a circular economy. This must include addressing its potential risks, ensuring that the growth of the circular economy does not exacerbate existing vulnerabilities, including those linked to gender imbalances and informality.⁶¹ Addressing these risks requires strengthening the institutional linkages between national green and circularity policies, national labour and employment strategies, and innovative approaches to sustainable development and financing. These efforts should be reinforced by inter-ministerial coordination and policy coherence, alongside the active involvement of world-of-work actors, particularly since circular economy roadmaps are currently primarily led by environmental ministries.⁶²

There is a profound lack of data on how the circular economy is structured globally and on the various dimensions of circular economy employment, limiting our understanding of its impact on labour markets. This latter limitation is well acknowledged within research on the circular economy. However, the former is less widely acknowledged but well-highlighted in this report through the different sectoral patterns observed and how they are reflected in broader economic structures within and across regions and country income groupings. This report reveals that the increasing number of circular

economy roadmaps, policies, and legislation under development increasingly rely on data that represents only a subset of the circular economy, heightening the risk of over- or underestimating the ripple effects of circular economy policies on workers—particularly for lower-income countries. Policies based on incomplete data will also fail to provide adequate protection for the diverse workforce engaged in circular activities.

Existing labour statistics rarely capture secondary and tertiary economic activities, and although much of the informal economy is included in national data, a significant share remains unmeasured. These gaps limit the ability to fully estimate employment in the circular economy, particularly where circular activities are performed alongside other income-generating work. This study demonstrates that data limitations are two-fold. First, statistical industrial classifications, such as ISIC, do not specifically classify circular activities and are not easily adapted to study enterprises or workers engaging in circular practices as a primary or secondary activity. Second, there is a lack of consistency across countries in the granularity of available employment data. For example, ISIC at the 4-digit level, where circular activities can be more clearly observed, is often inaccessible for many EU and Organisation for Economic Co-operation and Development (OECD) countries. See Annex II for further details. This highlights a parallel to the industrialised country bias observed in previous research under this initiative and suggests that efforts to improve the evidence base should also address data availability and accessibility in high-income countries. Relevant initiatives in this context include OECD efforts, such as the Key Indicators of Informality based on Individuals and their Households database and the Trade in Value-Added database, which aim to collect a broader range of indicators for use in research on employment and labour dynamics.

3.2 Recommendations: steps towards inclusive circularity

Building on this critical, foundational study will require expanding the evidence base so that future analyses capture the full scope and quality of circular economy employment across countries. Future iterations should integrate additional disaggregated data and methodological extensions to better measure circular activities and the employment they generate. Incorporating decent work indicators such as employment and enterprise type, wages, social protection coverage, and freedom of association will allow for a more accurate reflection of working conditions and labour outcomes across circular economy sectors. Linking this methodology with dimensions such as skills, enterprise characteristics, and local value-chain hotspots will further strengthen its analytical power and relevance for policy.

Additional research, institutional collaboration and bottom-up approaches can enhance the accuracy of employment estimates, particularly for partially circular sectors, notably agriculture.

Such efforts are particularly relevant for low- and middle-income countries, where livelihoods are often rooted in resource-based and subsistence-related activities that already exhibit circular practices. Advancing this work would help close the current evidence gap between livelihood-driven and technology-intensive circular economies and should be a priority for future editions of this study. Future modelling should also examine cross-country linkages, including how regulatory and market shifts in higher-income economies may influence employment patterns and inequalities elsewhere.

Recommendations from this study for policy and supporting measures are presented below, aligned with the nine policy principles in *Guidelines for a just transition towards environmentally sustainable economies and societies for all*, endorsed by 187 ILO Member States in 2023.⁶³



1. Macroeconomic and growth policies

Use these global estimates of employment in the circular economy as a catalyst for integrating socio-economic dimensions into circular economy policy-making and implementation.

Combining labour market and sectoral data enables the identification of priority areas for both circular economy development and decent work promotion. Periodic monitoring of global employment in the circular economy, using the global baseline methodology, can support the tracking of trends in the circular economy across time and geography. Such efforts will support the integration of circular practices and just transition considerations into environmental and climate policies, including in Nationally Determined Contributions.⁶⁴

Utilise data on circular economy employment to support policy coherence and the mainstreaming of circular economy and decent work into national, sectoral and local employment policies and development plans.

This can be enabled by conducting national or local baselines utilising the methodology presented in this report to support the development or augmentation of circular economy and employment roadmaps. This can support policymakers, employers' and workers' organisations, and other relevant stakeholders in developing action plans for skills, labour market, and sustainable enterprise development, including for MSMEs, cooperatives, and workers in the informal economy, to accelerate progress towards a circular economy and tailored pathways towards formalisation.

Reorient public investment strategies to support employment-intensive circular economy activities backed by employment support systems. Public sector institutions should be encouraged to develop models for funding circular transformation and create investment pipelines for circular economy sectors with high employment and decent work potential. When developed in collaboration with employers and worker organisations, these can be targeted towards improving productivity and addressing unemployment, particularly for young people in countries with a demographic dividend. Public circular economy investment should look beyond more conventional capital-intensive projects and direct concessional finance to employment-intensive initiatives, especially if they fall outside conventional bankability thresholds.



2. Industrial and sectoral policies

Promote circularity beyond fully circular sectors by incentivising sectors such as manufacturing, construction, and, in the future, agriculture, through sectoral roadmaps. Emerging markets and low-income countries that are industrialising such sectors have the opportunity to integrate circular economy strategies and decent work into industrial strategies. This can be complemented by further research into the challenges and opportunities faced by enterprises of different types, sizes and in different value chains and country contexts, when incorporating circularity into their business models and practices. This will, in turn, support workers' and employers' organisations in establishing pathways for scaling circularity with decent work and productivity gains through social dialogue.

Utilise this methodology and conduct complementary studies that use bottom-up data to identify the policies and investments required to diversify circular economy employment towards higher-value employment. This may be achieved through targeted investment in infrastructure and technology, such as funding for advancing and increasing productivity in recycling, remanufacturing and repair centres. Such funds would need to be accompanied by policies that incentivise increased collaboration, technical assistance, technology transfer and resource sharing between firms in advanced economies and those in developing countries, in line with the local needs and circumstances.

Governments and the private sector can catalyse decent job creation by integrating circular strategies and implementing green, circular procurement policies. Using national or local baselines generated using this methodology, authorities can identify strategies for priority sectors and hotspots for investment, and align procurement with these priority sectors to create predictable demand and bankable project pipelines. The Netherlands' *Versnellingsnetwerk Circulair Inkopen*⁶⁵ which enables companies to implement circular procurement and the City of Cape Town's *Green Procurement Action Plan*⁶⁶ are notable initiatives in this regard. Targeted public and private procurement can stimulate markets for recycled inputs, repair, and material recovery. Scaling such approaches can help governments identify priority sectors, channel investments, and generate predictable demand that translates directly into decent and formal employment opportunities.



3. Enterprise policies

Use national-level applications of this report’s methodology to identify where circular economy activities already contribute to employment and where additional opportunities for circular enterprise development exist. This can support policymakers and workers’ and employers’ organisations to set concrete goals for expanding circular activities and promoting employment. At the local level, municipalities in low- and middle-income countries can partner with cooperatives and workers’ organisations representing those in the informal economy—who are often excluded from formal finance channels—to strengthen the delivery of essential circular services in ways that improve working conditions and expand employment opportunities. In countries like Brazil and Colombia, union-led initiatives have helped integrate waste pickers into formal systems, offering a model for other contexts.⁶⁷

Promote an enabling environment for the development of sustainable circular economy enterprises, including MSMEs and cooperatives, by strengthening policy, regulatory and financial frameworks that allow enterprises to thrive during the transition to a circular economy. This includes supporting enterprise-related programmes, providing support for business development services and incentives for technical assistance providers, and improved access to finance and capacity development. Formalisation efforts for informal enterprises and cooperatives should be prioritised in locally-relevant ways to enable them to access public systems, finance, and markets.

Embed enterprise support measures that promote responsible business conduct within circular economy roadmaps and value chain initiatives. This should include multi-stakeholder initiatives, for example, to align prices and purchasing practices with social commitments and ensuring that purchasing models consider decent work. In turn, this will support the twin transition towards productivity and formality laid out at the outset of this report. The ILO’s *Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy* provides guidance in this area through its principles in the field of employment, training, conditions of work and life, and industrial relations.^{68,69}





4. Skills development

With fast-paced changes in the world of work, governments and the private sector must invest in skills development and lifelong learning for all, in collaboration with employers' and workers' organisations. This includes support for more technical and vocational education and training, ensuring workers in these sectors have opportunities for continuous development, in line with technological, regulatory and market changes that may shape their work in the short and long term. In higher-income countries, promoting circularity in already advanced sectors requires reskilling the existing workforce and integrating circularity into existing vocational and professional development pathways, including in the public sector. Setting targets for circularity in sectors at both national and local levels can provide financial incentives for employers and governments to invest in skills, alongside required complementary technology, infrastructure and equipment.

Ensure that skills development initiatives are inclusive and accessible to all, including workers in the informal economy, women, and youth. Skills provision should be designed to address the specific needs of and risks faced by workers operating in value chains across different country contexts. Workers' organisations, together with employers' organisations, have a key role to play through all forms of social dialogue, including collective bargaining, in ensuring decent work and in forecasting skills needs and transition-related employment challenges. This includes designing adequate and continuous training to promote equal access to opportunities for skills acquisition and recognition for all, in particular for young people, women, and workers who will need to be redeployed as sectors transition. Targeted skills development initiatives, such as the European Institute of Innovation and Technology's Girls Go Circular initiative, can provide a model for increasing women's access to employment opportunities and closing the gender skills gap in STEM fields that are key to the circular economy.^{70,71} Such skills initiatives should reach across borders, and for owners and workers of MSMEs, by offering specific training services,

ensuring suitable timing and duration, and promoting supportive policies to enable individuals to balance their work, family and lifelong learning interests.



5. Occupational safety and health

Engage in social dialogue to ensure that scaling circularity goes hand in hand with improved occupational safety and health, particularly in sectors and for groups of workers that face precarious work and hazardous working conditions. Occupational safety and health policy and management systems must be tailored to specific circular economy activities and continuously revisited to address emerging risks associated with new materials and processes that workers in different sectors are exposed to. Implementing robust OSH measures must come with enforcement, alongside training and support for supply chain actors to implement them.

Extend OSH coverage to informal workers and microenterprises engaged in circular activities through adapted approaches, such as community-based health and safety services, integration of OSH training and protective equipment into cooperative or municipal programmes, and simplified compliance schemes for microenterprises. Strengthening labour inspection and outreach in collaboration with organisations representing informal workers can help ensure that even those outside formal systems also benefit from minimum OSH protections.



6. Social protection

Recognise workers in the informal economy and women as critical enablers of the circular economy, especially in repair, waste, sewerage and material recovery sectors, where workers often face precarious working conditions and have limited access to social protection. More investments by governments are required to extend comprehensive social protection coverage, including, but not limited to, unemployment benefits, healthcare, and pensions, to all workers in the circular economy, thereby mitigating the social costs of the transition and ensuring no one is left behind.

Expand financing for social protection systems to cover workers engaged in circular economy activities, including those in informal and precarious forms of work. This can be achieved through a mix of public budgets, contributory schemes adapted to self-employed and informal workers, and innovative financing mechanisms. Financial institutions can play a catalytic role by co-financing national schemes. Clear reference to labour standards in circular economy roadmaps can also guide public and private actors to prioritise investments that improve job quality across circular value chains—including measures to extend social protection coverage, strengthen occupational safety and health, and support transitions out of informality. Directing funding toward these measures can help generate practical examples and shared learning on effective approaches to formalisation in circular economy sectors.



7. Active labour market policies

Foster entrepreneurship and support for young people in the circular economy through active labour market policies (ALMPs) that strengthen ecosystems for innovation, productivity and decent work opportunities. This requires expanding access to affordable finance, capacity building, and tailored training and mentoring programmes for workers and job seekers, particularly those engaged in MSMEs, cooperatives, informal enterprises and social and solidarity economy entities. ALMPs should build technical know-how and capacities to navigate emerging regulations and compliance requirements associated with circular economy markets. Such measures can promote labour market participation that is both socially inclusive and environmentally sustainable, positioning young people as key drivers of the circular economy transition.

Promote targeted opportunities for decent jobs for young people in the circular economy, including integrated youth employment strategies, active labour market policies, vocational training programmes and effective inclusion of young people in social dialogue. This will be particularly relevant in regions with significant youth populations and a rapidly growing workforce, but high levels of unemployment, such as in many countries in Africa and South Asia. Mobilising investments towards improved data ecosystems can enable more agile, efficient and evidence-based ALMPs and catalyse progress towards decent work in the circular economy.

Enhance the capacity of public agencies and statistics offices to build and improve national and international data ecosystems that are essential for effective ALMPs. International data initiatives can help improve data coverage, granularity and comparability. Given the extent of circular economy activity that takes place in the informal economy, initiatives to improve data and estimates for the informal economy will be highly valuable for supporting their inclusion in evidence and policymaking. Improved estimates will enable more targeted measures, including for marginalised groups, such as migrants, youth and women, in ALMPs.



8. Rights

Ensure the respect, promotion, and realisation of fundamental principles and rights at work in the circular economy, namely freedom of association and the effective recognition of the right to collective bargaining, the elimination of all forms of forced or compulsory labour, the effective abolition of child labour, the elimination of discrimination in respect of employment and occupation, and a safe and healthy working environment. These principles are not separate concepts but rather a coherent framework for decent work and empowering all those who work in the circular economy.⁷²

Gender-responsive circular economy strategies that address discriminatory practices are vital for addressing existing gender gaps in the overall labour market, including women's concentration in low-remunerating circular economy activities and their heightened exposure to precarious work conditions and waste-related hazards. Such strategies should prioritise women's access to skills development, social protection and safe working conditions, while creating pathways into higher-value segments of circular economy value chains where women remain underrepresented. Improved data on women's roles in circular economy sectors is also essential, as current statistics often fail to capture their contributions, particularly in informal work and community-based activities.

Promote legal recognition and tailored pathways toward the formalisation of workers and economic units in the informal circular economy in line with the *Transition from the Informal to the Formal Economy Recommendation, 2015 (R204)*, providing them with access to labour rights and protections, including by drawing on the ILO's recently adopted policy guidelines for the promotion of decent work in recycling.^{73,74}

Leverage enabling policy instruments to stimulate demand for decent, circular economy jobs and embed labour rights into social safeguards and just transition frameworks.

Among development finance institutions, environmental and social safeguards can be updated to support labour rights and decent work in the circular economy by extending protections to informal and circular-specific labour, ensuring fair conditions, social dialogue, and adequate consideration of labour market adjustments resulting from development initiatives.



9. Social dialogue and tripartism

Strengthen the capacity of governments, and employers' and workers' organisations to engage in meaningful social dialogue on circular economy policies. This should include support for social partners to bring data on circular economy jobs into social dialogue and collective bargaining processes. Efforts towards inclusive circular economy policy-making should be accompanied by dedicated support to organisations and formal recognition of workers and economic units in the informal circular economy. This includes joining organisations, federations and confederations of their own choosing. This will enable the voices of these often invisible workers to be heard in policy dialogues and increase their coverage in circular economy policies where they intersect with local labour standards and laws.

Strengthen legal protections, collective bargaining and institutional support for employers' and workers' organisations, to support employers and workers in both the formal and informal circular economy. This should come alongside strengthening tripartite mechanisms at national, sectoral, and local levels to facilitate negotiations and agreements on circular economy initiatives, ensuring that decent work is central in circular economy roadmaps. Guided by national assessments and social dialogue, Just Transition Plans should include measures to promote the creation of more decent jobs in the circular economy.

Endnotes

1. Circle Economy. (2024). *Circularity and Informality: Redefining narratives*. Retrieved from: [Circle Economy website](#)
2. ILO. (2018). *Women and men in the informal economy: A statistical picture* (3rd ed.). Retrieved from: [ILO website](#)
3. UNIDO. (2022). *Industrial Development Report 2022: The Future of Industrialization in a Post-Pandemic World*.
4. ILO. *Decent work*. Retrieved from: [ILO website](#)
5. Circle Economy, ILO & S4YE. (2023). *Decent Work in the Circular Economy: An Overview of the Existing Evidence Base*. Geneva: ILO. Retrieved from: [Circle Economy website](#)
6. Pansera, M., Barca, S., Martinez Alvarez, B., Leonardi, E., D'Alisa, G., Meira, T., & Guillibert, P. (2024). Toward a just circular economy: Conceptualizing environmental labor and gender justice in circularity studies. *Sustainability: Science, Practice, & Policy*, 20(1), Article 2338592. doi:10.1080/15487733.2024.2338592
7. Circle Economy. (2022). *Measuring and modelling circular jobs: A review of definitions, databases, methods and models for understanding employment in the circular economy*. Retrieved from: [Circle Economy website](#)
8. ILO. (2016). Guidelines for a just transition towards environmentally sustainable economies and societies for all. Retrieved from [ILO website](#).
9. UNIDO & Chatham House. (2023). *First study on national circular economy roadmaps*. Retrieved from: [UNIDO website](#)
10. UNIDO. (2022). *Why adopting a gender-inclusive approach towards circular economy matters*. Retrieved from: [UNIDO website](#)
11. Circle Economy. (2023). *Socioeconomic Impacts of European Union Circular Textiles Policies on Trading Partners*. Retrieved from: [Circle Economy website](#)
12. Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The circular economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768. doi:10.1016/j.jclepro.2016.12.048
13. Brink, H., Lucas, P., Baldé, C. P., & Kuehr, R. (2021). *Potential effects of Dutch circular economy strategies on low- and middle-income countries: The case of electrical and electronic equipment*. Retrieved from: [PBL Netherlands Environmental Assessment Agency website](#)
14. ILO. (2023). *Working Paper on informality measurement*. Retrieved from: [ILO website](#)
15. ILO. (2019). *Heat at work: Implications for safety and health: A global review of the science, policy and practice*. Retrieved from: [ILO website](#)
16. Circle Economy, ILO & S4YE. (2023). *Decent Work in the Circular Economy: An Overview of the Existing Evidence Base*. Retrieved from: [Circle Economy website](#)
17. Circle Economy, ILO & S4YE. (2024). *Measuring and modelling circular jobs: A review of definitions, databases, methods and models for understanding employment in the circular economy*. Retrieved from: [Circle Economy website](#)
18. Ellen MacArthur Foundation. (2022). The biological cycle of the butterfly diagram. Retrieved from: [EMF website](#)
19. Circle Economy. (2021). Key elements of the circular economy. Retrieved from: [Circle Economy website](#)
20. International Finance Corporation (IFC). (2025). Harmonized circular economy finance guidelines. Retrieved from: [IFC website](#)
21. Bocken, N., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320. doi:10.1080/21681015.2016.1172124
22. Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232. Retrieved from: [ScienceDirect](#)
23. Eurostat. (n.d.). EU circular economy monitoring framework. Retrieved from: [Eurostat website](#)
24. Circle Economy. (2023). Circular jobs methodology. Retrieved from: [Circle Economy website](#)
25. Ministère de la Transition écologique. (2024). Quantification de l'emploi dans l'économie circulaire. Retrieved from: [French government website](#)
26. Ellen MacArthur Foundation. (2022). *The biological cycle of the butterfly diagram*. Retrieved from: [EMF website](#)
27. IFC. (2025). *Harmonized circular economy finance guidelines*. Retrieved from: [IFC website](#)
28. Circle Economy. (2021). *Key elements of the circular economy*. Retrieved from: [Circle Economy website](#)
29. Bocken, N., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320. doi:10.1080/21681015.2016.1172124

30. Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232. Retrieved from: [ScienceDirect](#)
31. United Nations Economic Commission for Europe (UNECE). (2024). *Guidelines for measuring the circular economy: Part A – Conceptual framework and indicators*. Retrieved from: [UNECE website](#)
32. The technical cycling rate relates to the management of non-renewable and largely non-biological resources that are difficult to reintroduce into the biosphere safely. Examples include concrete, plastics and metals, as well as some processed biological materials, such as timber, paper, textiles and bioplastics—this is referred to as ‘technical biomass’. Materials that are part of the technical cycle fall into one of four categories: they become Secondary Materials, are Virgin, Non-Renewable Materials destined for disposal without recovery, are added to Stocks, or are Fossil Fuels combusted for energy.
33. MRIO Eora and Eora26 use the term “recycling sector” which corresponds to ISIC 383 – Materials Recovery.
34. MRIO Eora and Eora26 use the term “recycling sector” which corresponds to ISIC 383 – Materials Recovery.
35. ILO. (2025) ILOSTAT database. Retrieved from <https://ilostat.ilo.org/data>
36. ILO. (2023) Resolution concerning statistics on the informal economy. Retrieved from [ILO website](#)
37. Lenzen, M., Moran, D., Kanemoto, K., Geschke, A. (2013). [Building Eora: A Global Multi-regional Input-Output Database at High Country and Sector Resolution](#). *Economic Systems Research*, 25:1, 20-49, [DOI:10.1080/09535314.2013.769938](#)
38. World Bank. *World Bank country classifications by income level for 2024–2025*. *Data Blog*, July 1, 2024. Available at <datahelpdesk.worldbank.org>
39. Okraszewska, R., Romanowska, A., Clarissa Laetsch, D., Gobis, A., Reisch, L. A., Kamphuis, C. B. M., Lakerveld, J., Krajewski, P., Banik, A., den Braver, N. R., Forberger, S., Brenner, H., & Żukowska, J. (2024). Interventions reducing car usage: Systematic review and meta-analysis. *Transportation Research Part D: Transport and Environment*, 131, Article 104217. doi:10.1016/j.trd.2024.104217
40. FAO. (2024). *World Food and Agriculture – Statistical Yearbook 2024*. Rome. <https://doi.org/10.4060/cd2971en>
41. Includes 16.2 million jobs in major economies in 2023, as reported in IRENA and ILO’s Renewable Energy and Jobs Annual Review 2024
42. Here onwards, unless specified otherwise, sectors refer to ISIC Rev. 4 classification and are defined as follows: A – Agriculture (crops & plant-based divisions); B – Mining (all divisions); C – Manufacturing (all divisions); E – Waste & Sewerage (E37, E381, E383); F – Construction (all divisions); G – Wholesale & Retail; Vehicles repair (G4669, G452, G4774); H – Transport (H4921); N – Leasing & Rentals (N771–773); R – Libraries & Archives (R9101); and S – Repair Services (S95).
43. European Public Service Union (EPSU). (2017). *Waste management in Europe: Good jobs in the circular economy*. Retrieved from: [EPSU website](#)
44. Inclusive of collection of hazardous and non-hazardous waste, remediation activities and other waste management services, and wholesale of waste and scrap and other products n.e.c.
45. Cook, E., Souza de Lima Cano, N., & Velis, C. A. (2024). Informal recycling sector contribution to plastic pollution mitigation: A systematic scoping review and quantitative analysis of prevalence and productivity. *Resources, Conservation & Recycling*, 206, Article 107144. <https://doi.org/10.1016/j.resconrec.2024.107588>.
46. Global Alliance of Waste Pickers. (2025). International Waste Pickers’ Day – 1st March 2025 message. Retrieved from: [GlobalRec website](#)
47. Gill, K. (2010). *Of Poverty and Plastic: Scavenging and Scrap Trading Entrepreneurs in India’s Urban Informal Economy*. [Oxford University Press](#).
48. Gutberlet, J. (2021) Grassroots waste picker organizations addressing the UN Sustainable Development Goals. [World Development](#), 138, 105195.
49. Ochogwu, J., Orakwue, A., & Ebiede, T. (2024). *Formalising the informal waste picker economy for sustainable development in Nigeria*. INCLUDE Knowledge Platform. Retrieved from: [Include Platform website](#)
50. ILO. (2021). *Child labour: Global estimates 2020, trends and the road forward*. Retrieved from: [ILO website](#)
51. Circle Economy, Labour at Informal Economy and BUTEX University [Upcoming]. Making the invisible visible: Towards a just circular transition for Bangladesh’s Jhut workers
52. ILO, Circle Economy, & S4YE (2023). *Decent work in the circular economy: An overview of the existing evidence base*. Retrieved from: [ILO website](#)
53. Circle Economy. (2020). *Jobs & skills in the circular economy: State of play and future pathways*. Retrieved from: [Circle Economy website](#)

54. Raghu, D., De Wolf, C. (2024). India's Informal Reuse Ecosystem Towards Circular Construction. In: Thomsen, M.R., Ratti, C., Tamke, M. (eds) Design for Rethinking Resources. UIA 2023. Sustainable Development Goals Series. Springer, Cham. Retrieved from: https://doi.org/10.1007/978-3-031-36554-6_10
55. Palm, J., Lazoroska, D., Valencia, M., Bocken, N., & Södergren, K. (2024). *A gender perspective on the circular economy – a literature review and research agenda*. Journal of Industrial Ecology, 28(6), 1670–1683. <https://doi.org/10.1111/jiec.13554>
56. ILO. (2022). Women entrepreneurs leading the way: Promoting a circular economy and more sustainable practices in the garment sector. Retrieved from: [ILO website](#).
57. Pansera, M., Barca, S., Martinez Alvarez, B., Leonardi, E., D'Alisa, G., Meira, T., & Guillibert, P. (2024). Toward a just circular economy: Conceptualizing environmental labor and gender justice in circularity studies. *Sustainability: Science, Practice, & Policy*, 20(1), Article 2338592. <https://doi.org/10.1080/15487733.2024.2338592>
58. Korsunova-Tsaruk, A., Halme, M., Kourula, A., Levänen, J., & Lima-Toivanen, M. (2022). *Necessity-driven circular economy in low-income contexts: How informal sector practices retain value for circularity*. *Global Environmental Change*, 76, Article 102573. <https://doi.org/10.1016/j.gloenvcha.2022.102573>
59. FAO. (2023). *The State of Food and Agriculture 2023: Leveraging Agrifood Systems for Circularity*.
60. International Bank for Reconstruction and Development & World Bank. (2023). *The Circular Economy in Developing Countries: A Roadmap for Action*. Washington, DC: World Bank. Retrieved from: [World Bank website](#).
61. Datta, N., Edmonds, C. N., & Melchor, M. (2023). *Putting young people at the center of the circular economy*. World Bank Blogs: Jobs. Retrieved from [the World Bank Group](#)
62. UNIDO & Chatham House. (2023). *First study on national circular economy roadmaps*. Retrieved from: [UNIDO website](#)
63. ILO. (2016). Guidelines for a just transition towards environmentally sustainable economies and societies for all. Retrieved from [the ILO](#).
64. ILO. (2025). Advancing a just transition through nationally determined contributions. Retrieved from [the ILO](#).
65. *Ikwilcirculairinkopen.nl* □ *Hét platform dat je verder helpt* (2025). Versnellingsnetwerk Circulair Inkopen. Available at: <https://ikwilcirculairinkopen.nl/>
66. City of Cape Town. *City of Cape Town Green Procurement Action Plan*. (2020). GLCN — Global Lead Cities Network. Retrieved from: [GLCN website](#)
67. Márquez, Silva de Souza Lima Cano & Rutkowski. (2021). Inclusion of Waste Pickers Into Municipal Waste Management Systems. *The Journal of Environment & Development*. <https://www.jstor.org/stable/27286272>
68. ILO. (2024). ILO Helpdesk: Business and a Just Transition. Retrieved from [ILO website](#)
69. ILO & UNEP Finance Initiative. (2023). Just Transition Finance: Pathways for Banking and Insurance. Retrieved from [ILO website](#)
70. Wiesen, C. (2022). *The tactics to drive a gender-inclusive circular economy*. *Vietnam Investment Review (VIR)*. Reterived from [VIR](#)
71. European Institute of Innovation and Technology (EIT) Community / EIT RawMaterials. (n.d.). *Girls Go Circular: Who we are*. Retrieved from [EIT](#)
72. ILO. (2016). Guidelines for a just transition towards environmentally sustainable economies and societies for all. Retrieved from [the ILO](#).
73. ILO. (2025). Policy guidelines for the promotion of decent work in recycling. Retrieved from [the ILO](#).
74. ILO. (2015). the Transition from the Informal to the Formal Economy Recommendation. Retrieved from [ILO](#).
75. United Nations. (2021). *Classification of Environmental Activities (CEA): Summary and integration of CEPA and CReMA*. New York: United Nations Statistics Division. Retrieved from <https://seea.un.org/content/classification-environmental-protection-activities-and-expenditure-cepa-and-classification>
76. Eurostat. (n.d.). *Circular economy monitoring framework*. European Commission. Retrieved from <https://ec.europa.eu/eurostat/web/circular-economy/monitoring-framework>
77. Service des données et études statistiques (SDES). (2024). *Quantification de l'emploi dans l'économie circulaire* [Document de travail]. Ministère de la Transition écologique (France). Retrieved from <https://www.statistiques.developpement-durable.gouv.fr/quantification-de-lemploi-dans-leconomie-circulaire>
78. Circle Economy, United Nations Environment Programme and EHERO. (2021). *Circular Jobs Methodology*. Circle Economy Foundation. Retrieved from <https://www.circle-economy.com/resources/circular-jobs-methodology>
79. Zink, T., & Geyer, R. (2017). Circular economy rebound. *Journal of Industrial Ecology*, 21(3), 593-602. Retrieved from: <https://doi.org/10.1111/jiec.12545>

Annexe I

List of fully and partially circular sectors, identified in ISIC, and their alignment with existing circular economy frameworks.

Sectors of circular economy	ISIC	R-strategies	Rationale for inclusion	Known issues / challenges	CEA ⁷⁵	Eurostat ⁷⁶	ADEME ⁷⁷	UNEP & Circle Economy (2021) ⁷⁸
FULLY CIRCULAR SECTORS								
Renting and leasing of motor vehicles; personal and household goods; other machinery, equipment and tangible goods (N)	771	Rethink Reduce	Shared access, and the shift from product to service can reduce production needs. Can create incentives for extended product lifespans.	Rebound effects ⁷⁹ (e.g. increased affordability of new, luxury goods). Circularity depends on product longevity, usage patterns and business models.	No	Yes	Yes	Yes
	772 773							
Library and archives activities (R)	9101		Shared access improves product utilization. Reduces demand for new goods.	Need to be accessible to avoid idle time. Digital alternatives may be more resource efficient.	No	Yes	No	No
Urban and suburban passenger land transport (H)	4921	Rethink Reduce	Shared access, and the shift from product to service can reduce production needs. Reduces demand for new extraction and private car usage.	Extent of circular strategies like repair, remanufacturing and recycling within public transport are not captured. Public transport in many countries still largely relies on fossil fuels.	No	No	No	Yes
Retail sale of second-hand goods (G)	4774	Reuse	Extends product lifespans. Reduces demand for new goods.	Rebound effects (e.g. increased affordability of new, luxury goods that retain resale value). Circularity depends on product longevity and usage patterns.	No	Yes	No	Yes
Repair of fabricated metal products, machinery and equipment (C)	331	Repair Refurbish	Extends product lifespans. Reduces the need for new production.	Often requires new manufactured parts rather than refurbished / reused equipment. Some specialized repairs may be energy and resource intensive.	No	Yes	Yes	Yes

Sectors of circular economy	ISIC	R-strategies	Rationale for inclusion	Known issues / challenges	CEA ⁷⁵	Eurostat ⁷⁶	ADEME ⁷⁷	UNEP & Circle Economy (2021) ⁷⁸
FULLY CIRCULAR SECTORS								
Maintenance and repair of motor vehicles (G)	452	Repair Refurbish	Extends product lifespans. Reduces the need for new production.	Often requires new manufactured parts rather than refurbished / reused equipment. Some specialized repairs may be energy and resource intensive.	No	Yes	Yes	Yes
Repair of computers and personal household goods (S)	95				No	Yes	No	No
Washing and (dry-) cleaning of textile and fur products (S)	9601	Rethink Reduce			No	Yes	No	Yes
Sewerage (E)	37	Recycle Recover	Wastewater treatment enables recycling and reuse, and the recovery of nutrients.	Wastewater is not always treated. Treated water is often discharged instead of recycled.	Yes	Yes	No	Yes
Waste collection (E)	381		Extracts valuable materials from waste streams.	Waste collection does not ensure recycling.	Yes	Yes	No	Yes
Materials recovery (E)	383		Enables recycling and materials recovery.	Downcycling limits full recovery potential.	Yes	Yes	No	Yes
Remediation activities and other waste management services (E)	39		Losses during recovery, sorting and processing.	Yes	Yes	Yes	Yes	
Wholesale of waste and scrap and other products n.e.c. (G)	4669		Extracts value from waste streams. Reduces demand for new extraction.	Should exclude wholesale of industrial chemicals ('other products n.e.c.').	No	Yes	Yes	Yes

Sectors of circular economy	ISIC	R-strategies	Rationale for inclusion	Known issues / challenges	CEA ⁷⁵	Eurostat ⁷⁶	ADEME ⁷⁷	UNEP & Circle Economy (2021) ⁷⁸
PARTIALLY CIRCULAR SECTORS								
Mining and quarrying (B)	05-09 (All divisions)	Recycle	Inputs to the material recovery sector (e.g. tailings, slags, waste rock, etc).	Valourising mining residues may legitimise expansion of extractive industry	No	Partially included	No	No
Manufacturing (C)	10-32	Reduce Recycle	Reduces demand for new extraction.	Circularity depends on product longevity, usage patterns and business models.	No	Partially included	No	No
Construction (F)	41-43 (All divisions)	Reduce Recycle	Reduces demand for new extraction.	-	No	Partially included	Yes	Yes

Table four: Overview of sectors of circular economy activities (identified in ISIC Rev 4) and alignment with other classification approaches

Annexe II

The distribution of 177 countries included in the study across regions and country income groups is listed below. The term “country” is used interchangeably with “economy” and refers to territories that report distinct labour and economic statistics, regardless of political status.

Africa: 50; Americas: 29; Arab States: 13; Asia: 37; Europe: 48.

High income countries: 60; Upper-middle income countries: 46;

Lower-middle income countries: 44; Low income countries: 27.

<p>Countries with ISIC 4-digit employment data [63 countries]</p>	<p>Afghanistan, Angola, United Arab Emirates, Argentina, Bangladesh, Bahamas, Bolivia (Plurinational State of), Brazil, Barbados, Brunei, Bhutan, Botswana, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, Ethiopia, Fiji, United Kingdom, Ghana, Gambia, Guyana, Honduras, Indonesia, India, Iran (Islamic Republic of), Iraq, Kenya, Cambodia, Lao People's Democratic Republic, Lebanon, Sri Lanka, Madagascar, Maldives, Myanmar, Mongolia, Namibia, Nigeria, Nepal, Pakistan, Panama, Peru, Philippines, Rwanda, Saudi Arabia, Sudan, Senegal, Sierra Leone, El Salvador, Suriname, Eswatini, Seychelles, Thailand, Tajikistan, Tunisia, Tanzania (United Republic of), Uganda, Uruguay, Viet Nam, Vanuatu, Samoa and Zambia.</p>
<p>Countries with ISIC 2-digit employment data [48 countries]</p>	<p>Albania, Armenia, Australia, Austria, Burundi, Benin, Burkina Faso, Bosnia and Herzegovina, Belarus, Switzerland, Chile, Côte d'Ivoire, Congo, The Democratic Republic of the, Cyprus, Czechia, France, Georgia, Greece, Guatemala, Israel, Italy, Jordan, Japan, Kyrgyzstan, Korea (Republic of), Liberia, Lesotho, Mexico, North Macedonia, Mali, Mozambique, Mauritania, Mauritius, New Caledonia, Niger, Papua New Guinea, Portugal, Palestine (State of), Singapore, Somalia, Serbia, Slovakia, Chad, Togo, Turkey, Ukraine, United States, Zimbabwe.</p>
<p>Countries with ISIC 1-digit employment data [33 countries]</p>	<p>Belgium, Bulgaria, Belize, Cameroon, Cabo Verde, Germany, Denmark, Spain, Estonia, Finland, Croatia, Haiti, Hungary, Ireland, Iceland, Jamaica, Lithuania, Luxembourg, Latvia, Morocco, Moldova (Republic of), Malta, Montenegro, Netherlands, Norway, Poland, Romania, Russian Federation, Sao Tome and Principe, Slovenia, Sweden, Trinidad and Tobago and Uzbekistan.</p>
<p>Countries with employment data in clusters of ISIC sections or in ISIC Rev 3.1 [33 countries]</p>	<p>Canada, Hong Kong, Macao, Nicaragua, Taiwan, Venezuela, Yemen, South Africa, China, Malaysia, Korea (the Democratic People's Republic of), Algeria, Kazakhstan, Malawi, Syrian Arab Republic, Cuba, Azerbaijan, South Sudan, Guinea, Paraguay, New Zealand, Kuwait, Oman, Turkmenistan, Qatar, Libya, Congo, Central African Republic, Eritrea, Bahrain, Gabon, Djibouti, French Polynesia.</p>

Table five: Overview of countries included in the baseline and their employment data resolution in ISIC Rev 4

<p>Countries with gender disaggregation availability in ISIC 1, 2 or 4 digit [177 countries]</p>	<p>Azerbaijan, Belgium, Bulgaria, Bahrain, Belize, Central African Republic, Canada, China, Cameroon, Congo, Cape Verde, Cuba, Germany, Djibouti, Denmark, Algeria, Eritrea, Spain, Estonia, Finland, Gabon, Guinea, Hong Kong, Croatia, Haiti, Hungary, Ireland, Iceland, Jamaica, Kazakhstan, Kuwait, Libyan Arab Jamahiriya, Lithuania, Luxembourg, Latvia, Macao, Morocco, Moldova, Republic of, Malta, Montenegro, Malawi, Malaysia, Nicaragua, Netherlands, Norway, New Zealand, Oman, Poland, Korea, Democratic People's Republic of, Paraguay, French Polynesia, Qatar, Romania, Russia Federation, Sao Tome and Principe, Slovenia, Sweden, Syrian Arab Republic, Turkmenistan, Trinidad and Tobago, Taiwan, Province of China, Uzbekistan, Venezuela, Yemen, South Africa, Albania, Armenia, Australia, Austria, Burundi, Benin, Burkina Faso, Bosnia and Herzegovina, Belarus, Switzerland, Chile, Côte d'Ivoire, Congo, The Democratic Republic of, Cyprus, Czechia, France, Georgia, Greece, Guatemala, Israel, Italy, Jordan, Japan, Kyrgyzstan, Korea, Republic of, Liberia, Lesotho, Mexico, Macedonia, The Former Yugoslav Republic Of, Mali, Mozambique, Mauritania, Mauritius, New Caledonia, Niger, Papua New Guinea, Portugal, Palestinian Territory, Occupied, Singapore, Somalia, Republic of Serbia, Slovakia, Chad, Togo, Turkey, Ukraine, United States, Zimbabwe, Afghanistan, Angola, United Arab Emirates, Argentina, Bangladesh, Bahamas, Bolivia, Brazil, Barbados, Brunei Darussalam, Bhutan, Botswana, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, Ethiopia, Fiji, United Kingdom, Ghana, Gambia, Guyana, Honduras, Indonesia, India, Iran, Islamic Republic of, Iraq, Kenya, Cambodia, Lao, People's Democratic Republic, Lebanon, Sri Lanka, Madagascar, Maldives, Myanmar, Mongolia, Namibia, Nigeria, Nepal, Pakistan, Panama, Peru, Philippines, Rwanda, Saudi Arabia, Sudan, Senegal, Sierra Leone, El Salvador, Suriname, Swaziland, Seychelles, Thailand, Tajikistan, Tunisia, Tanzania, United Republic of, Uganda, Uruguay, Vietnam, Vanuatu, Samoa, Zambia, South Sudan.</p>
<p>Countries with informal status disaggregation available in ISIC 1 or 2 digit [122 countries]</p>	<p>Afghanistan, Angola, Argentina, Armenia, Austria, Burundi, Belgium, Benin, Burkina Faso, Bangladesh, Bulgaria, Bahamas, Bosnia and Herzegovina, Bolivia, Plurinational State of, Brazil, Barbados, Brunei Darussalam, Botswana, Switzerland, Chile, Côte d'Ivoire, Cameroon, Congo, The Democratic Republic of the, Colombia, Cabo Verde, Costa Rica, Cyprus, Czechia, Germany, Denmark, Dominican Republic, Ecuador, Egypt, Spain, Estonia, Ethiopia, Finland, Fiji, France, United Kingdom, Georgia, Ghana, Gambia, Greece, Guatemala, Guyana, Honduras, Croatia, Haiti, Hungary, Indonesia, India, Ireland, Iraq, Iceland, Italy, Jamaica, Jordan, Kenya, Kyrgyzstan, Cambodia, Korea, Republic of, Lao People's Democratic Republic, Lebanon, Liberia, Sri Lanka, Lesotho, Lithuania, Luxembourg, Latvia, Moldova, Republic of, Madagascar, Maldives, Mexico, North Macedonia, Mali, Malta, Myanmar, Mongolia, Mozambique, Mauritania, Mauritius, Namibia, Niger, Netherlands, Norway, Nepal, Pakistan, Panama, Peru, Poland, Portugal, Palestine, State of, Romania, Russian Federation, Rwanda, Sudan, Senegal, Sierra Leone, El Salvador, Somalia, Serbia, Suriname, Slovakia, Slovenia, Sweden, Eswatini, Seychelles, Chad, Togo, Thailand, Tajikistan, Tunisia, Turkey, Tanzania, United Republic of, Uganda, Uruguay, Viet Nam, Vanuatu, Samoa, Zambia, Zimbabwe.</p>
<p>Countries with ISIC 1-digit employment data [33 countries]</p>	<p>Belgium, Bulgaria, Belize, Cameroon, Cabo Verde, Germany, Denmark, Spain, Estonia, Finland, Croatia, Haiti, Hungary, Ireland, Iceland, Jamaica, Lithuania, Luxembourg, Latvia, Morocco, Moldova (Republic of), Malta, Montenegro, Netherlands, Norway, Poland, Romania, Russian Federation, Sao Tome and Principe, Slovenia, Sweden, Trinidad and Tobago and Uzbekistan.</p>
<p>Countries with informal status disaggregation available as regional and country income group averages [55 countries]</p>	<p>Albania, United Arab Emirates, Australia, Azerbaijan, Bahrain, Belarus, Belize, Bhutan, Central African Republic, Canada, China, Congo, Cuba, Djibouti, Algeria, Eritrea, Gabon, Guinea, Hong Kong, Iran, Islamic Republic of, Israel, Japan, Kazakhstan, Kuwait, Libya, Macao, Morocco, Montenegro, Malawi, Malaysia, New Caledonia, Nigeria, Nicaragua, New Zealand, Oman, Philippines, Papua New Guinea, Korea, Democratic People's Republic of, Paraguay, French Polynesia, Qatar, Saudi Arabia, Singapore, Sao Tome and Principe, South Sudan, Syrian Arab Republic, Turkmenistan, Trinidad and Tobago, Taiwan, Ukraine, United States, Uzbekistan, Venezuela, Bolivarian Republic of, Yemen, South Africa.</p>

Table six: Overview of countries included in the baseline with gender/informality availability.

<p>Countries with total employment available but without partially coefficients [17 countries]</p>	<p>Saint Lucia, Comoros, Micronesia, Federated States of, Kiribati, Kosovo, Niue, Cook Islands, Guinea-Bissau, Grenada, Marshall Islands, Nauru, Palau, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Wallis and Futuna.</p>
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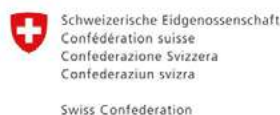
Table seven: Overview of countries not included in the baseline due to no data available for material and economic coefficients.

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