



International
Labour
Organization

► Issue paper on child labour and climate change



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and climate change**



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► Acronyms

CCLR	Carbon and Child Labour Rucksack
ESG	Environmental, Social and Governance issues
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
IFRC	International Federation of Red Cross and Red Crescent Societies
ILO	International Labour Organisation
IOE	International Organisation of Employers
IOM	International Organisation for Migration
ITUC	International Trade Union Confederation
IPCC	Intergovernmental Panel for Climate Change
MNC	Multinational Corporations
NGO	Non-governmental organisation
RSPO	Roundtable on Sustainable Palm Oil
UNICEF	United Nations Children's Fund
UN OHCHR	United Nations Human Rights Office of the High Commissioner
VSS	Voluntary Sustainability Standards
WMO	World Meteorological Organisation



Executive summary



► Executive summary

This issue paper brings together and reviews existing research on the interplay between climate change and child labour. It is aimed at providing an initial picture of some of the key channels – both direct and indirect – through which climate change and climate change responses are linked to child labour, and the broad implications for policy moving forward.

The paper examines more than 100 articles from the peer-reviewed literature and reports from international organizations, think tanks and non-governmental organizations. The available evidence, though still limited, makes abundantly clear that climate change – and public and private responses to it – is already having profound impacts on child labour, and, following from this, on global progress towards ending all forms of child labour by the 2025 target date set by the Sustainable Development Goals. As the impacts of climate change grow and intensify, this will be even truer in the years up to and beyond the 2025 target date.

There is an urgent need to consider child labour in broader public and private action towards a just transition to climate-neutral economies and societies. This means, above all, ensuring that climate action is structured in a way that furthers child labour reduction goals and does not instead result in unintended negative consequences for child labour. Both public and private climate actions are relevant in this context.

Public climate action has implications for child labour across a range of policy areas. Safeguards, for example, are needed so that public policies promoting the clean energy transition do not create labour market disruptions that leave low-skill workers and their families in a position of greater vulnerability and more reliant on their children's labour.

Climate change adaptation policies, such as environmentally sustainable methods to intensify agriculture production in the face of climate change, or public works schemes to buffer climate shocks, must also be designed in a way that reduces household dependence on child labour and do not instead result in greater demand for child labour.

In regulatory terms, combining both environmental and human rights considerations into national laws and regulations governing the behaviour of firms can play an important role in ensuring complementarity between these two regulatory goals.

1

Introduction





► 1. Introduction

Climate change is having large and growing impacts on people and societies worldwide. Between the years 2000 and 2019, more than 11,000 extreme weather events caused the death of over 475,000 people and produced estimated economic losses of US\$ 2.5 trillion around the globe.¹ Agriculture is among the sectors most sensitive to climate change, but its effects are systemic and extend to all sectors of the economy, as climate change and responses to it are producing widespread shocks and readjustments in global production and value chains.

The adverse socio-economic impacts of climate change – including the loss of income sources and livelihoods, food insecurity, malnutrition, compromised health, reduced labour productivity, loss of homelands – are profound and growing. Marginalised and vulnerable groups who have less resilience to climate impacts are being disproportionately affected.² Children in particular have been repeatedly identified as one of the population groups most at risk from the systemic shocks caused by climate change.³

A small but growing body of evidence underscores the importance of climate change as a threat multiplier for child labour, particularly in the agriculture sector, where 70 per cent of all child labour is located.⁴ Understanding and addressing the precise channels through which climate change, and responses to it, are impacting child labour will be critical to broader global progress toward ending all forms of child labour by 2025, as set by Target 8.7 of the Sustainable Development Goals.

This issue paper brings together and reviews existing research on the interplay between climate change and child labour. It is aimed at providing an initial picture of some of the key channels – both direct and indirect – through which climate change and climate change responses are linked to child labour, and the broad implications for policy moving forward. The fact that climate change is affecting the global labour force is widely recognized,⁵ but its effects on child labour have received less research attention and cannot be directly derived from its effects on adult work, as the underlying drivers of child labour and its associated risks are quite different.

¹ Eckstein et al., 'Global Climate Risk Index 2021 Who Suffers Most Extreme Weather Events?'

² IPCC, 'Climate Change 2022: Impacts, Adaptation and Vulnerability.'

³ Myers and Theytaz-Bergman, 'The Neglected Link - Effects of Climate Change and Environmental Degradation on Child Labour'.

⁴ ILO and UNICEF, 'Child Labour: Global Estimates 2020, Trends and the Road Forward'.

⁵ Alsamawi et al., 'Measuring Child Labour, Forced Labour and Human Trafficking in Global Supply Chains: A Global Input-Output Approach'; IOE, 'Make Transitions Work: Climate Change and Employment'; ITUC, 'A Guide to New Technologies to Fight Climate Change and Create Jobs'. Climate Justice Frontline Briefing'.

An extensive review of the literature of child labour and its link with climate change provides the basis for the issue paper.⁶ A total of more than 800 peer-reviewed documents and 5,000 articles from the grey literature were identified with basic keyword searches,⁷ out of which a total of 142 were deemed relevant for the purposes of this issue paper and the most recent 116 were included in the paper. It is worth noting that the total number of documents identified through the keyword searches does not constitute a large volume of results, demonstrating that the joint analysis of child labour and climate change is relatively novel. For a comparison, searching for child labour and poverty or income yields more than 6,000 peer-reviewed articles in Scopus and more than 15,000 results in Google Scholar.

The issue paper looks at both how the physical manifestations of climate change *and* at how responses to climate change are influencing child labour. The paper concludes with a brief forward looking discussion on the need to consider child labour in broader public and private action towards a just transition to climate-neutral economies and societies.

6 The search for relevant evidence on the effects of climate change on child labour and on its link with climate-related actions was performed through two different means. First, the search for relevant keywords was implemented using repositories of peer-reviewed articles, such as Elsevier's Scopus, one of the largest abstracts and citation database, or Web-of-Science, and cross-checked with other sources of high quality unpublished working papers in Google Scholar, the National Bureau of Economics and Statistics (NBER), the Centre for Economic Policy Research (CEPR), the Social Science Research Network (SSRN) and the Research Papers in Economics (RePEc). Second, the search included any grey literature from reputable international organizations, NGOs and think-tanks that produce reliable data and analytical information on the issue, such as the ILO, UNICEF (for example the Innocenti papers' series), ITUC, IOE, FAO, IOM, World Bank, Terre des Hommes, Human Rights Watch, Amnesty International, Save The Children, the International Red Cross Red Crescent (especially the Climate Centre of the IFRC), and so on.

7 Keyword searches were based on variations of a boolean search for ("child labo*r" AND "climate change") in either the title, abstract or keywords of an article or in the main body of the document; the wildcard * allows for both the American and British spelling of labour/labor.

A photograph of two young girls standing in a field of debris, likely a disaster zone. The girl on the left has long dark hair and a worried expression. The girl on the right has a yellow flower headband and is holding a small green object. The background is filled with broken wood and other debris.

2

Climate
change and
child labour:
theoretical
linkages

► 2. Climate change and child labour: theoretical linkages

The literature on child labour points to two contrasting forces that can lead to children's involvement in child labour. On one hand, the *poverty hypothesis* states that families rely on child labour because their income is too low to meet their subsistence needs without their children's earnings or production.⁸ Accordingly, when some fraction of the population is driven into conditions of greater economic difficulty, there is a higher risk of child labour. On the other hand, the allocation of work within households also depends on relative capabilities, returns to children's labour and on the alternatives that households have for children's time. In this view, child labour is also driven by the *relative* value of an hour spent by children in work compared to one spent in school or on other activities.⁹

Climate change affects child labour through both mechanisms, but the effects are not necessarily linear or unidirectional. For example, if global warming reduces agricultural outputs through severe droughts and soil depletion, it makes farming households poorer, and more likely to have to resort to child labour (in agriculture or off the farm) to meet their subsistence needs. At the same time, climate-related droughts and soil depletion can reduce agricultural productivity, in turn encouraging families to lessen the time children spend in agricultural work, since their labour on the farm becomes less valuable. But diminishing agricultural productivity may also make adult agricultural labour less valuable, inducing adults to move to off-farm jobs, in turn *increasing* the need for children working in the farm. The *net* impact of climate change on child labour in any given context depends on the interaction and relative strength of these different effects.

⁸ Basu and Van, 'The Economics of Child Labor'.

⁹ Ray, 'Child Labor, Child Schooling, and Their Interaction with Adult Labor'.



3

Climate change
and child labour:
key impact
channels

► 3. Climate change and child labour: key impact channels

Climatic modifications operate at two different levels, both with important implications for child labour: first, through marginal changes in temperature (causing direct global warming, melting permafrost, rising sea levels, ocean's acidification, coastal erosion, etc.), with slow and steady accompanying modifications of physical and biological systems; and, second, through abrupt disruptions, extreme weather events (heat waves, hurricanes and tropical storms, droughts, etc.) and possibly even irreversible tipping points in the functioning of major ecosystems. Since marginal changes can initiate feedbacks and cascading effects among interlinked biophysical systems, these two levels are closely interlinked – abrupt disruptions can be triggered after a period of slow and steady change.¹⁰

The impact of climate change at both these levels is greatest in the countries whose economies are most exposed and where mitigation and adaptation capacities are weakest. Some of the largest adverse impacts of climate change are occurring in the primary sector (agriculture, forestry and fisheries) and in tourism, which play a particularly important role in the economies of many of the less industrialised countries where child labour levels are also high.¹¹ These countries also have lower adaptive capacity to both the slow-onset and abrupt changes in the climate.¹² They face greater financial constraints for investments in building dams, adopting advanced irrigation systems, providing systemic early-warning systems, climate-proofing buildings and infrastructures, and all the other critical adaptation strategies that can minimize the social and economic impacts of climate change.

This section examines evidence of some of the key specific channels through which climate change is currently affecting child labour and is likely to further affect child labour in the future.

Poverty

Increased poverty is perhaps the most important channel through which climate change is affecting child labour. A large body of evidence makes clear that the adverse impacts of climate change are already significantly affecting livelihoods and living conditions, pushing more people into poverty and exacerbating the circumstances of those already in situations of poverty and vulnerability, who are less resilient, have fewer adaptation options and less access to institutional support structures.¹³ According to the World Bank, between 32 and 132

¹⁰ Lenton et al., 'Climate Tipping Points — Too Risky to Bet Against'.

¹¹ IPCC, 'Climate Change 2014'.

¹² Chapagain et al., 'Climate Change Adaptation Costs in Developing Countries: Insights from Existing Estimates'.

¹³ IPCC, 'Climate Change 2022: Impacts, Adaptation and Vulnerability'.

million people could fall into extreme poverty by 2030 due to the impacts of climate change.¹⁴ Many will be forced into economic transitions, accelerating the shift from agriculture to other sectors and work modalities, and driving broader patterns of labour migration and human settlement.¹⁵

At the same time, poverty is central to understanding vulnerability to child labour. In extreme synthesis, poor households are more likely to have to resort to child labour in order to meet basic needs and deal with uncertainty. Exposure to shocks can have a similar impact on household decisions concerning the children's time use. Households typically respond to what they regard as a temporary reduction in their income by either borrowing, drawing down savings or selling household assets, but when these options are not available, or not available on the scale required, they more likely to have to resort to child labour as a buffer or insurance against the impact of the shock they have experienced.¹⁶

A growing number of studies consistently support the view that poverty induces households to rely more on child labour.¹⁷ Evidence also lends support to the argument that families often use child labour as a buffer against shocks. Studies in Cambodia¹⁸ and Tanzania,¹⁹ for instance, found that child labour was substantially higher in villages experiencing agriculture-related shocks such as drought, flood and crop failure, which are growing in frequency and intensity as a result of climate change. Food price shocks – also increasingly attributable to climate events or climate-related changes to agricultural productivity (see below) – have also been shown to influence child labour. Evidence from countries including Uganda²⁰ and Pakistan,²¹ for example, links increases in food prices to a rise in the probability and the time intensity of child labour in non-agricultural families.

Agricultural productivity

The agriculture sector accounts for by far the largest share of child labour – an estimated 112 million children are in agricultural child labour,²² accounting for 70 per cent of total children in child labour.²³ It is also the sector that is most affected by climate change. Agriculture is therefore especially important to the broader discussion of the interplay between child labour and climate change.

Overall, heat stress on plants and animals, modified rainfall patterns, as well as extreme climatic events like droughts, hurricanes and flooding, are producing direct changes in crop phenology and yields.²⁴ Soil depletion and erosion, water shortages, changes in salinity,

¹⁴ IPCC.

¹⁵ IPCC.

¹⁶ ILO, 'World Report on Child Labour'.

¹⁷ Edmonds and Schady, 'Poverty Alleviation and Child Labor'.

¹⁸ Guarcello, Kovrova, and Rosati, 'Child Labour as a Response to Shocks: Evidence from Cambodian Villages'.

¹⁹ Beegle, Dehejia, and Gatti, 'Child Labor and Agricultural Shocks'.

²⁰ Frempong and Stadelmann, 'The Effect of Food Price Changes on Child Labour'.

²¹ Hou, Hong, and Scott, 'The Heterogeneous Effects of a Food Price Crisis on Child School Enrolment and Labour: Evidence from Pakistan'.

²² The agriculture sector includes crops, livestock, fishing, aquaculture and forestry.

²³ ILO and UNICEF, 'Child Labour: Global Estimates 2020, Trends and the Road Forward'.

²⁴ Fatima et al., 'The Fingerprints of Climate Warming on Cereal Crops Phenology and Adaptation Options'.

desertification and other climate-related effects on landscape and geographic conditions are also hindering agricultural productivity. The ongoing movement of pests and plant pathogens to different latitudes with warming climate is further impacting crop production in new areas previously unaffected by them.²⁵

Most of the empirical evidence these climate change impacts are affecting child labour focuses on changes in precipitation in rain-fed agricultural areas – a key determinant of agricultural productivity – and associated changes in children’s involvement in child labour and in schooling.²⁶

In most cases considered by the literature, an *increase* in rainfall causes an increase in child labour, because of higher agricultural productivity.²⁷ For example, above-average rainfall in Vietnam was associated with more children entering agricultural work as well as being pulled into and spending more time doing household chores.²⁸ For Tanzania, a one standard deviation increase in rainfall led to an increase in child labour for children aged 6 to 13 years by nearly five days per year, while a decrease in rainfall had no effect.²⁹ Importantly, child labour appeared to increase less in cases where family small holder farms had access to local labour markets that enabled them to hire adult wage workers instead of relying on child family members to absorb the increase in productivity. This finding suggests that the provision of better labour market access and support for the matching of temporary agricultural workers could reduce the need for children in the fields.

In India, a large long-term study also found that children aged 5 to 16 switch out of school and into work when rainfall is higher, indicating again that a positive production shock increases child labour and decreases educational attainment, because children’s work on the farm is made more valuable, thus increasing demand for it.³⁰ These results were long-lasting: for each year of exposure to a positive rainfall shock when they were aged 11 to 13 years, adults completed 0.2 fewer total years of schooling.³¹

By contrast, some contexts have seen a fall in agricultural child labour as a result of declines in agricultural productivity linked to periods of drought.³² In the India study, for example, children were 20 per cent less likely to work in agriculture and more likely to attend school in drought years relative to heavy rainfall years.³³

Other studies, however, suggest that such falls in agricultural child labour do not lead to a decline in child labour *generally*, especially beyond the short-term, but rather the displacement of child

²⁵ Bebber, Ramotowski, and Gurr, ‘Crop Pests and Pathogens Move Polewards in a Warming World’.

²⁶ Aragón, Oteiza, and Rud, ‘Climate Change and Agriculture: Subsistence Farmers’ Response to Extreme Heat’.

²⁷ In the child labour decision process, the “substitution” effect dominates over the income effect: even if families are less poor due to the higher productivity, which should reduce child labour, the time-allocation of family members to agricultural activities is so valuable that overall child labour increases.

²⁸ Trinh, Posso, and Feeny, ‘Child Labor and Rainfall Deviation: Panel Data Evidence from Rural Vietnam’.

²⁹ Dumas, ‘Productivity Shocks and Child Labor: The Role of Credit and Agricultural Labor Markets’.

³⁰ Math test scores fell by 2-5 per cent of a standard deviation, school attendance fell by 2 percentage points, and the probability that a child was enrolled in school falls by 1 percentage point

³¹ Shah and Steinberg, ‘Drought of Opportunities: Contemporaneous and Long-Term Impacts of Rainfall Shocks on Human Capital’.

³² Dumas, ‘Productivity Shocks and Child Labor: The Role of Credit and Agricultural Labor Markets’; Shah and Steinberg, ‘Drought of Opportunities: Contemporaneous and Long-Term Impacts of Rainfall Shocks on Human Capital’; Soares, Kruger, and Berthelon, ‘Household Choices of Child Labor and Schooling’.

³³ Shah and Steinberg, ‘Drought of Opportunities: Contemporaneous and Long-Term Impacts of Rainfall Shocks on Human Capital’.

labour from agriculture into other non-farm sectors, such as mining and manufacturing.³⁴ In Burkina Faso, for example, worsening economic conditions in the agricultural sector, coupled with a gold rush, encouraged families to look for new income opportunities and resulted in children working in dangerous conditions in gold mines, an activity itself highly destructive for the environment.³⁵ Similarly, in Nepal and Peru, as agricultural productivity has declined, more families have sent their children to work in manufacturing entities such as brick kilns.³⁶

Climate change and its impact on agricultural productivity is also giving rise to changes in land use patterns, again with important potential implications for child labour. In some contexts, as farmers adapt their choice of crops to changing temperature and rainfall patterns, the cultivation of “child labour-intensive” crops, such as cacao, coffee and cotton, is shifting to locations where these crops have not been grown in the past.³⁷ This can create additional risks of child labour in the new locations, especially where mitigating regulatory and policy measures have not kept pace.

Changes in land use patterns linked to climate change are also likely to create new competition from other regions of the world. Countries in the Northern hemisphere are expected to experience a lengthening of the growing season, and areas that were previously unsuitable for agricultural purposes might become more fertile and productive as global warming proceeds,³⁸ creating new sources of competition for emerging economies that rely on export revenues from cash crops.

Climate-related extreme weather shocks

Climate change is not only gradually increasing temperatures and modifying precipitation patterns but is also driving a growing number of extreme weather shocks. In Sub-Saharan Africa between 2010 and 2019, for example, the frequency of droughts nearly tripled, the frequency of storms more than quadrupled and the frequency of floods increased tenfold.³⁹

These weather shocks can have important consequences for child labour. For example, a study of the effect of hurricane Matthew in agricultural communities in rural Haiti showed that 46 per cent of the children enrolled in school stopped attending because of the hurricane. Haitian parents identified the need for children’s labour on the family farm, given the loss of income due to crop damage and livestock deaths, as the primary cause for their children leaving school.⁴⁰ In Madagascar, negative rainfall deviations and cyclones increased the probability of teenagers aged 14 to 16 years entering the work force, especially for girls.⁴¹ Climate-induced

³⁴ The India study, however, did not examine possibility that children were displaced into work in other sectors in order to help their families make ends meet during drought years.

³⁵ Myers and Theytaz-Bergman, ‘The Neglected Link - Effects of Climate Change and Environmental Degradation on Child Labour’.

³⁶ Myers and Theytaz-Bergman.

³⁷ Black et al., ‘Cocoa Plant Productivity in West Africa under Climate Change: A Modelling and Experimental Study’.

³⁸ Mueller et al., ‘Lengthening of the Growing Season in Wheat and Maize Producing Regions’.

³⁹ Zeufack et al., ‘An Analysis of Issues Shaping Africa’s Economic Future’.

⁴⁰ Cook and Beachy, ‘The Impact of Hurricane Matthew on School Attendance: An Analysis from Rural Haiti’.

⁴¹ Marchetta, Sahn, and Tiberti, ‘The Role of Weather on Schooling and Work of Young Adults in Madagascar’.

natural disasters can also increase the risk of children being separated from their families⁴² which is a well-known risk factor for child labour.⁴³

The effects of extreme climate events on child labour can long outlast the events themselves. Following one of the largest tropical storms in Guatemala in 2010, there was an increase in child labour at the expense of schooling in the medium term, 10-15 months after the natural disaster, due to the associated rise in poverty.⁴⁴ A study in Latin America covering a 100-year time horizon found that children born to mothers who had been exposed to natural disasters had a lower average level of education and an increased probability of child labour. Thus, the effects of climate-related natural disasters can persist even in subsequent generations of children.⁴⁵

Extreme weather events not only damage crops and reduce harvests but can also result in the destruction of livelihood assets such as livestock, farm machinery or storage facilities. This can be particularly problematic since assets owned by the household can serve as buffer stocks and as collateral for borrowing; a study of Tanzania shows that they can absorb almost 90 per cent of the negative effect on child labour of agricultural shocks.⁴⁶ Studies also point to the forced sale of livelihood assets as a survival strategy in the context of extreme climate events such as floods or droughts, in turn increasing vulnerability to future climate events and raising the risk of falling into persistent poverty traps.⁴⁷

Climate-driven migratory movements and conflict

The growing scarcity of water, fertile lands, and income opportunities induced by climate change is driving large migratory movements and population displacements. Around 500 million children, for example, face the risk of displacement because they live in areas that are extremely vulnerable to floods arising from cyclones, hurricanes, and storms, as well as rising sea levels.⁴⁸ In Bangladesh alone, one of the most vulnerable countries to climate change, estimates indicate that between 50,000 and 200,000 people are displaced by river erosion every year.⁴⁹

Climate change is driving population movements of an emergency-humanitarian, seasonal and permanent nature, each with important potential consequences for child labour. Sudden emergency population displacements because of extreme weather events can result in severe disruptions to livelihoods, schooling, social protection, family support networks and the rule of law, all serving to heighten the risk of child labour.⁵⁰ Climate change is also driving new patterns of short-term seasonal migration. In India, for example, migrant children fleeing from environmental stress in the state of Odhisa have been found to work increasingly in hazardous forms of child labour, and, as seasonal migration has extended in duration, their

⁴² UNICEF, 'A Child Is a Child: Protecting Children on the Move from Violence, Abuse and Exploitation'.

⁴³ Engle, 'National Plans of Action for Orphans and Vulnerable Children in Sub-Saharan Africa. Where Are the Youngest Children?'

⁴⁴ Baez et al., 'Gone with the Storm: Rainfall Shocks and Household Wellbeing in Guatemala'.

⁴⁵ Caruso, 'The Legacy of Natural Disasters'

⁴⁶ Beegle, Dehejia, and Gatti, 'Child Labor and Agricultural Shocks'.

⁴⁷ IPCC, 'Climate Change 2022: Impacts, Adaptation and Vulnerability.'

⁴⁸ UNICEF, 'The Climate Crisis Is a Child Rights Crisis'.

⁴⁹ UNICEF Bangladesh, 'Battling Climate Change with School and Success'.

⁵⁰ ILO and UNICEF, 'Child Labour: Global Estimates 2020, Trends and the Road Forward'.

access to education has become even less consistent.⁵¹ Evidence suggests that climate-driven permanent displacement can also worsen children's circumstances, at least in the short term, as households must leave behind their livelihoods and adjust to often very different living situations in new settings. In the Caribbean, for example, children uprooted to flee zones that have become increasingly hurricane-prone have become more vulnerable to rights abuses.⁵²

Climate change is also fuelling conflicts over the scarce resources, and with it the risk of worst forms of child labour including involvement in armed conflict and child trafficking.⁵³ In Africa's Lake Chad Basin, for example, the displacement of more than 4 million people due to desertification forms the backdrop of a conflict involving children as combatants and other egregious violations of the human rights of children.⁵⁴ Beyond the recruitment as child soldiers or other in roles in conflict situations, children in conflict zones face a higher risk of child labour because of the broader disruptions to livelihoods, school, infrastructure and basic services that accompany situations of armed conflict.

Health issues and hazardous child labour

Climate change is inducing a significant worsening of working conditions in some contexts,⁵⁵ with important implications for child labour.

Heat stress in agricultural contexts is a particular concern among children, who are more susceptible to heat exhaustion and dehydration than adults.⁵⁶ An FAO working paper published in 2018 concludes that children could be at greater risk of heat-related illnesses at temperatures above 36°C,⁵⁷ and other studies indicate that children are already suffering such heat-related effects in some agricultural contexts.⁵⁸ In contexts of declining agricultural productivity due to climate change, piece rate payment schemes can mean that agricultural workers, including children, must increase the pace and intensity of work to fulfil targets or quotas, increasing the risk of heat exhaustion and heat stress in the fields.⁵⁹ Heat stress is also a growing concern in industrial settings such brick kilns,⁶⁰ where children in child labour are also found.

Beyond heat stress, extreme weather events, insect-borne diseases (such as malaria and dengue), dust exposure, and forestry risks like wildfires, are just a few of the occupational

⁵¹ Myers and Theytaz-Bergman, 'The Neglected Link - Effects of Climate Change and Environmental Degradation on Child Labour'.

⁵² UNICEF, 'Children Uprooted in the Caribbean: How Stronger Hurricanes Linked to a Changing Climate Are Driving Child Displacement'.

⁵³ Njiru, 'Climate Change, Resource Competition, and Conflict amongst Pastoral Communities in Kenya'; Burzyńska et al., 'Climate Change, Inequality, and Human Migration'.

⁵⁴ UNICEF, 'Children on the Move Children Left Behind'.

⁵⁵ See, for example: ILO, 'Working on a Warmer Planet: The Impact of Heat Stress on Labour Productivity and Decent Work'; European Agency for Safety and Health at Work, 'Review of the Future of Agriculture and Occupational Safety and Health (OSH) : Foresight on New and Emerging Risks in OSH'.

⁵⁶ Greenfield, 'An Urgent Need to Reassess Climate Change and Child Labour in Agriculture'.

⁵⁷ Staal Wästerlund, 'Managing Heat in Agricultural Work: Increasing Worker Safety and Productivity by Controlling Heat Exposure'.

⁵⁸ Arnold et al., 'Heat-Related Illness Among Latinx Child Farmworkers in North Carolina'.

⁵⁹ Greenfield, 'An Urgent Need to Reassess Climate Change and Child Labour in Agriculture'.

⁶⁰ Lundgren-Kownacki et al., 'Climate Change-Induced Heat Risks for Migrant Populations Working at Brick Kilns in India: A Transdisciplinary Approach'.

safety and health risks that are increasing with climate change,⁶¹ with direct ramifications for the hazardousness and health consequences of the work performed by children. Other coping strategies to respond to climate change, such as increasing the amounts of pesticides to sustain agricultural productivity and promote resistance to new pathogens,⁶² will also inevitably expose children to more chemical hazards in the course of their work. The effects of all of these hazards are likely to be particularly pronounced for children, whose still developing minds and bodies are much more vulnerable.⁶³

These climate-related workplace hazards can also impact on child labour indirectly through their detrimental effect on the health and productivity of adult workers. Evidence from countries including Tanzania, India, Mali, Ethiopia and Vietnam indicates that when adult breadwinners fall sick and are unable or less able to work, child labour increases, as children must shoulder more the responsibility for ensuring household livelihoods.⁶⁴

Destruction or degradation of basic services infrastructure

Climate-related extreme weather events acting in concert with the slower impacts of marginal changes in temperature (e.g., rising sea levels, coastal erosion, etc.) can destroy or degrade critical basic services infrastructure necessary for children's well-being,⁶⁵ such as schools, health facilities, roads and other transport links, power grids and water networks.

Compromised infrastructure can specifically impact child labour through a number of channels. The destruction of schooling infrastructure, for example, or of the transport infrastructure needed to arrive at school, can render schooling unavailable or dramatically lengthen school travel times, in turn meaning that school is a less viable alternative to child labour in affected areas. Disruptions to water networks and power grids can mean children must spend more time hauling water or fetching fuelwood for their households, leaving them with less time for school and studying.⁶⁶ The disruption to power lines and power outages caused by unexpected weather events can also pose a safety risk for children involved in child labour, both in the workplace and in transit to work in badly illuminated streets.⁶⁷ More broadly, damage to basic services infrastructure can disrupt economic activity and livelihoods, exacerbating the conditions of households already in situations of vulnerability, and increasing the risk of their having to resort to child labour as a survival strategy.

⁶¹ European Agency for Safety and Health at Work, 'Review of the Future of Agriculture and Occupational Safety and Health (OSH) : Foresight on New and Emerging Risks in OSH'.

⁶² Balbus et al., 'Implications of Global Climate Change for the Assessment and Management of Human Health Risks of Chemicals in the Natural Environment'.

⁶³ UNICEF, *Unless We Act Now: The Impact of Climate Change on Children*.

⁶⁴ Alam, 'Parental Health Shocks, Child Labor and Educational Outcomes: Evidence from Tanzania'; Dhanaraj, 'Effects of Parental Health Shocks on Children's Schooling: Evidence from Andhra Pradesh, India'; Dillon, 'Child Labour and Schooling Responses to Production and Health Shocks in Northern Mali'; Dinku, 'The Impact of Public Works Programme on Child Labour in Ethiopia'; Mendolia, Nguyen, and Yerokhin, 'The Impact of Parental Illness on Children's Schooling and Labour Force Participation: Evidence from Vietnam'.

⁶⁵ UNICEF, *Unless We Act Now: The Impact of Climate Change on Children*.

⁶⁶ See, for example: Otto et al., 'Social Vulnerability to Climate Change: A Review of Concepts and Evidence'.

⁶⁷ UNICEF, 'An Assessment of the Impact of Climate, Energy and Environment on Children in Guyana'.

Climate change mitigation policies

Climate mitigation efforts aim at lowering or removing greenhouse gas emissions from the atmosphere. These efforts include reducing CO₂ emissions through a transition away from coal, oil and gas to renewable energy; land use change, afforestation/reforestation; climate smart/organic agriculture; sustainable transport; environmentally effective waste management; and industrial changes.⁶⁸ Actions in all these areas have potential relevance for child labour.

A number of activities that involve child labour will be affected in the transition to clean energy. The phasing out of coal and closure of coal mines, for example, will reduce child labour in coal mining, a form of child labour that typically involves extremely hazardous work conditions.⁶⁹ However, the overall child labour effects of transitioning away from coal and other fossil fuels are hard to predict. Historically, the closure of coal mines has often been associated with significant economic hardship in the affected regions.⁷⁰ If the families of these children do not see any improvement in their living standards, it is possible that the children will just move to work in other sectors. The measures taken by governments to ensure a 'just transition' out of coal will heavily determine the outcomes for children involved in these mining activities.

Policies incentivizing the transition to a green economy, for example, subsidies for electric vehicles and renewable energy storage, are also of potential direct relevance to child labour. The extraction of cobalt and other rare earth minerals needed especially for the production of batteries to store renewable energy and to power electric vehicles is creating demand for child labour in contexts such as the Democratic Republic of Congo.⁷¹ Reports of child labour in cobalt mining emphasize the extremely hazardous working conditions that children face,⁷² and legal complaints have been filed against a number of large companies for allowing child labour in their cobalt supply chains.⁷³ Similarly, both government incentives and market signals are creating a growing demand for renewable fuels like bioethanol derived from sugarcane, for renewable fuels like bioethanol derived from sugarcane, a sector in which child labour occurs in a number of locations.⁷⁴

The careful regulation of e-waste disposal at the national and, even more importantly, international level, as part of broader efforts towards environmentally-effective waste management, is of direct relevance to preventing the further growth of hazardous child labour in out-sourced e-waste management in less industrialised countries.⁷⁵ Already, there is widespread involvement of children, some as young as 5 years old, in unregulated informal e-waste recycling at dumpsites to recover rare earth minerals used in batteries and other electronic products, where the World Health Organisation indicates they are exposed to as

⁶⁸ IPCC, 'Climate Change 2022: Impacts, Adaptation and Vulnerability.'

⁶⁹ See, for example: Baloch and Ellis-Petersen, "'Coal Workers Are Orphans': The Children and Slaves Mining Pakistan's Coal And".

⁷⁰ Harrahill and Douglas, 'Framework Development for "Just Transition".'

⁷¹ UNEP and International Resource Panel, 'Mineral Resource Governance in the 21st Century: Gearing Extractive Industries Towards Sustainable Development'.

⁷² Amnesty International, 'This Is What We Die for: Human Rights Abuses in the Democratic Republic of the Congo Power the Global Trade in Cobalt'.

⁷³ Laviertes, 'Tesla, Apple among Firms Accused of Aiding Child Labor in Congo'; Zimmer, 'Green Energy's Dirty Side Effects'.

⁷⁴ ILO, 'Child Labour in the Primary Production of Sugarcane'.

⁷⁵ Sergeant, 'Safe Work in E-Waste Management: ILO Fundamental Conventions, Safety and Child Labour'.

many as 1,000 harmful substances with severe consequences for the immediate and long-term health and well-being.⁷⁶ The importance of preventing violations of children's rights in this sector was underlined by the Special Rapporteur on the Implications for Human Rights of the Environmentally Sound Management and Disposal of Hazardous Substances and Wastes, who emphasized the obligations of States and responsibilities of businesses in preventing exposure by children to toxic substances, with explicit reference to child labour.⁷⁷

As economies move towards more circular and eco-friendly practices, again in response to market signals and government incentives, structural changes to entire sectors are also likely to occur, with unpredictable consequences for child labour. For instance, the demand for raw cotton is likely to decrease for environmental reasons (and productivity may also decline due to climate change sensitivity), and, conversely, the demand for recycled cotton and synthetic fabrics to increase. Although many children worldwide work in the cotton sector,⁷⁸ the overall effect of the shrinking of this industry on child labour is difficult to foresee: it could reduce the demand for child labour, but it is also possible that as the industry struggles to survive, it might demand more children and fewer regularly paid adult workers in order to reduce labour costs. Moreover, even if the demand from child labour were to completely disappear in one industry, it is not clear that the children would all automatically move into schooling, and not to other jobs in other sectors or industries.

Climate adaptation policies

Climate *adaptation* efforts aim at adjusting systems and societies to withstand the impacts of climate change. The net effects of some adaptation measures on child labour can be difficult to predict, as they can render beneficiary households better-off and more resilient (thus reducing their need to resort to child labour) but can also create new work opportunities for children (thus raising demand for child labour). It is critical that these competing effects are accounted for in the design of climate adaptation measures.

A rural employment guarantee scheme in India, for example, designed to act as a buffer against agricultural shocks, has been found to generate excess demand for adult labour, which has in turn caused some increase in child labour in informal labour markets and reduced schooling during the times of highest labour demand, such as during favourable harvest seasons.⁷⁹ Thus, the labour market effects need to be weighed carefully in the design of such schemes to ensure that children are not withdrawn from school and employed in other activities as an indirect unintended consequence.

In agriculture, programmes to encourage climate-smart agricultural practices that increase productivity in the face of a changing climate can also have the unintended consequence of raising demand for child labour if this risk is not accounted for in programme design.⁸⁰ For

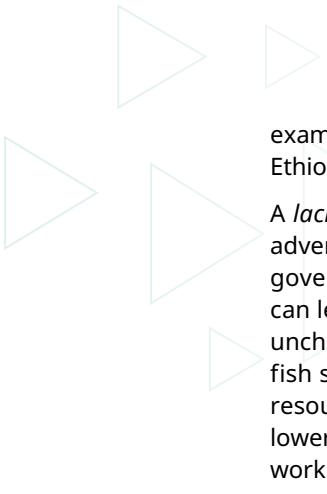
⁷⁶ Sergeant; World Health Organisation, 'Children and Digital Dumpsites'.

⁷⁷ Human Rights Council, *Report of the Special Rapporteur on the Implications for Human Rights of the Environmentally Sound Management and Disposal of Hazardous Substances and Wastes on His Mission to Germany*.

⁷⁸ ILO, 'Child Labour in Cotton - a Briefing'.

⁷⁹ Ajefu and Abiona, 'Impact of Shocks on Labour and Schooling Outcomes and the Role of Public Work Programmes in Rural India'.

⁸⁰ FAO, 'How Can Agricultural Policies and Strategies Help to End Child Labour in Agriculture?'



example, there is evidence that the adoption of Soil and Water Conservation technologies in Ethiopia has led to greater use of child labour.⁸¹

A *lack* of adaption policies to help people cope with climate change can also clearly have adverse consequences for child labour. Without coordinated adaptation strategies from the government, individual households will implement their own coping mechanisms, which can lead to unsustainable practices and worsening collective conditions. For example, the unchecked inter-related effects of climate change and overfishing are leading to depleted fish stocks in many marine ecoregions, necessitating more effort to capture ever-scarcer resources, in turn resulting in rising input costs (such as fuel for longer periods at sea) and lower financial returns. These cost pressures can be passed on to fishers through exploitative work conditions and human rights abuses.⁸²

⁸¹ Fontes, 'Soil and Water Conservation Technology Adoption and Labour Allocation: Evidence from Ethiopia'.

⁸² See, for example: Suckall, Tompkins, and Stringer, 'Identifying Trade-Offs between Adaptation, Mitigation and Development in Community Responses to Climate and Socio-Economic Stresses'; Decker Sparks and Hasche, 'Complex Linkages between Forced Labor Slavery and Environmental Decline in Marine Fisheries'.



4

Discussion:
child labour and a
just transition to
a climate-neutral
economy and
society



► 4. Discussion: child labour and a just transition to a climate-neutral economy and society

The available evidence makes abundantly clear that climate change is already having profound impacts on child labour, and, following from this, on global progress toward ending all forms of child labour by the 2025 target date set by the Sustainable Development Goals. As the impacts of climate change grow and intensify, this will be even more true in the years up to and beyond the 2025 target date.

A just transition to a climate-neutral economy and society is one that is as fair and inclusive as possible to everyone concerned, that creates decent work opportunities and that leaves no one behind.⁸³ From a child labour perspective, a just transition means, above all, that climate action is structured in a way that furthers child labour reduction goals and does not instead result in unintended negative consequences for child labour. It means maximising the child labour benefits accruing from climate action while at the same time carefully managing potential adverse side effects on the supply and demand of child labour. Both public and private climate actions are relevant in this context.

Public climate action

Ensuring a just transition from a child labour perspective has implications for public climate action across a range of policy areas. Safeguards, for example, are needed so that public policies promoting the clean energy transition do not create labour market disruptions that leave low-skill workers and their families in a position of greater vulnerability and more reliant on their children's labour. Government incentives programmes promoting "green" products such as electric cars and solar panels should include measures to address the risk of child labour in mining activities or in other production activities in the supply chains of these products. Relatedly, policies promoting the recycling of e-waste and other items should ensure that these activities do not create new demand for hazardous child labour in outsourced e-waste management and recycling. Climate change adaptation policies, such as environmentally sustainable methods to intensify agriculture production in the face of climate change, or public works schemes to buffer climate shocks, must also be designed in a way that reduces household dependence on child labour and do not instead result in greater demand for child labour.

⁸³ ILO, 'ntly Asked Questions on Just Transition'.

Public action to ensure a just transition from a child labour perspective also has an important regulatory dimension. Combining both environmental and human rights elements into national laws and regulations governing the behaviour of firms, including in their domestic and cross-border supply chains, can play an important role in ensuring complementarity between these two regulatory goals. Governments can also incentivise action on human rights and the environment in business operations and supply chains through rules in trade agreements requiring commitment to fundamental ILO conventions and to climate goals.

A just transition also requires that countries' regulatory actions account for the potential negative environmental and human rights externalities embedded in the goods and services they import. In other words, regulatory measures should consider not only the child labour and climate impacts associated with domestic production, but also the impacts in third countries in the production of the imported goods and services. The annex to this report describes a simple methodology for measuring CO₂ emissions and hours of child labour embedded in imported goods and services.

Private climate action

Environmental and human rights abuses in business operations and supply chains frequently occur in tandem and are closely linked. Examples are many. Monocrop coffee production in a number of contexts is associated with both child labour and environmental damage including deforestation, soil erosion, and water pollution. The mining of coltan, a mineral indispensable to the manufacture of range of electronic goods, involves the widespread use of child labour and at the same time is seriously damaging ecosystems and affecting wildlife habitats.⁸⁴ Similarly, the cobalt industry is associated with negative environmental impacts ranging from habitat destruction to water and air pollution and is also beset with human rights abuses including child labour, forced labour and commercial sexual exploitation of women and girls.⁸⁵ In the palm oil industry, environmental destruction from deforestation occurs alongside the use of child labour in palm oil harvesting.⁸⁶ Cotton production, among other environmental concerns, involves as a by-product the creation of nitrous oxides, a greenhouse gas 300 times more potent than CO₂, while also in many contexts is reliant on child labour.⁸⁷

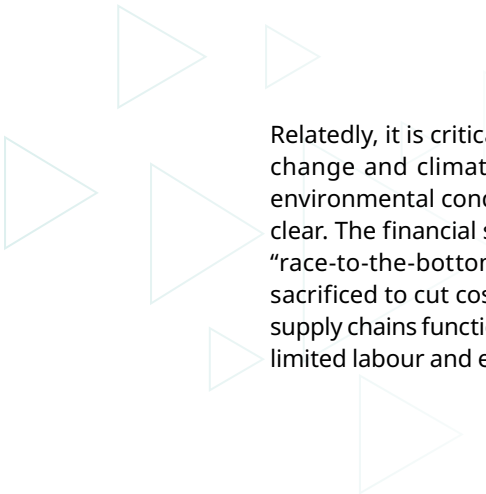
For business, in these and many other industries facing both environmental and human rights challenges, a just transition from a child labour perspective means ensuring that environmental and human rights due diligence efforts are reasonably aligned and mutually reinforcing. Businesses that aim to meet environmental due diligence obligations at the expense of due diligence obligations around human rights, or vice versa, ultimately do not meet their obligations in either of these areas, as human and environmental rights are inextricably linked. Rather, a comprehensive approach is needed in which these environmental and human rights obligations are addressed hand-in-hand. While some businesses are moving to more synergistic "triple-bottom-line" approaches (i.e., planet, people and profit), in recognition of the inter-linkages between environmental health, labour rights and financial success, much more needs to be done in this regard.

⁸⁴ Ojewale, 'Child Miners'; Ojewale, 'What Coltan Mining in the DRC Costs People and the Environment'.

⁸⁵ Buxton, 'Mining Cobalt Better'.

⁸⁶ Amnesty International, 'The Great Palm Oil Scandal: Labour Abuses behind Big Brand Names'.

⁸⁷ ILO, 'Child Labour in Cotton - a Briefing'.



Relatedly, it is critical that business responses to the cost pressures associated with climate change and climate-related shocks are not at the expense of either human rights and environmental conditions in their operations and supply chains. The risks in this regard are clear. The financial stress associated with losses from climate-related shocks can incentivize “race-to-the-bottom” strategies in which human rights and environmental standards are sacrificed to cut costs. This is a particular concern in segments of business operations and supply chains functioning in jurisdictions hard hit by climate change that at the same time have limited labour and environmental standards and weak enforcement mechanisms.



Bibliography

► Bibliography

- Ajefu, Joseph Boniface, and Olukorede Abiona. 'Impact of Shocks on Labour and Schooling Outcomes and the Role of Public Work Programmes in Rural India'. *The Journal of Development Studies* 55, no. 6 (2019): 1140–57. <https://doi.org/10.1080/00220388.2018.1464146>.
- Alam, Shamma Adeeb. 'Parental Health Shocks, Child Labor and Educational Outcomes: Evidence from Tanzania'. *Journal of Health Economics* 44, no. December (2015): 161–75. <https://doi.org/10.1016/j.jhealeco.2015.09.004>.
- Alsamawi, Ali, Tihana Bule, Claudia Cappa, Harry Cook, Claire Galez-Davis, and Gady Saiovici. 'Measuring Child Labour, Forced Labour and Human Trafficking in Global Supply Chains: A Global Input-Output Approach'. In *ILO Technical Paper*, 2019.
- Amnesty International. 'The Great Palm Oil Scandal: Labour Abuses behind Big Brand Names', 2016.
- . 'This Is What We Die for: Human Rights Abuses in the Democratic Republic of the Congo Power the Global Trade in Cobalt', 2016. <https://www.amnesty.org/en/documents/afr62/3183/2016/en/>.
- Aragón, Fernando M., Francisco Oteiza, and Juan Pablo Rud. 'Climate Change and Agriculture: Subsistence Farmers' Response to Extreme Heat'. *American Economic Journal: Economic Policy* 13, no. 1 (2021): 1–35.
- Arnold, Taylor J., Thomas A. Arcury, Joanne C. Sandberg, Sara A. Quandt, Jennifer W. Talton, Dana C. Mora, Gregory D. Kearney, Haiying Chen, Melinda F. Wiggins, and Stephanie S. Daniel. 'Heat-Related Illness Among Latinx Child Farmworkers in North Carolina: A Mixed-Methods Study'. *New Solutions: A Journal of Environmental and Occupational Health Policy: NS* 30, no. 2 (August 2020): 111–26. <https://doi.org/10.1177/1048291120920571>.
- Baez, Javier E., Leonardo Lucchetti, Maria E. Genoni, and Mateo Salazar. 'Gone with the Storm: Rainfall Shocks and Household Wellbeing in Guatemala'. *The Journal of Development Studies* 53, no. 8 (2017): 1253–71. <https://doi.org/10.1080/00220388.2016.1224853>.
- Balbus, John M., Alistair B.A. Boxall, Richard A. Fenske, Thomas E. McKone, and Lauren Zeise. 'Implications of Global Climate Change for the Assessment and Management of Human Health Risks of Chemicals in the Natural Environment'. *Environmental Toxicology and Chemistry* 32, no. 1 (2013): 62–78. <https://doi.org/10.1002/etc.2046>.
- Baloch, Shah Meer, and Hannah Ellis-Petersen. "'Coal Workers Are Orphans': The Children and Slaves Mining Pakistan's Coal And". *The Guardian (blog)*, 2020. <https://www.theguardian.com/global-development/2020/feb/19/coal-workers-are-orphans-the-children-and-slaves-mining-pakistans-coal>.
- Basu, Kaushik, and Pham Hoang Van. 'The Economics of Child Labor'. *The American Economic Review* 88, no. 3 (1998): 412–27. <https://www.jstor.org/stable/116842>.
- Bebber, Daniel P., Mark A.T. Ramotowski, and Sarah J. Gurr. 'Crop Pests and Pathogens Move Polewards in a Warming World'. *Nature Climate Change* 3, no. 11 (2013): 985–88. <https://doi.org/10.1038/nclimate1990>.

- Beegle, Kathleen, Rajeev H. Dehejia, and Roberta Gatti. 'Child Labor and Agricultural Shocks'. *Journal of Development Economics* 81, no. 1 (2006): 80–96. <https://doi.org/10.1016/j.jdeveco.2005.05.003>.
- Black, Emily, Ewan Pinnington, Caroline Wainwright, Fiona Lahive, Tristan Quaife, Richard P. Allan, and Peter Cook. 'Cocoa Plant Productivity in West Africa under Climate Change: A Modelling and Experimental Study'. *Environmental Research Letters* 16, no. 1 (2020): 014009. <https://doi.org/10.1088/1748-9326/abc3f3>.
- Burzyńska, Michał, Christoph Deuster, Frédéric Docquier, and Jaime Melo. 'Climate Change, Inequality, and Human Migration', IZA Discussion Paper, No. 12623 (2019): 64.
- Buxton, Abbi. 'Mining Cobalt Better'. International Institute for Environment and Development, 2021. <https://www.iied.org/mining-cobalt-better>.
- Caruso, Germán Daniel. 'The Legacy of Natural Disasters: The Intergenerational Impact of 100 Years of Disasters in Latin America'. *Journal of Development Economics* 127, no. C (2017): 209–33. <https://ideas.repec.org/a/eee/deveco/v127y2017icp209-233.html>.
- Chapagain, Dipesh, Florent Baarsch, Michiel Schaeffer, and Sarah D'haen. 'Climate Change Adaptation Costs in Developing Countries: Insights from Existing Estimates'. *Climate and Development* 12, no. 10 (2020): 934–42. <https://doi.org/10.1080/17565529.2020.1711698>.
- Cook, Amanda, and Donovan Beachy. 'The Impact of Hurricane Matthew on School Attendance: An Analysis from Rural Haiti'. *International Journal of Environmental Research and Public Health* 16, no. 1 (2018): 55. <https://doi.org/10.3390/ijerph16010055>.
- Decker Sparks, Jessica L., and Leslie K. Hasche. 'Complex Linkages between Forced Labor Slavery and Environmental Decline in Marine Fisheries'. *Journal of Human Rights* 18, no. 2 (15 March 2019): 230–45. <https://doi.org/10.1080/14754835.2019.1602824>.
- Dhanaraj, Sowmya. 'Effects of Parental Health Shocks on Children's Schooling: Evidence from Andhra Pradesh, India'. *International Journal of Educational Development* 49, no. July (2016): 115–25. <https://doi.org/10.1016/j.ijedudev.2016.03.003>.
- Dillon, A. 'Child Labour and Schooling Responses to Production and Health Shocks in Northern Mali'. *Journal of African Economies* 22, no. 2 (2013): 276–99. <https://doi.org/10.1093/jae/ejs025>.
- Dinku, Yonatan. 'The Impact of Public Works Programme on Child Labour in Ethiopia'. *South African Journal of Economics* 87, no. 3 (2019): 283–301. <https://doi.org/10.1111/saje.12226>.
- Dumas, Christelle. 'Productivity Shocks and Child Labor: The Role of Credit and Agricultural Labor Markets'. *Economic Development and Cultural Change* 68, no. 3 (2020): 763–812. <https://doi.org/10.1086/701828>.
- Eckstein, David, Vera Künzel, Laura Schäfer, and Germanwatch. 'Global Climate Risk Index 2021 Who Suffers Most Extreme Weather Events?' In *Weather-Related Loss Events in 2019 and 2000-2019*, 2021.
- Edmonds, Eric V., and Norbert Schady. 'Poverty Alleviation and Child Labor'. *American Economic Journal: Economic Policy* 4, no. 4 (May 2012): 100–124. <https://doi.org/10.1257/pol.4.4.100>.
- Engle, Patrice. 'National Plans of Action for Orphans and Vulnerable Children in Sub-Saharan Africa. Where Are the Youngest Children?' *Working Papers in Early Childhood Development*, no. 50 (2008).
- European Agency for Safety and Health at Work. 'Review of the Future of Agriculture and Occupational Safety and Health (OSH) : Foresight on New and Emerging Risks in OSH'. European Agency for Safety and Health at Work, 2020. <https://data.europa.eu/doi/10.2802/769257>.

- FAO. 'How Can Agricultural Policies and Strategies Help to End Child Labour in Agriculture?' *Global Forum on Food Security and Nutrition*, no. N.165: 20 (2020).
- Fatima, Zartash, Mukhtar Ahmed, Mubshar Hussain, Ghulam Abbas, Sami Ul-Allah, Shakeel Ahmad, and Niaz Ahmed. 'The Fingerprints of Climate Warming on Cereal Crops Phenology and Adaptation Options'. *Scientific Reports* 10, no. 1 (2020): 18013. <https://doi.org/10.1038/s41598-020-74740-3>.
- Fontes, Francisco Pereira. 'Soil and Water Conservation Technology Adoption and Labour Allocation: Evidence from Ethiopia'. *World Development* 127 (2020): 104754. <https://doi.org/10.1016/j.worlddev.2019.104754>.
- Frempong, Raymond Boadi, and David Stadelmann. 'The Effect of Food Price Changes on Child Labour: Evidence from Uganda'. *Journal of Development Studies* 55, no. 7 (2019): 1492–1507. <https://ideas.repec.org//a/taf/jdevst/v55y2019i7p1492-1507.html>.
- Greenfield, Muhammad Hidayat. 'An Urgent Need to Reassess Climate Change and Child Labour in Agriculture'. *The Lancet Planetary Health* 6, no. 6 (1 June 2022): e456–57. [https://doi.org/10.1016/S2542-5196\(22\)00118-8](https://doi.org/10.1016/S2542-5196(22)00118-8).
- Guarcello, L., I. Kovrova, and F. Rosati. 'Child Labour as a Response to Shocks: Evidence from Cambodian Villages'. Understanding Children's Work Programme Working Paper Series, 2008.
- Harrahill, Kieran, and Owen Douglas. 'Framework Development for "Just Transition". In *Coal Producing Jurisdictions*. *Energy Policy* 134, 110990, 2019. <https://doi.org/10.1016/j.enpol.2019.110990>.
- Hou, Xiaohui, Seo Yeon Hong, and Kinnon Scott. 'The Heterogeneous Effects of a Food Price Crisis on Child School Enrolment and Labour: Evidence from Pakistan'. *The Journal of Development Studies* 52, no. 5 (2016): 718–34. <https://doi.org/10.1080/00220388.2015.1093116>.
- Human Rights Council. *Report of the Special Rapporteur on the Implications for Human Rights of the Environmentally Sound Management and Disposal of Hazardous Substances and Wastes on His Mission to Germany*. UN General Assembly, 2016.
- ILO. 'Child Labour in Cotton - a Briefing'. ILO Fundamentals, 2016. <https://www.ilo.org/ipecinfo/product/download.do?type=document&id=29655>.
- . 'Child Labour in the Primary Production of Sugarcane'. Report, 29 September 2017. http://www.ilo.org/ipec/Informationresources/WCMS_IPEC_PUB_29635/lang--en/index.htm.
- . 'Frequently Asked Questions on Just Transition'. Document, 22 October 2021. http://www.ilo.org/global/topics/green-jobs/WCMS_824102/lang--en/index.htm.
- . 'Working on a Warmer Planet: The Impact of Heat Stress on Labour Productivity and Decent Work'. International Labour Office, 2019. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_711919.pdf.
- . 'World Report on Child Labour: Economic Vulnerability, Social Protection and the Fight against Child Labour'. Report, 29 April 2013. http://www.ilo.org/ipec/Informationresources/WCMS_178184/lang--en/index.htm.
- ILO, and UNICEF. 'Child Labour: Global Estimates 2020, Trends and the Road Forward'. Report, 10 June 2021. http://www.ilo.org/ipec/Informationresources/WCMS_797515/lang--en/index.htm.

- IOE. 'Make Transitions Work: Climate Change and Employment'. Geneva, Switzerland, 2020.
- IPCC. 'Climate Change 2014: Synthesis Report'. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva, Switzerland: Intergovernmental Panel on Climate Change, 2015.
- . 'Climate Change 2022: Impacts, Adaptation and Vulnerability.' Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK and New York, NY, USA: Cambridge University Press. Cambridge University Press, 2022. <https://doi.org/10.1017/9781009325844>.
- ITUC. 'A Guide to New Technologies to Fight Climate Change and Create Jobs'. Climate Justice Frontline Briefing'. Brussels, Belgium, 2017.
- Lavietes, M. *Tesla, Apple among Firms Accused of Aiding Child Labor in Congo*. Reuters - Thomson Reuters Foundation, 2019. <https://www.reuters.com/article/us-usa-mining-children-trfn/tesla-apple-among-firms-accused-of-aiding-child-labor-in-africa-idUSKBN1YK24F>.
- Lenton, Timothy M., Johan Rockström, Owen Gaffney, Stefan Rahmstorf, Katherine Richardson, Will Steffen, and Hans Joachim Schellnhuber. 'Climate Tipping Points — Too Risky to Bet Against'. *Nature* 575, no. 7784 (2019): 592–95. <https://doi.org/10.1038/d41586-019-03595-0>.
- Lundgren-Kownacki, Karin, Siri M. Kjellberg, Pernille Gooch, Marwa Dabaieh, Latha Anandh, and Vidhya Venugopal. 'Climate Change-Induced Heat Risks for Migrant Populations Working at Brick Kilns in India: A Transdisciplinary Approach'. *International Journal of Biometeorology* 62, no. 3 (2018): 347–58. <https://doi.org/10.1007/s00484-017-1476-0>.
- Marchetta, Francesca, David E. Sahn, and Luca Tiberti. 'The Role of Weather on Schooling and Work of Young Adults in Madagascar'. *American Journal of Agricultural Economics* 101, no. 4 (2019): 1203–27. <https://doi.org/10.1093/ajae/aaz015>.
- Mendolia, Silvia, Nga Nguyen, and Oleg Yerokhin. 'The Impact of Parental Illness on Children's Schooling and Labour Force Participation: Evidence from Vietnam'. *Review of Economics of the Household* 17, no. 2 (2019): 469–92. <https://doi.org/10.1007/s11150-018-09440-z>.
- Mueller, Brigitte, Mathias Hauser, Carley Iles, Ruksana Haque Rimi, Francis W. Zwiers, and Hui Wan. 'Lengthening of the Growing Season in Wheat and Maize Producing Regions'. *Weather and Climate Extremes* 9, no. September (2015): 47–56. <https://doi.org/10.1016/j.wace.2015.04.001>.
- Myers, Lisa, and Laura Theytaz-Bergman. 'The Neglected Link - Effects of Climate Change and Environmental Degradation on Child Labour'. Terre Des Hommes, 2017.
- Njiru, Beth Njeri. 'Climate Change, Resource Competition, and Conflict amongst Pastoral Communities in Kenya'. In *Climate Change, Human Security and Violent Conflict*, edited by Jürgen Scheffran, Michael Brzoska, Hans Günter Brauch, Peter Michael Link, and Janpeter Schilling, 8:513–27. Hexagon Series on Human and Environmental Security and Peace. Berlin, Heidelberg: Springer, 2012. https://doi.org/10.1007/978-3-642-28626-1_24.
- Ojewale, Oluwole. 'Child Miners: The Dark Side of the DRC's Coltan Wealth'. ISS Africa, 18 October 2021. <https://issafrica.org/iss-today/child-miners-the-dark-side-of-the-drcs-coltan-wealth>.
- . 'What Coltan Mining in the DRC Costs People and the Environment'. The Conversation, 29 May 2022. <http://theconversation.com/what-coltan-mining-in-the-drc-costs-people-and-the-environment-183159>.

- Otto, Ilona M., Diana Reckien, Christopher P.O. Reyer, Rachel Marcus, Virginie Le Masson, Lindsey Jones, Andrew Norton, and Olivia Serdeczny. 'Social Vulnerability to Climate Change: A Review of Concepts and Evidence'. *Regional Environmental Change* 17, no. 6 (2017): 1651–62. <https://doi.org/10.1007/s10113-017-1105-9>.
- Ray, Ranjan. 'Child Labor, Child Schooling, and Their Interaction with Adult Labor: Empirical Evidence for Peru and Pakistan'. *The World Bank Economic Review* 14, no. 2 (2000): 347–67. <https://www.jstor.org/stable/3990240>.
- Sergeant, Kelvin. 'Safe Work in E-Waste Management: ILO Fundamental Conventions, Safety and Child Labour'. In *ILO- DWT- South Asia*, 2019.
- Shah, Manisha, and Bryce Millett Steinberg. 'Drought of Opportunities: Contemporaneous and Long-Term Impacts of Rainfall Shocks on Human Capital'. *Journal of Political Economy* 125, no. 2 (2017): 527–61. <https://doi.org/10.1086/690828>.
- Soares, Rodrigo, Diana Kruger, and Matias Berthelon. 'Household Choices of Child Labor and Schooling: A Simple Model with Application to Brazil'. *Journal of Human Resources* 47, no. 1 (2012): 1–31. https://econpapers.repec.org/article/uwpjhriss/v_3a46_3ay_3a2012_3ai_3a1_3ap_3a1-31.htm.
- Staal Wästerlund, D. 'Managing Heat in Agricultural Work: Increasing Worker Safety and Productivity by Controlling Heat Exposure'. *Forestry Working Paper*, no. 1 (2018).
- Suckall, Natalie, Emma Tompkins, and Lindsay Stringer. 'Identifying Trade-Offs between Adaptation, Mitigation and Development in Community Responses to Climate and Socio-Economic Stresses: Evidence from Zanzibar, Tanzania'. *Applied Geography* 46 (1 January 2014): 111–21. <https://doi.org/10.1016/j.apgeog.2013.11.005>.
- Trinh, Trong-Anh, Alberto Posso, and Simon Feeny. 'Child Labor and Rainfall Deviation: Panel Data Evidence from Rural Vietnam'. *The Developing Economies* 58, no. 1 (2020): 63–76. <https://doi.org/10.1111/deve.12215>.
- UNEP, and International Resource Panel. 'Mineral Resource Governance in the 21st Century: Gearing Extractive Industries Towards Sustainable Development', 2020.
- UNICEF. 'A Child Is a Child: Protecting Children on the Move from Violence, Abuse and Exploitation', 2017. https://www.unicef.org/publications/index_95956.html.
- . 'An Assessment of the Impact of Climate, Energy and Environment on Children in Guyana'. *Climate Landscape Analysis for Children*, 2018. <https://www.unicef.org/guyanasuriname/media/686/file/Climate-landscape-analysis-for-children-report.pdf>.
- . 'Children on the Move Children Left Behind', 2016. https://www.unicef.org/sites/default/files/press-releases/glo-media-Children_on_the_Move_Children_Left_Behind.pdf.
- . 'Children Uprooted in the Caribbean: How Stronger Hurricanes Linked to a Changing Climate Are Driving Child Displacement', 2019.
- . 'The Climate Crisis Is a Child Rights Crisis', 2019. <https://www.unicef.org/press-releases/fact-sheet-climate-crisis-child-rights-crisis>.
- . *Unless We Act Now: The Impact of Climate Change on Children*. New York: Unicef, 2015. http://www.unicef.org/publications/files/Unless_we_act_now_The_impact_of_climate_change_on_children.pdf.
- UNICEF Bangladesh. 'Battling Climate Change with School and Success', 2019. <https://www.unicef.org/rosa/stories/battling-climate-change-school-and-success>.

World Health Organisation. 'Children and Digital Dumpsites: E-Waste Exposure and Child Health', 2021. <https://www.who.int/publications-detail-redirect/9789240023901>.

Zeufack, Albert G., Cesar Calderon, Megumi Kubota, Vijdan Korman, Catalina Cantu Canales, and Alain Ntumba Kabundi. 'An Analysis of Issues Shaping Africa's Economic Future'. *Africa's Pulse*. Washington, DC: World Bank, 6 October 2021. <https://doi.org/10.1596/978-1-4648-1805-9>.

Zimmer, Carl-Johan Karlsson, Katarina. 'Green Energy's Dirty Side Effects'. *Foreign Policy* (blog), 18 June 2020. <https://foreignpolicy.com/2020/06/18/green-energy-dirty-side-effects-renewable-transition-climate-change-cobalt-mining-human-rights-inequality/>.





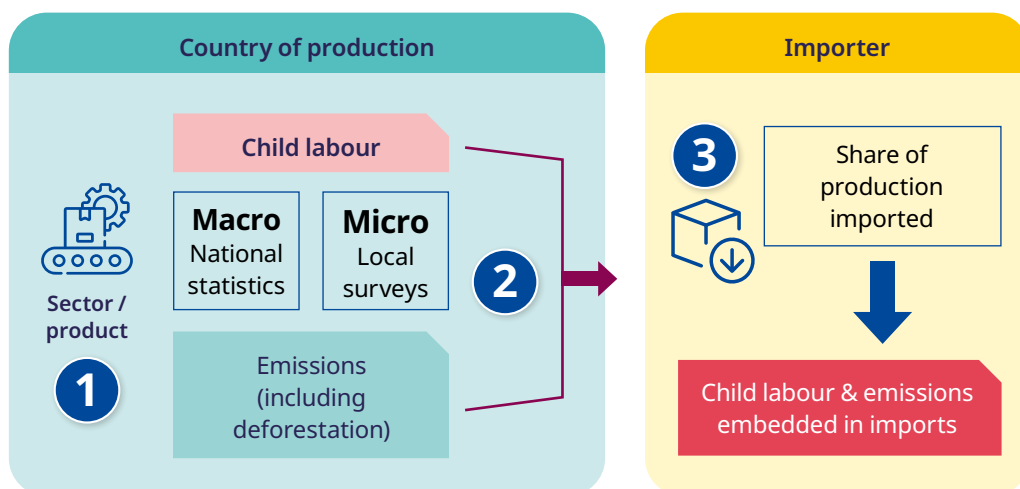
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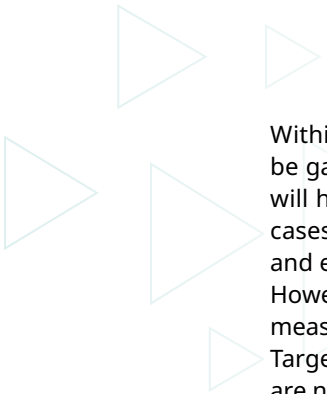
► Annex: Measuring the shared responsibility for climate change and child labour: a carbon and child labour rucksack

The Carbon and Child Labour Rucksack (CCLR) presents a simple methodology to measure child labour and CO2 emissions embedded in traded goods, that can be adopted by importing countries, multinational companies, or any organization interested in understanding the co-movement of child labour and emissions in global value chains. Figure 1 below illustrates the principles underlying the calculation of the CCLR.

First of all, the CCLR analysis should establish the product or service relevant for the desired level of measurement. The analysis can be performed at the level of a single product within a value chain or for a whole sector of the economy, e.g., agriculture (Step 1).

► Figure 1. Calculation of the Carbon and Child Labour Rucksack (CCLR)





Within each specific sector or product, information about child labour and emissions can be gathered at a more or less aggregate level (Step 2). The scope and validity of this data will heavily influence the accuracy and value of the information using the CCLR. In some cases, national statistics may be the best source of representative data across the country and ensure broader data coverage and national representativeness of geographic regions. However, national statistics may be of low quality and are usually not targeted specifically to measure child labour in a given sector, so they might lack coverage of problematic hotspots. Targeted micro surveys on child labour usually include more detailed information but they are not typically representative of the whole country, so they cannot easily be generalized to other territories and they might over-emphasize the problem, since they intentionally select communities where child labour is expected to be highly problematic.

After selecting the most appropriate available data on child labour, and combining it with emissions for a measure of climate damages, the share of total production that is imported by each destination country (Step 3) will determine the amount of the child labour damages and emissions that should be attributed to the importer.

These calculations are of course limited by the quality of the data regarding both child labour and CO₂ emissions. Note also that these calculations are not “consumption-based” estimates, but simply account for the content of child labour and CO₂/eq. emissions embedded in imports.

The CCLR methodology can be applied to any importing country, or even to a multinational corporation purchasing imports from the global South. Moreover, this methodology is relevant not only for the agricultural sector: it could be used for other value chains, especially minerals and materials needed for the circular economy, measuring child labour hours and CO₂/equivalents per gram of metals. If materials were to be recycled, the metric could be used to indicatively estimate how much child labour and emissions could be “avoided” by not mining the minerals ex-novo.

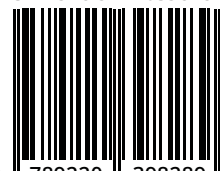
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Branch (FUNDAMENTALS)**

ILO Green Jobs Programme

International Labour Office
Route des Morillons, 4
CH-1211 Geneva 22 – Switzerland
T: +41 (0) 22 799 61 11
E: childlabour@ilo.org

► ilo.org/childlabour

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