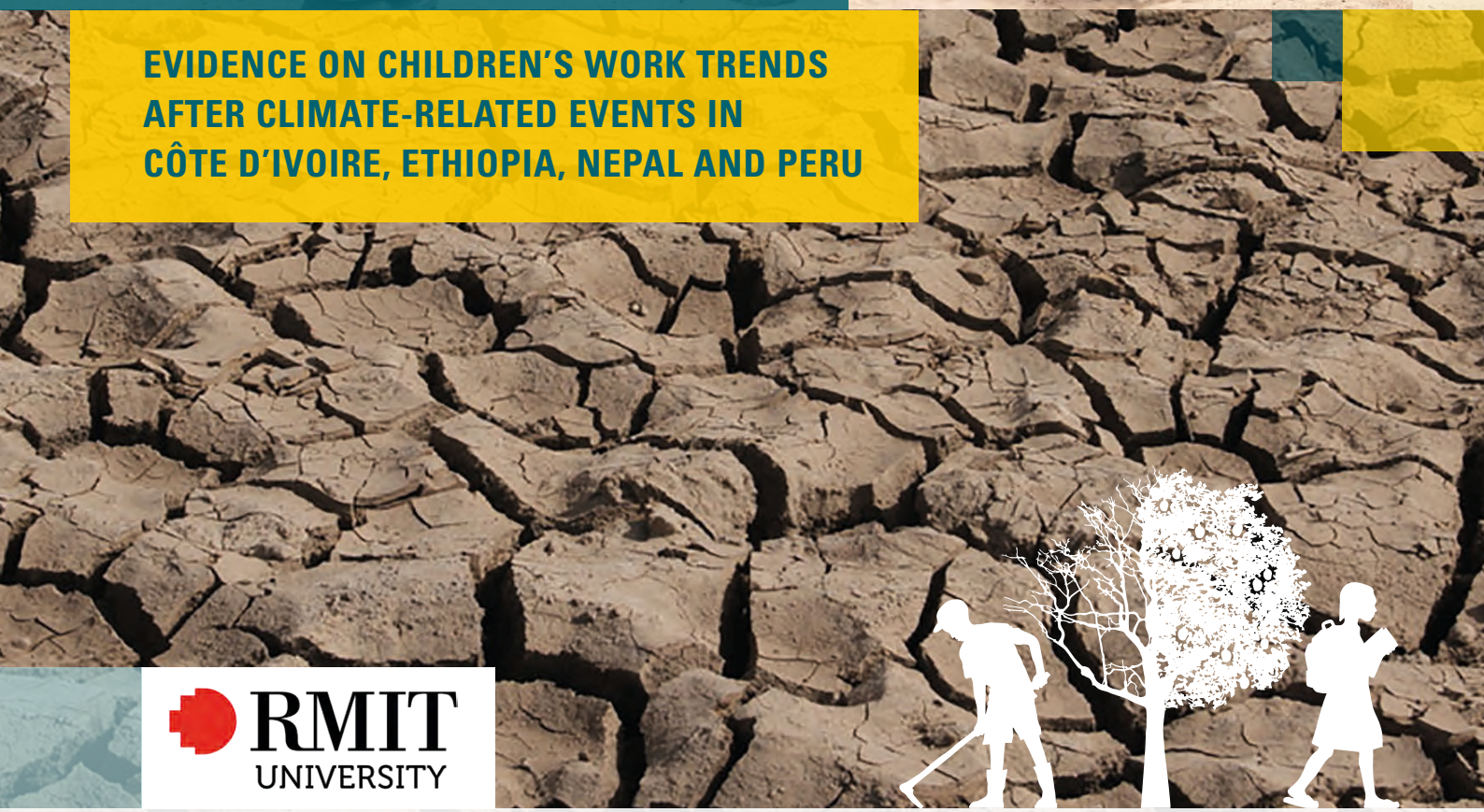
Food and Agriculture Organization of the United Nations

The relations between climate change and child labour in agriculture

EVIDENCE ON CHILDREN'S WORK TRENDS AFTER CLIMATE-RELATED EVENTS IN CÔTE D'IVOIRE, ETHIOPIA, NEPAL AND PERU



RMIT UNIVERSITY

The relations between **climate change and child labour** in agriculture

EVIDENCE ON CHILDREN'S WORK TRENDS AFTER CLIMATE-RELATED EVENTS IN CÔTE D'IVOIRE, ETHIOPIA, NEPAL AND PERU

Food and Agriculture Organization of the United Nations
Rome, 2023

Required citation:

FAO. 2023. *The relations between climate change and child labour in agriculture – Evidence on children's work trends after climate-related events in Côte d'Ivoire, Ethiopia, Nepal and Peru*. Rome. https://doi.org/10.4060/cc6244en.4060/cc6244en

ISBN 978-92-5-137911-0

Cover photographs (from top to bottom):
© FAO/Patrick Meinhardt, ©FAO/AU/Yohannes Zirotti

Contents

Tables and figures

Foreword

Climate change is threatening global food security, poverty eradication and the livelihoods of millions of individuals. Changing rainfall patterns, unpredictable weather events and sudden natural disasters are disproportionally impacting rural populations in the poorest countries in an intolerable paradox in which those who have contributed least to climate change are the ones most affected by it.

Climate-induced poverty and malnutrition contribute to a deterioration of human rights situations and exacerbate child labour. ***The sixth assessment report (AR6) synthesis report on climate change 2022: impacts, adaptation and vulnerability of the Intergovernmental Panel on Climate Change*** (IPCC) confirms that climate change-related events undermine children's educational attainment, exposing them to child labour, hazardous work and forced migration. This nexus is particularly relevant for agriculture and its subsectors: indeed, they absorb about 26 percent of the economic impacts of climate change-related disasters[1] and host 70 percent of all child labour (160 million girls and boys)[2] .

In this context, the Durban Call to Action – the outcome document of the 5th Global Conference on the Elimination of Child Labour, held in South Africa in May 2022 – has identified the elimination of child labour in agriculture as a top priority. Consistently, the call to action urges the incorporation of child labour elimination into climate action plans and just transition policies.

To that aim, and through the present study, the Food and Agriculture Organization of the United Nations (FAO) and the Royal Melbourne Institute of Technology (RMIT) worked together to generate gender-disaggregated evidence from three different regions on how climate-related events – mainly including dry spells and heavy rain, but also hail and lightning, frosts and pests – are pushing more children into work in agriculture.

---

1 **FAO.** 2021. *The impact of disasters and crises on agriculture and food security: 2021.* Rome. https://doi.org/10.4060/cb3673en

2 **ILO & UNICEF.** 2021. *International Labour Office and United Nations Children's Fund, Child Labour: Global estimates 2020, trends and the road forward.* New York, ILO and UNICEF. www.ilo.org/ wcmsp5/groups/public/---ed_norm/---ipec/documents/publication/wcms_797515.pdf

FAO's Strategy on Climate Change aims to reduce vulnerability and empower and engage women, children and youth, Indigenous Peoples and people in vulnerable situations in climate action. In this framework, supporting agrifood system actors to strengthen the integration of a child labour lens into climate-change interventions is essential. Conversely, reducing farmers' functional and economic dependency on child labour will materialize thanks to climate-resilient agriculture.

The fast-approaching deadline of Sustainable Development Goal (SDG) Target 8.7 on ending all forms of child labour by 2025, combined with the increasing frequency of climate change-related events, reminds us that the clock is ticking. We need to upscale innovative investments and solutions on this nexus, to avoid a climate change-driven increase in child labour in agriculture outweighing child-labour reduction efforts. Supporting the education and climate resilience of today's children means investing in the ability of tomorrow's farmers to realize socially and environmentally sustainable rural development.

Zitouni Ould-Dada

FAO Deputy Director
of the Office of Climate Change,
Biodiversity and Environment (OCB)

Lauren Phillips

FAO Deputy Director
of the Inclusive Rural Transformation
and Gender Equality Division (ESP)

Acknowledgements

The study, *The relations between climate change and child labour in agriculture – evidence on children's work trends after climate-related events in Côte d'Ivoire, Ethiopia, Nepal and Peru,* was commissioned by the Food and Agriculture Organization of the United Nations (FAO) commissioned to the Royal Melbourne Institute of Technology (RMIT).

Alberto Posso, Professor of Economics, Researcher and Director of the Center for International Development, and Simon Feeny, Professor of the School of Economics, Finance and Marketing and group leader of the International Development and Trade Research Group at RMIT developed the first draft of the study under the joint guidance of FAO's Office of Climate Change, Biodiversity and Environment (OCB) and FAO's Child Labour Prevention in Agriculture team in the Inclusive Rural Transformation and Gender Equality Division (ESP).

The original idea and oversight of this study were provided by Julia Wolf (OCB), Ariane Genthon (ESP) and Emily Nicole Tanganelli (OCB). Significant technical support was provided by Adriano Bolchini (ESP), Francesca Pastorelli (ESP), Marwan Benali (ESP), Marco Fiorentini (ESP), Sibyl Nelson (OCB) and Krystal Crumpler (OCB). The study further benefited from valuable feedback provided by Nicholas Sitko (ESP), Reuben Sessa (OCB), and Raffaele Dannolfo (OCB).

Moreover, our gratitude goes to the external reviewers for their substantial inputs, especially from the United Nations Children's Fund (UNICEF) – Inah Fatouma Kaloga, Valeria Groppo, Claudia Cappa, Eshani Ruwanpura and Kendra Gregson – and from the International Labour Organization (ILO) – Christina Dankmeyer, Christina Behrendt, Ian Orton and Mira Bierbaum.

Thanks go to Christin Campbell for the copy-editing work and to Bartoleschi company for the graphic design.

The financial support received from FAO's Multi-Partner Programme Support Mechanisms (FMM), now known as Flexible Voluntary Contribution (FVC), is gratefully acknowledged.

FAO's Child Labour Prevention in Agriculture team (ESP) can be reached at: *endchild-labour@fao.org*.

FAO's Office of Climate Change, Biodiversity and Environment (OCB) can be reached at: *OCB-Director@fao.org*

©Chris Steele-Perkins/Magnum Photos for FAO

Abbreviations and acronyms

AGEPE	Agence Emploi Jeaine
CSA	Central Statistical Agency
C4ED	Center for Evaluation and Development
DHS 2000	Demographic and Health Survey
DS	Direct Support
ECMWF	European Centre for Medium-Range Weather Forecasts
FAO	Food and Agriculture Organization of the United Nations
FM	frequency modulation
GDP	gross domestic product
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Institute
ILO	International Labour Organization
INS	Institut National de la Statistique
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
IPEC	International Programme on the Elimination of Child Labour
LAPA	Local Adaptation Plan
LSMS 2001	Peru Living Standards Measurement Survey
NAPA	National Adaptation Plan
NGO	non-governmental organization
OECD	Organisation for Economic Co-operation and Development
PSNP	productive safety net programme

PSUs	provincial support units
PW	Public Works
RMIT	Royal Melbourne Institute of Technology
SDGs	Sustainable Development Goals
SNNP	Southern Nations, Nationalities and Peoples
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WHO	World Health Organization

Executive summary

Background

In December 2020, the Food and Agriculture Organization of the United Nations (FAO) commissioned the Royal Melbourne Institute of Technology (RMIT) University to undertake a global case study on the relationship between climate change and child labour in agriculture.

FAO recognizes that the increasing frequency and intensity of climate change-related events affect the food security and nutrition, living conditions and livelihoods of millions, especially communities living in rural areas and their children. This in turn may lead to the increased involvement of children in child labour. As part of its mandate, FAO works to prevent and eliminate child labour in agriculture, a prerequisite to achieve SDG 1 and 2 on eliminating poverty and hunger, and a specific SDG Target 8.7 on the elimination of all forms of child labour.

Agriculture is one of the most hazardous sectors together with mining and construction (ILO, 2017a) in terms of work-related fatalities, non-fatal accidents and occupational diseases. Compared to industry and services, agriculture gathers the highest share of children in hazardous work: 67.1 percent – 64 million (ILO and UNICEF, 2020).

Workers face risks that include operating heavy machinery and equipment, lifting weights and working with animals on a daily basis. Seventy percent of child labour occurs in the agricultural sector, one of the sectors most dependent on natural resources and thus vulnerable to climate-related shocks and slow onset events. Child labour is a systemic problem with complex root causes, which makes it a global challenge across sectors and cultures.

According to the latest International Labour Organization (ILO)-United Nations Children's Fund (UNICEF) statistics, most child labour takes place within the family unit, and child labour in agriculture is found in both subsistence and commercial farming. In family farming, there is continuity between farming operations and household chores, such as water fetching and firewood collection.

Thus, understanding the nexus between climate change-related events and child labour is crucial for providing evidence-based policy recommendations to governments and supporting and empowering the participation of the civil society.

Based on the available data pertaining to both climate change and child labour, this study aims to identify the extent to which climate-related events affect children's likelihood to be in child labour and the amount of time they work. The researchers canvassed existing data sources and determined, in consultation with FAO, that data from the following countries could be used for this exercise:

- Peru
- Ethiopia
- Nepal
- Côte d'Ivoire

The available data from these countries would allow a comprehensive and wide-ranging study, including sufficient diversity in terms of contexts and environments. While the available data allow the production of a robust analysis on climate-related events and how they influence children's work or work involvement, it was not possible to disentangle the impacts of climate change itself on child labour. Likewise, while the datasets and their sources described below allow experts to draw solid conclusions on the effects of climate-related events on children's work, the level of disaggregation of data was not sufficient to always capture the multiple dimensions of child labour's statistical definition. Hence, the country case studies refer to children's work or work involvement, and not throughout to child labour.

Data

For this study, quantitative data are sourced from four representative household surveys conducted in the four above-mentioned countries. They include "Young Lives" data for Peru and Ethiopia, a National Survey on the Situation of Child Labour in Côte d'Ivoire (2013), and Household Risk and Vulnerability Surveys for Nepal (Full Panel, 2016–2018).

Data for the four countries were matched with monthly precipitation data at the local level based on the ERA5 satellite reanalysis of global weather and climate. These data come from the European Centre for Medium-Range Weather Forecasts (ECMWF). The ERA5 data combine information from weather balloons, satellites, ground stations and other input sources with climate models to estimate various weather variables across grids (Dell, Jones and Olken, 2012). "Rainfall shocks" are defined as the difference between observed rainfall in a year and the long-run average for the same location, divided by the long-run standard deviation.

Methodology

The use of these different datasets allows experts to analyse the effects of different types of events on different types of child work in the four countries. Differences between boys and girls are also identified. These data were used to estimate robust econometric models that control for well-known determinants of child labour, such as mother's education and location-specific characteristics. Household socioeconomic characteristics are captured by household level controls. In some specifications, panel data techniques can be used to control for unobserved time-invariant child-level determinants of child labour, such as ability.

More specifically, the study examines the relationship between children's work and the two types of climate-related events, namely dry spells and heavy rains.

Quantitative analysis is complemented with qualitative analyses that explore the connections between climate change-related events and children's work in the four countries. Information was sourced from interviews with 15 experts who work for national governments, international non-government or intergovernmental organizations, research institutions, or from independent consultants. All interviewees are experts in the domains of labour, child labour, agriculture, or climate change. More explanation on the methodology used and the relative datasets can be found in Appendix A and Appendix B.

Findings

Our econometric analysis allows experts to account for a long list of determinants of child labour, including policy-relevant determinants, such as access to social protection frameworks. That is, our analysis allows us to understand the effect of shocks on the average household irrespective of, for example, whether they receive government support, have access to credit, or where they live.

Findings are nuanced. Summaries are presented by country below.

- Côte d'Ivoire:
  - Heavy rains lead to a reduction in the incidence of children's work for boys and a reduction in the incidence of hazardous work, i.e. child labour, for boys.
  - Heavy rains lead to an increase in the incidence of children's work for girls and an increase in the incidence of hazardous work for girls.
  - Dry spells increase the number of hours of work for boys and the number of hours of hazardous work for boys.
- Ethiopia:
  - A recent heavy rain, over a 20- or 30-year period, is likely to increase children's work in an affected region by between 10 and 25 percent, respectively. This result is driven by the effects on boys.
- Nepal:
  - Dry spells lead to an increase in the incidence of child work for girls but a decrease in the incidence of child work for boys.
  - Heavy rains reduce the number of hours of child work for girls.
  - Recent dry spells reduce the number of hours of child work for boys.
- Peru:
  - A dry spell is associated with a statistically significant increase in the probability of a boy entering work by approximately 10 percent.
  - A dry spell is associated with an increase in the amount of time that a boy spends working by approximately 15 minutes over a two-week period.
  - Experiencing a recent heavy rain is associated with an approximately 5 percent increase in boys' involvement in work.

These findings are summarized in the table below.

We conclude that, from our list of climate-related events, not all events affect child work, and by extension child labour. However, where impacts are identified to affect child work, they are more likely to increase incidences of child labour than decrease them. We also find that different shocks affect child work differently in different countries. Further, child gender matters.

Summary of the effects of climate change-related events on the incidence and intensity of child labour in agriculture

Hazard/change in child labour	Ethiopia	Peru	Nepal	Côte d'Ivoire
ERA 5 Heavy rain				
Overall incidence	Increase			Decrease
Overall intensity				
Incidence for boys	Increase	Increase		Decrease
Intensity for boys	Increase	Increase		
Incidence for girls				Increase
Intensity for girls				
ERA 5 Dry spell				
Overall incidence				
Overall intensity				
Incidence for boys			Decrease	Increase
Intensity for boys			Decrease	Increase
Incidence for girls			Increase	
Intensity for girls				

Note: Not all the parameters were measured in the four countries.
Source: Authors' own elaboration

Conceptually, when children's work increases or decreases, then time dedicated to other activities also changes. We find evidence of a trade-off between children's work in productive activities and household chores, for example, for Peru and Ethiopia. Information on household chores is not available for the two other countries.

Using Peruvian and Ethiopian data also allows experts to test whether social protection policies play a role in mitigating the potential effect of shocks on child labour. We find the following:

- Children from households registered in social protection programmes are equally likely to work in the aftermath of a shock than children from non-registered households.
- Girls from households registered in a social protection framework were more likely to work after a heavy rain than girls in non-registered households.

More research would be needed to better understand why children in households registered in social protection programmes were in some cases equally or more likely than children from other households to work in the aftermath of a climate shock, including accounting for potential structural differences between the two types of households.

© FAO/Laure-Sophie Scheltecanté

Policy implications

These results suggest that one-size-fits-all policy prescriptions are unlikely to work. Policies must be tailored to different communities based on their characteristics. However, drawing on its findings from both the quantitative and qualitative analyses, this study proposes the following groups of policy recommendations to prevent or mitigate the negative impact of weather shocks (climate-related shocks) on children's work in the countries studied:

- Put in place social protection policies that ensure rural households have adequate income and access to basic services to mitigate the need to use children in work throughout or before, during and after such events, as some of the climate change-related events covered are also slow onset and/or can last for quite some time (or social protection support and recovery can precede the next event, as in the case of recurring and seasonal ones).
- Create communication strategies that include building household awareness on the detrimental effects of child labour.

- Enact education policies ensuring the availability of fee-free education and adequately staffed schools that provide children with relevant high-quality education.
- Provide education, training opportunities and resources to farmers to improve climate-resilient coping mechanisms to maintain productivity and implement livelihoods, diversification strategies, while reducing the need for child labour.
- Improve resilience to climate change and climate change-related events through climate-adaptation strategies, such as the introduction of new drought- and flood-resistant varieties of seeds; the development of infrastructure to collect water and prevent flooding; and land-use policies to reduce deforestation and degradation, while increasing restoration.
- Improve farm infrastructure, including mechanization of agriculture to act as a substitute for child labour and increase agricultural productivity, and ensure farmers have adequate storage facilities for their crops.
- Enable households to access mechanisms such as public and private insurance, credit and so on, to not only cope with but already anticipate and prepare for climate change-related events.
- Provide information about forthcoming weather patterns which may allow farmers to better anticipate and prepare, e.g. by diversifying and adapting their strategies to minimize the effect of these events.
- Support ways to communicate climate-related information along with adaptive strategies to various levels of stakeholders, including at community level.
- Collect better data to capture the incidence and intensity of child labour and how they are changing over time; collect better data on changing weather patterns and on the implementation of early warning systems for extreme weather events.
- Find innovative ways of changing cultural and social norms regarding child labour in the countries covered by the study will also be important in making progress towards the achievement of SDG Target 8.7 on eliminating child labour in all its forms by 2025.

Country-specific policy recommendations

Our analysis also allowed us to provide several country-specific policy recommendations which are presented in detail in Chapter 3.

Côte d'Ivoire

The data analysed for Côte d'Ivoire reveal important gendered impacts of climate-related events on child labour. Changing gendered social norms and attitudes towards child labour in Côte d'Ivoire is required starting with educating households about the consequences of harmful work on children and the value of obtaining a formal education.

Ethiopia

Our econometric analysis reveals that pests are likely to increase incidences of child labour, particularly for boys. Improving household's resilience to pests will need the adoption of an integrated pest management framework, which provides households with expertise in managing economic, health and environmental risks, while minimizing undesirable outcomes for crop production. Investing in storage facilities may also prevent exposure to pests and is also an effective way to safely curb the potential child labour effects of this shock.

Nepal

The analysis reveals that dry spells are associated with an increase in child labour for girls. Water-saving strategies such as collecting water in the rainy season will assist in mitigating dry spells. Water fetching also is an activity mainly carried out by children, often girls. This could be achieved through irrigation systems and plastic ponds. Further, heavy rain barriers should be erected in heavy rain-prone areas. Finally, as in Côte d'Ivoire, changing gendered social norms and attitudes towards child labour through educational campaigns targeting households may be a fruitful approach.

Peru

The Peruvian analysis suggests that households that suffer a dry spell and are registered with one of their social protection programmes seems more likely to send their boys to work than non-registered shock-affected households. This would require further analysis of the targeting and design of these social protection programmes to understand better this result. Educational campaigns teaching households about the costs of (hazardous) child labour could also prove useful in Peru.

©FAO/IFAD/WFP/Michael Tewelde

Chapter 1
Introduction

In December 2020, the Food and Agriculture Organization of the United Nations (FAO) commissioned Royal Melbourne Institute of Technology (RMIT) University to undertake a global case study on the relationship between climate change and child labour in agriculture.

The year 2021 has been declared by the United Nations General Assembly as the International Year for the Elimination of Child Labour.[1] Moreover, the elimination of child labour is a global priority embedded in the Sustainable Development Goals (SDGs). Target 8.7 aims to take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms. Target 16.2 aims to end abuse, exploitation, trafficking and all forms of violence against and torture of children.

FAO has established a *Framework on ending child labour in agriculture* (FAO, 2020). Child labour is defined as work that is mentally, physically, socially or morally dangerous and harmful to children and/or interferes with their schooling by: depriving them of the opportunity to attend school, obliging them to leave school prematurely, or requiring them to attempt to combine school attendance with excessively long and heavy work.

[1] For more information see https://undocs.org/en/A/RES/73/338.

The Organization believes that:

If children are still overwhelmingly found working in harsh conditions instead of benefiting from education, **it is not possible to achieve sustainable agriculture and food systems feeding the world, protecting the planet and guaranteeing good livelihoods for farmers** (FAO, 2020, p. x).

FAO recognizes that the increasing quantity and intensity of climate-related events affect the food security, living conditions and livelihoods of millions, including vulnerable children (FAO, IFAD, UNICEF, WFP and WHO, 2018). FAO also recognizes that children and youth under 18 are the least responsible for climate change, yet they are the first to be negatively affected. Indeed, this study finds evidence of an association between climate-related events and children's involvement in work. Therefore, failure to address climate change and to promote climate resilience would jeopardize child labour in agriculture prevention efforts.

According to available evidence, agriculture is the sector in developing countries most affected by climate change (IFPRI, 2009). The agricultural sector is classified in this study as rural areas where the primary economic activity encompasses the cultivation of crops and animal husbandry as well as forestry, fisheries, and the development of land and water resources. We also recognize that labour in rural areas is fluid and household members act as substitutes for each other in different activities. Therefore, we also study labour in family businesses (such as making and selling handicrafts). Children and youth need to be equipped with the tools and knowledge to prepare for climate change, but they are not benefitting from education while working in conditions that are harmful to their health and sometimes to the environment.

This study aims to identify the extent to which certain climate change-related events affect child labour in agriculture. We define climate change as a long-term shift in global or regional climate patterns. We focus on events which are understood to increase in frequency and severity because of climate change. Our analysis focuses on more sudden-onset events associated with long-term changes in climatic patterns.

Based on data availability, we focus on dry spells and heavy rains. The researchers canvassed existing data sources and determined that the following countries had enough data for a comprehensive study:

- Ethiopia
- Peru
- Côte d'Ivoire
- Nepal

Ethiopia is a landlocked African country. It is categorized as a least developed country, with a gross domestic product (GDP) per capita in 2019 of approximately 855 USD. Ethiopia has one of the highest rates in the world of child labour, with for example nearly 60 percent of children working at age 11 (CSA, UNICEF Ethiopia and C4ED, 2020).

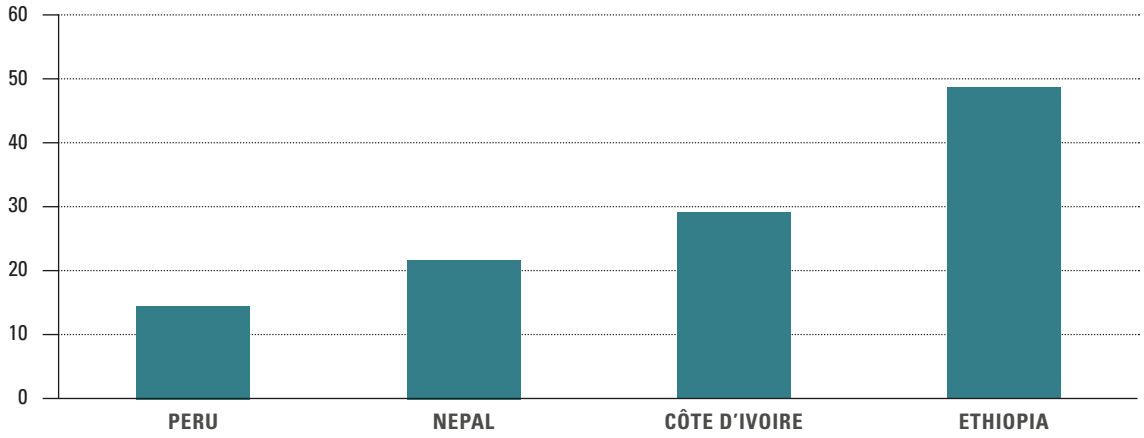
Peru is an upper-middle-income economy in South America. Its GDP per capita in 2019 was approximately USD 7 000. However, it is a highly unequal country, with rural poor predominantly located in the country's mountainous areas. According to UNICEF (2021), based on the 2015 Child Labour Survey (national databases), approximately 15 percent of Peruvian children between 5 and 17 years old are engaged in child labour.

Côte d'Ivoire is a lower-middle-income country in West Africa with a population of over 26 million. Just under 30 percent of the population lived below the poverty line of USD 1.90 (2011 PPP) in 2015 (World Bank, 2021). According to the data produced by national authorities and collected by UNICEF through the Multiple Indicator Cluster Survey 2016, approximately 22 percent of children are engaged in child labour. A comprehensive report by the International Labour Organization (ILO) (2020) found 53.4 percent of children are involved in child labour in agriculture and 35.6 percent in the services sector. On average, they worked for around 35 hours a week. In addition to these working hours, a large proportion complete an average of 12 hours of household chores fortnightly, with a much bigger representation of girls. Out of 2 million children involved in child labour, 1.4 million (or 7 in every 10) are engaged in dangerous work. The export sector is a major employer, with the two main crops being cocoa and coffee.

Nepal is a landlocked country in South Asia. The World Bank classifies Nepal as a lower-middle-income country with a GDP per capita of USD 1 090 in 2019. The ILO's latest survey on Nepal finds that among its 7 million children, 1.1 million children (15.3 percent) are engaged in child labour (ILO, 2021). The report also shows that the prevalence of child labour for younger children is higher – 18 percent of those between the ages of 5 and 13 work, compared to 10 percent of children between the ages of 14 and 17. Additionally, the ILO shows data that suggests that girls are more likely to be engaged in child labour (17 percent) than boys (14 percent). Finally, in Nepal about 87 percent of child labour occurs in the agricultural sector.

All four countries have high incidences of child labour by regional standards, coupled with sufficient variability in terms of geography, topography, and average national income. Household surveys seldom collect sufficient age-, time- and task disaggregated data which allow researchers to classify child labour based on the ILO definition. Therefore, we take a more simplistic measure often used in academia (see Chapters 2 and 3) that simply looks at whether a child spends more than one hour of time at work as well as the amount of time they work. This approach generally produces higher incidences of child labour compared to those that apply the United Nations' definitions. Figure 1 summarizes the percentage of children between 5–17 years of age involved in child labour as per UNICEF (2021) data, averaged over the 2010–2020 period.

Figure 1. **Incidence of child labour in selected countries**



Notes: A child is considered to be involved in child labour under the following conditions: (a) children 5–11 years old who, during the reference week, undertook at least one hour of economic activity and/or more than 21 hours of unpaid household services; (b) children 12–14 years old who, during the reference week, undertook at least 14 hours of economic activity and/or more than 21 hours of unpaid household services; and (c) children 15–17 years old who, during the reference week, undertook at least 43 hours of economic activity; (d) children 5–17 years old who, during the reference week, undertook hazardous work.

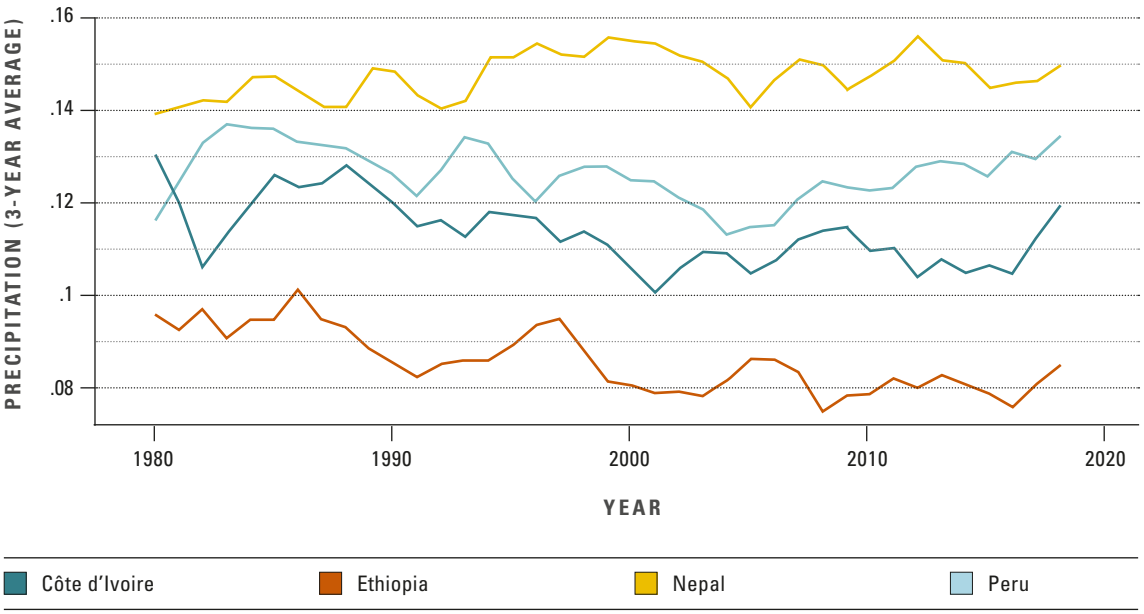
Source: UNICEF. 2021. Child labour. In: UNICEF. New York. Cited in 2021. https://data.unicef.org/topic/child-protection/child-labour/

We test the relationship between child labour and a subset of available climate-related events. In most cases, our analysis focuses on deviations in rainfall patterns relative to long-run averages. To set the stage for the ensuing analysis, Figure 2 aims to capture climate change in these nations using three-year averaged precipitation data from the ERA5 Satellite data, discussed in more detail in Chapter 3. The figure shows that climate patterns change slowly and differently in the four different countries. For example, we show a slow-moving increasing trend of precipitation in Nepal over the 1980 to 2019 period. Ethiopia and Côte d'Ivoire show a slow-moving decreasing rainfall pattern. Finally, Peru exhibits a high rate of variation with the most recent period (2005–2019) exhibiting a strong positive trend.

Our analysis builds on a comprehensive literature review. The extant literature confirms that climate change-related shocks can push children into work, yet the multidimensional relationship between child labour in agriculture and climate-related events has not been adequately explored empirically. Our findings from quantitative and qualitative analyses are nuanced, suggesting that one-size-fits-all policy prescriptions are unlikely to work.

The remainder of this report is structured as follows. The next section presents the literature review. Section 3 discusses the quantitative analysis, while Section 4 presents its qualitative counterpart. Section 5 concludes the report.

Figure 2. **Precipitation in selected countries, three-year averaged data**



Source: Authors' own elaboration based on ERA5 dataset.

©Chris Steele-Perkins/Magnum Photos for FAO

Chapter 2
Literature review

The literature review focuses on both the grey and academic literatures. It is beyond the scope of this review to discuss the entire literature on child labour.[2] Our focus will be to highlight what theoretical and empirical work has found to be the main determinants of child labour and the role played by climate-related events. In doing so, this review informs our empirical strategy.

This section is structured as follows. Section 2.1 provides information from the grey literature on child labour. This is used to highlight trends and patterns in child labour across countries and place child labour in a global context. Section 2.2 reviews the theory of child labour primarily borne out by the microeconomics literature. Section 2.3 summarizes the literature on known determinants of child labour. Section 2.4 looks at the literature on the nexus between child labour and shocks, primarily income-related shocks. Section 2.5 reviews the literature on child labour and agricultural impacts from climate-related events. The final section concludes by highlighting knowledge gaps.

[2] A simple Google Scholar search indicates that there are over 17 500 studies on this topic.

2.1. Trends and patterns in child labour

Literature on child labour is predominantly authored by the ILO and UNICEF. This literature serves two primary purposes. The first is to define "child labour", and the second is to describe trends in patterns in child labour, while often focusing on global events and shocks that can influence these patterns.

A definition of "child labour" is important because child labour, according to the two ILO "child labour conventions", generally does not refer to all work activities that a child undertakes. In 2008, at the 18th International Conference of Labour Statisticians, convened by the ILO, the members of the International Conference of Labour Statisticians agreed on a definition of child labour to allow for the collection and analysis of data (ILO, 2008). Child labour is defined as work that is inappropriate for a child's age, affects children's education, or is likely to harm their health, safety or morals.[3] More specifically, the 18th International Conference of Labour Statisticians provided a comprehensive definition of child labour (see page 19 of the resolution). It takes into consideration a child's age and work activities, but in this case, national authorities have greater scrutiny to define what constitutes child labour in terms of number of hours worked. Considerations regarding hazardous work and the worst forms of child labour remain virtually unchanged.

According to the 2018 definition, the age threshold remains centred at between the ages of 5 to 17, although a proviso exists for countries to set lower age bounds if applicable. Importantly, the new definition distinguishes between child work and child labour. Child work refers to individuals below 18 years of age who are engaged in any activity to produce goods or to provide services for use by others or for their own use. Child labour, according to the new definition, is defined as individuals from 5 to 17 years of age who were engaged in one or more of the following categories of activities:

- worst forms of child labour (includes slavery, prostitution, and illicit activities);
- work within the 2008 System of National Accounts production boundary performed by children below the minimum age;
  - Article 2 of ILO Convention No. 138 stipulates that the minimum age for admission to employment or work should not be less than the age of completion of compulsory schooling and, in any case, not less than 15 years, or a lower minimum age for light work activities as specified under Article 7 of ILO Convention No. 138.

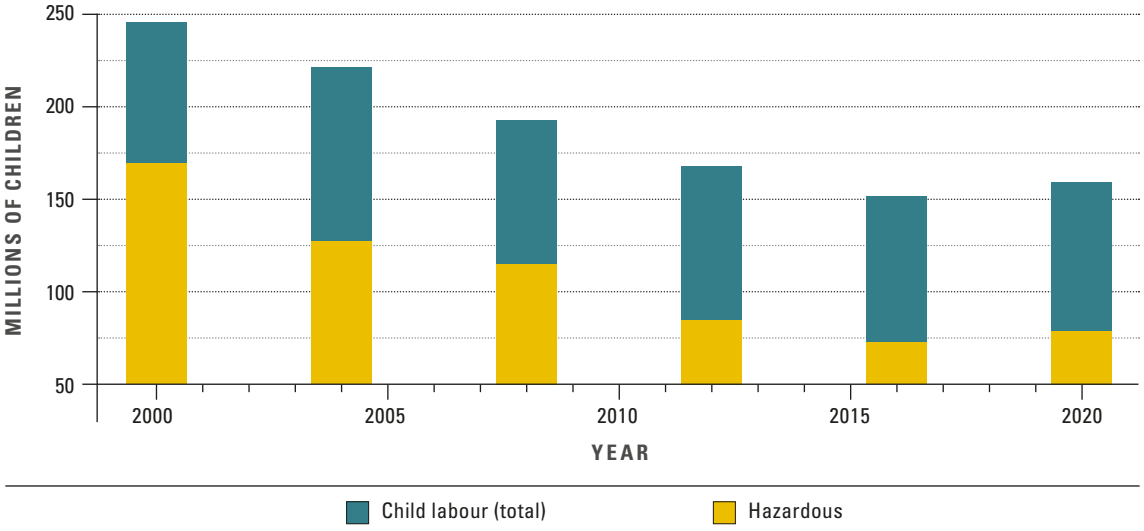
[3] See ILO Conventions 138 and 182.

- work on activities that are harmful to their health or development;
- work that prejudices children's attendance at school or participation in vocational orientation or training programmes;
- work above a number of hours, as determined by national authorities; and
- hazardous unpaid household services. Hazardous work includes long hours, unhealthy environments or dangerous locations.

Reports such as the ILO (2017b) document global trends in child labour, placing it in a global context. The first global estimates of child labour were documented by the ILO in 2000. In the subsequent 16 years, the world saw a net reduction in child labour by approximately 94 million. Further, the number of children in hazardous work fell by more than half over the same period. In 2020 there were approximately 160 million children engaged in child labour, with 79 million engaged in hazardous work. These values suggest a total increase in child labour by nearly 10 million children since 2016 and the first time that child labour has risen since data collection began (ILO and UNICEF, 2021).

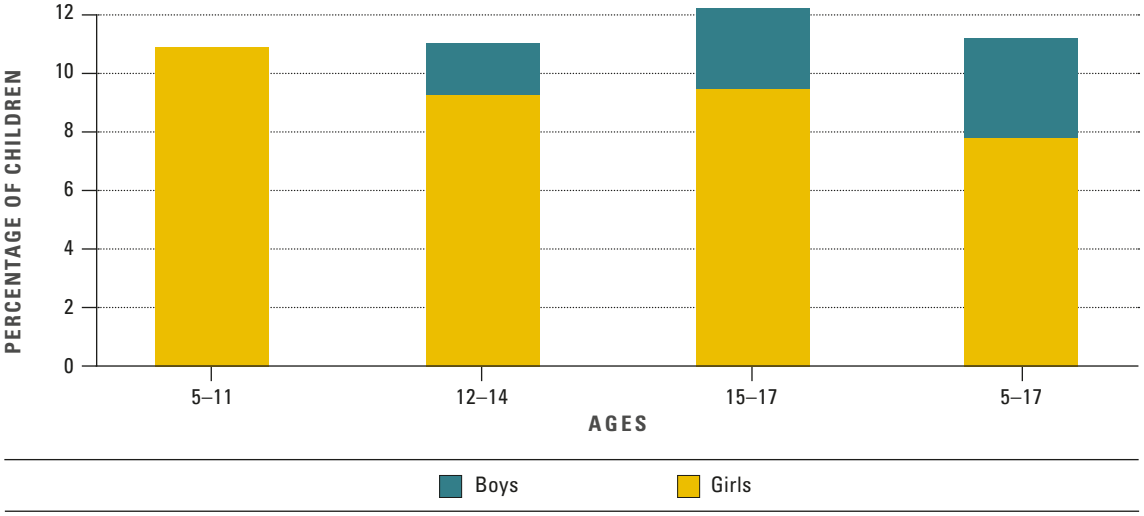
Figure 3 provides the global incidence of child labour for the period 2000–2020. It demonstrates that the incidence of child labour fell from the year 2000 until 2016, then rose for the first time in 2020. Figure 4 provides the global incidence of child labour by child gender and age using 2020 data. The figure shows that child labour is more prevalent among boys than girls at every age, with its incidence being more prominent among children from 15–17 years of age.

Figure 3. **Global incidence of child labour (2000–2020)**



Source: ILO & UNICEF. 2021. International Labour Office and United Nations Children's Fund, Child Labour: Global estimates 2020, trends and the road forward. New York, ILO and UNICEF. www.ilo.org/wcmsp5/groups/public/---ed_norm/---ipec/documents/publication/wcms_797515.pdf

Figure 4. **Global incidence of child labour by age and sex**



Source: ILO & UNICEF. 2021. International Labour Office and United Nations Children's Fund, Child Labour: Global estimates 2020, trends and the road forward. New York, ILO and UNICEF. www.ilo.org/wcmsp5/groups/public/---ed_norm/---ipec/documents/publication/wcms_797515.pdf

Much of the literature documents how households respond to global challenges and their implications for child labour. The ILO and UNICEF (2020), for example, argue that the COVID-19 pandemic, with its disruptions to employment and added economic insecurity, is likely to result in falling household income, rising poverty and, consequently, rising child labour. They highlight that temporary school closures are likely to exacerbate these effects as households look for new ways to allocate children's time.

Although the full effects of this crisis remain unknown, the ILO and UNICEF (2020) note that government action can potentially decrease the magnitude of the disruption to children's lives and ensure they stay out of work. For example, they stress that enacting and strengthening social protection measures will be important:

> Globally, 190 countries and territories have planned, introduced or adapted 937 social protection measures in response to COVID-19. … **Cash transfer programmes are a widely used social protection measure, with demonstrated results in combating child labour while enhancing income security**. Increasing benefit levels and extending coverage through existing or new programmes, and adapting entitlement conditions, obligations and delivery mechanisms are among the most important immediate responses to the crisis (ILO and UNICEF, 2020, p. 23).

©FAO/Jordi Vaque

They also argue that back-to-school campaigns and active outreach programmes aimed at encouraging parents to send their children back to school will likely help mitigate the effect of school closures on attendance and child labour.

The latter highlights an important component of the grey literature: providing policy recommendations. The ILO and UNICEF maintain a strong tradition in recommending evidence-based policies, which rely on both their work and the broader academic literature. For example, the ILO (2017c) embeds its policy discussion in the latest thinking on child labour, based on practical experience, research and impact evaluations. They note that progress towards the eradication of child labour relies on active government policy that "addresses the array of factors that push or pull children into child labour" (p. 11). The ILO maintains that while economic growth is relevant, existing evidence suggests that four principal areas matter even more:

- Education – Access to free and quality of schooling are well understood to curb child labour in most countries.
- Social protection – In particular social assistance programmes providing cash transfers to vulnerable families, including those conditional on school attendance or participation in preventive health, are understood to generally increase schooling and lower child labour.
- Labour markets – Incidences of child labour are most prevalent in societies where adults cannot access their rights to decent work in its four pillars: employment, social protection, workers' rights and social dialogue. Informal workers lack bargaining and organization rights and occupational health and safety standards. These problems undermine access to decent work and increase the likelihood that working households must rely on child labour as a coping strategy.
- Legal standards and regulations – An adequate legal framework accompanied by sufficient institutional capacity would ensure that safety standards are met and workers in all sectors have access to fundamental labour rights such as freedom of association, freedom from discrimination and freedom from forced labour. There is a strong correlation between violations of fundamental labour rights and child labour.

However, the ILO (2017c) warns that the consensus around a common set of policies does not mean there is a suitable one size-fits-all approach for addressing child labour in all countries. The academic and grey literature continue to search for new evidence from within countries, states and provinces to better understand the role of tailored solutions embedded in the contexts in which child labour persists.

The ILO (International Labour Organization), OECD (Organisation for Economic Co-operation and Development), IOM (International Organization for Migration) and UNICEF (United Nations Children's Fund) (2019) also focuses on policy initiatives that address the prevalence of child labour in global supply chains. Globalization and the production networks that drive it are understood in the economics literature as both an engine of growth and a mechanism for poverty reduction. However, poor regulatory quality, informality and poor labour standards also mean that supply chains can often be riddled with child labour. The value orientation and risk preference 2019 study finds evidence from across the developing world that child labour is persistent in agriculture, wholesale and retail, transport and storage, textiles and apparel, food products, mining and basic metals. Their analysis shows that most child labour (between 65 percent and 97 percent) in export industries occurs in the agricultural sector. This is not surprising as it is known that most child labour – 70 percent – is in the agricultural sector (ILO, 2021).

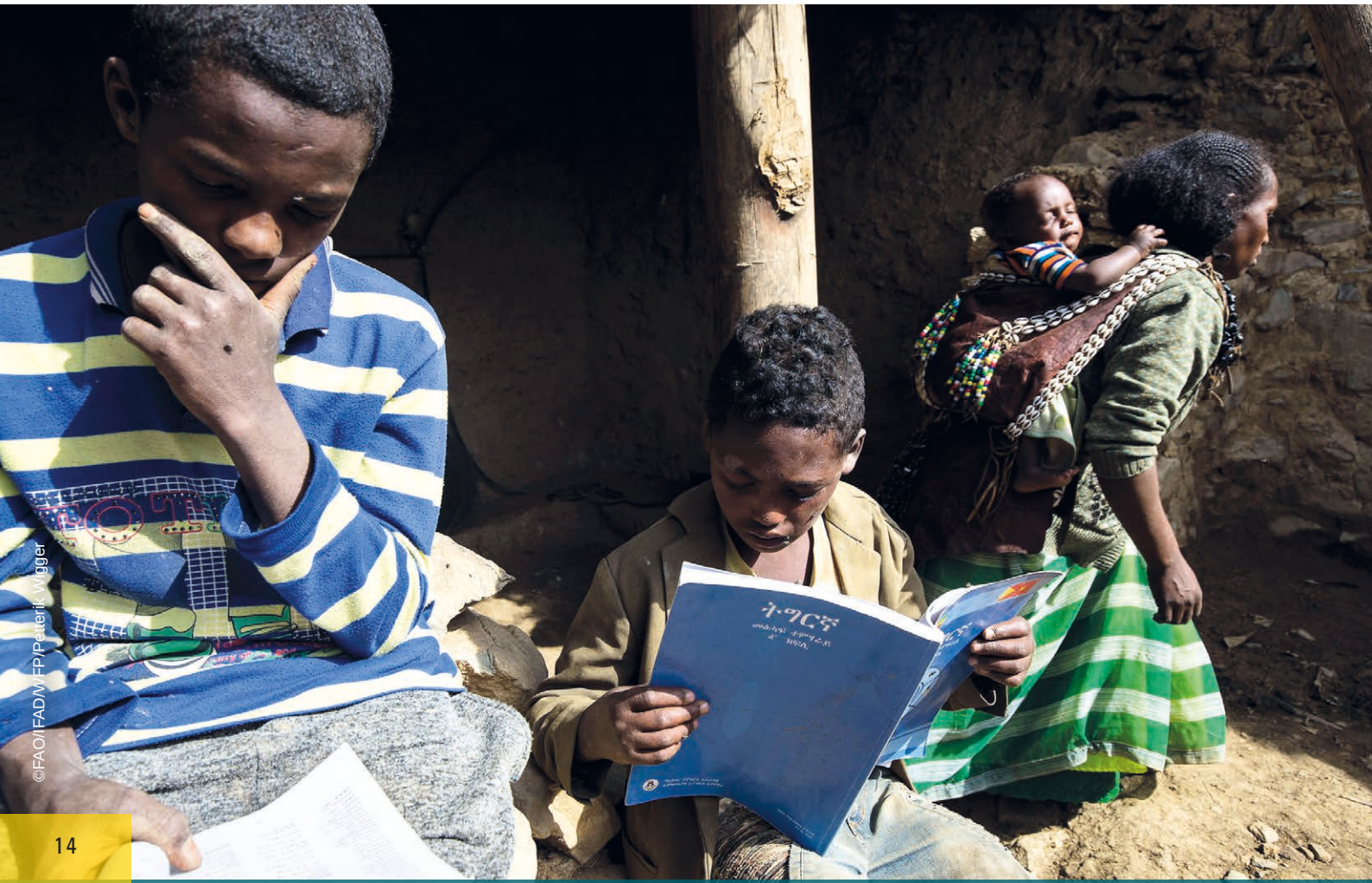
While child labour had been falling globally until the onset of the COVID-19 pandemic (see Figure 3), some evidence suggests that child labour has been rising in some countries and sectors, even prior to the COVID-19 pandemic. Sadhu *et al.* (2020) found that in response to increasing demand for cocoa during the period 2008–09 to 2018–19, the prevalence of child labour and hazardous child labour in cocoa production among agricultural households in Côte d'Ivoire and Ghana increased by 14 and 13 percentage points, respectively. The high demand for smartphones, tablets, laptops, and the increased uptake of electric cars are increasing the demand for cobalt (used in batteries) and are associated with a high incidence of child labour in cobalt mining in the Democratic Republic of the Congo (Amnesty International, 2016).

Work in mines is generally understood to be particularly harmful for children. Working in tunnels, for example, can result in death or injury from tunnel collapse, while working with heavy metals is associated with neurological and musculoskeletal disorders, fatigue and immune deficiency (ILO, 2019). Globally, however, around 60 percent of hazardous child labour occurs in agriculture (ILO, 2011a). Rural children begin work younger, often between the ages of 5 and 7 years (ILO, 2006). Work in rural areas can be significantly hazardous for young children because their bodies and minds are still developing, meaning they are often less able to judge risks (ILO, 2011b). The main risks that can lead to worsening health outcomes for children working in agriculture include:

- long periods of stooping and repetitive movements;
- carrying heavy loads over long distances;
- work in extreme temperatures and without access to safe water; and
- exposure to pesticides, chemicals, organic dusts and biological hazards (ILO, 2011b).

The last risk listed is especially harmful to children. Because their body, brain and nervous systems are at critical stages of development, children have fewer natural defences and can develop serious health problems as a result of pesticide exposure (Rohlman *et al.*, 2015). For both biological and behavioural reasons, children are typically more vulnerable than adults to risks associated with pesticides. No child under 18 should be involved in the direct use of hazardous pesticides (FAO, 2020). At the same time, climate change is likely to increase the threat of pests and diseases, as some of the most prevalent pest and diseases are expected to become more active in higher temperatures. As a consequence, climate change-induced pesticide use may increase children's exposure to hazardous work.

The prevalence of hazardous child labour in agriculture means that the present report is timely, not only due to the well-understood threat that climate change poses to countries, in particular to those with low- to (lower)-middle incomes (World Bank, 2010) but also because children may become significantly more likely to be engaged in hazardous agricultural work as households cope with income shocks associated with climate change. The remainder of this review sets the stage for the ensuing analysis with an appraisal of the understanding of the drivers of child labour in the scholarly literature.



©FAO/FAD/WFP/Peter Lowgger

2.2. The theory of child labour

The explosion of research into child labour in the mainstream economics literature began with the seminal theory on child labour presented by Basu and Van (1998) Their work humanizes child labour by highlighting that it is primarily a function of poverty (Congdon Fors, 2012). Their motivation was to challenge a misconception about child labour dominant at the time – that selfish parents in developing countries exploit their children for money. Instead, they take the position that:

> ...when we have children working as a mass phenomenon as in many less-developed countries, it is much more likely that this reflects not a difference in the attitude of the parents but the problem of stark poverty where the parents are compelled to send the children to work for reasons of survival (Basu & Van, 1998, p. 413).[4]

They introduce two fundamental principles, the luxury axiom and the substitution axiom:

- The luxury axiom suggests that households will send children to work if adult wages fall below a minimum subsistence standard.[5]
- The substitution axiom suggests that adult and child labour are substitutes.[6]

Together, these axioms suggest that if the market wage is high enough – such that a minimum subsistence standard is met by adult labour alone – then children will not work. Thus, a fall in the wage rate below a given point can induce child labour.

Building on this premise, Basu and Van (1998) explain that a ban on child labour may be an effective policy tool. They argue that the first effect of a ban on child labour is to generate a shortage of labour, given that child and adult labour are substitutes. The shortage of labour, in turn, puts upward pressure on wages. As adult wages rise, households achieve a minimum substance standard without sending their children to work. This argument rests on the assumption that children participate in wage labour in competitive markets, given that the results are based on market equilibria.

---

4 The notion that parents are altruistic is a subject of continued debate in the economics literature. See Congdon Fors (2012) for a discussion.

5 In the economic theory of child labour, the decision to work is predominantly understood to be a household level choice – that is, children are generally assumed to not have agency over their time allocation.

6 Some theories take a more sophisticated approach, with child labour being considered a substitute for unskilled labour. See Edmonds and Pavcnik (2006) for a discussion.

However, Congdon Fors (2012) makes a compelling argument that this is often not the case. She argues that the common perception that most children involved in child labour work for wages in the formal sector is wrong. It is well documented that most child labour occurs in the agricultural sector and very few children work for wages outside the home. Most children involved in child labour are employed by their parents on the family farm or business. Therefore, building on the luxury axiom, if the ban does not affect adult wages, then banning children will simply push children into other types of labour, often in more hazardous sectors (Posso, 2020).[7]

The principal mechanism through which banning child labour leads to falling child labour in Basu and Van's (1998) model is by increasing wages. However, Edmonds and Pavcnik (2005) argue that this mechanism is not necessarily valid. They propose a theory where a farming household experiences a rise in the price of the good that it produces, which translates into an increase in income. The increase in income would, on the one hand, raise the marginal value product (wages) of children's labour and, therefore, would lead to higher incidences of child labour. On the other hand, if child labour is bad in parental preferences (as in Basu and Van [1998]), an increase in income would allow the household to reach its minimum subsistence standard with fewer family work hours, leading to a downward shift in the demand for child labour. The first case is referred to as a substitution effect, as households substitute away from leisure time and into labour.[8] The second case is referred to as an income effect, where richer households can buy more leisure time. The subsequent empirical analysis undertaken by Edmonds and Pavcnik (2005), which exploits exogenous variations in the price of exported rice, shows evidence in favour of the income effect story.

Therefore, while child labour is theoretically a function of poverty, Edmonds and Pavcnik's (2005) model argues that pushing households out of poverty through positive wage effects will not necessarily decrease child labour. Other theoretical work also highlights that poverty is not the only factor that can influence the child labour decision.

For example, Emerson and Knabb (2006) discuss how child labour may be influenced by the quality of schooling and returns to education. They develop a theoretical model that argues that varying degrees of access to "opportunity" results in heterogeneous returns to education, which simultaneously determine the incidence of child labour. They define opportunity as any socioeconomic heterogeneity in education returns. Therefore, opportunity can:

- consist of lower quality of education for individuals of lower socioeconomic status;

---

7 We expand on this below.

8 This is a key premise in most labour market models in economics.

- result from segmented labour markets, which lead to less demand for educated labour in some sectors (i.e. the rural sector); and
- consist of discrimination or pure exploitation (e.g. based on ethnicity).

In their model, lack of opportunity serves as an intervening variable that determines all three of these characteristics. Emerson and Knabb's (2006) model demonstrates that income poverty is not the only cause of child labour as equally poor households may differ in access to opportunity. Therefore, programmatic interventions that ban child labour or introduce compulsory education laws could lower the welfare of households where child labour exists by exacerbating the same societal inequities that resulted in child labour in the first place – because access to opportunity has not changed. They argue that only by providing increased access to opportunity can a government improve the welfare of the poor and simultaneously eliminate child labour.

Other models focus on imperfect markets. An interesting observation is that child labour can be higher among children from land-rich households than children from land-poor households, a phenomenon referred to as the wealth paradox (Bhalotra & Heady, 2003; Congdon Fors, 2012).

Bhalotra and Heady (2003) present a model that shows that ownership of land can affect child labour in various ways. Building on the luxury axiom, large landholdings generate higher income, which makes it easier for households to forgo child labour earnings. However, in the absence of well-functioning labour markets, landowners who are unable to hire productive labour would have an incentive to employ their children. Because the marginal product of labour is increasing in farm size, this incentive is stronger for larger landowners. Important for the current study, they argue that weather variability makes agricultural output stochastic, while (often unobservable) differences in soil quality make it difficult to use the output of neighbouring farms as a comparative yardstick. This means it is easy for hired labour to shirk. This presents landowners with a moral hazard issue, which hiring family members mitigates against. Importantly, they argue that regardless of the distinction between hired and family labour, children should be easier to supervise and discipline, further mitigating moral hazard.

Bar and Basu (2009) present a similar model. They note that one of the implications of Bhalotra and Heady's (2003) model is that land-reform initiatives could potentially lead to greater incidences of child labour. Bar and Basu (2009) point to evidence from India that suggests an inverted-U relationship between landholdings and child labour (Basu, Das and Dutta, 2010). Their paper explains this by studying the short-run and long-run effects of changes in a household's landholdings (or other durable capital) on child labour. As in Bhalotra and Heady (2003), Bar and Basu (2009) show that for poor households, labour (and capital) market imperfections coupled with the fact that children's marginal productivity increases with landholdings result in an

increase in demand for child labour as landholding rises. However, Bar and Basu (2009) show that beyond a given size of large landholdings, education is preferred and child labour drops. They argue that enhancing ownership and the productivity of land are likely to be effective tools in the fight against child labour in the long run.

Discussions of short- versus long-run child labour outcomes naturally need to consider credit markets. In economics, access to credit is understood to allow households to buffer against shocks.[9] Households aim to smooth consumption in the long run, and access to credit and financial markets allows households to transfer income from present (future) windfalls to meet future (present) needs. In the child labour literature, well-functioning credit markets allow parents to borrow against their child's future earnings, which lowers demand for child labour and increases demand for education (Congdon Fors, 2012). **In summary, the theoretical literature identifies potential determinants of child labour. First, poverty may force households to send their children to work. Second, child labour can be influenced by the quality of schooling and returns to education.** Where quality is low and employment opportunities (and therefore the returns to education) are poor, parents have fewer incentives to enrol their children in school and thus the incidence of child labour could be higher. **Third, the size of landholdings can influence child labour, though likely not in a linear fashion.** Given imperfect labour markets and potentially high returns from child labour, incidence of child labour might increase as landholdings increase (at least initially) but fall after reaching a particular threshold of landholdings. **Fourth, in the absence of access to credit and financial services, shocks (such as the death or illness of a household member, heavy rains, dry spells and so forth) are likely to lead to an increase in child labour as households strive for additional income.**

Policy implications arise from this theoretical literature. **High(er) minimum wages** could mitigate child labour if they allow adults to earn a living wage. While banning child labour could reduce its incidence by reducing labour supply and raising wages, most children work in the informal sector, implying that a ban might not affect wages and would be very difficult to enforce. Moreover, depending on parents' preferences, higher wages could lead to greater incentives for child labour, increasing its incidence. **Land reform, improving land productivity, enabling access to credit, ensuring equal access to opportunities and eliminating all forms of discrimination** all show promise in reducing child labour.

Finally, it is worth noting that while the theoretical models described above view child labour and school as substitutes, most empirical evidence suggests that children involved in child labour attend school (ILO, 2017). However, research also

9 We discuss shocks in depth below.

suggests that children involved in child labour are educationally penalized. The time and energy required by work interfere with children's ability to fully take advantage of schooling opportunities, which includes finding time outside the classroom for independent study (ILO, 2017). As a result, a growing literature has identified that children involved in child labour have lower levels of future income (Posso, 2017).

2.3. The determinants of child labour in the empirical literature

The determinants of child labour in the empirical literature are largely informed by the theoretical evidence described above. Further, the theory is often informed by empirical findings. For example, as highlighted above, the wealth paradox theory was put forward to explain an empirical finding (Bhalotra & Heady, 2003; Congdon Fors, 2012). As previously mentioned, it is beyond the scope of this review to discuss all the empirical work on child labour. We focus on the main determinants of child labour at the household and community level.

2.3.1. Poverty and income

Basu and Van (1998) argue that child labour results from poverty. This proposition sparked a debate in the early 2000s, with some researchers finding a positive relationship between income and rates of child labour. However, this finding is most likely due to endogeneity, and the consensus of more recent work is that **child labour stems from poverty** (Beegle, Dehejia and Gatti, 2006; Congdon Fors, 2012). Edmonds and Pavcnik (2006), for example, set out to investigate the relationship between child labour and trade using macroeconomic data. They show that the main determinant of child labour is GDP per capita, their proxy for income; that is, poorer economies are more likely to have higher incidences of child labour.

Most studies on child labour, however, use household-level data. Beegle, Dehejia and Gatti (2006) use household panel data from Tanzania to show that a **negative income shock – proxied using accidental crop loss – significantly increases hours of child labour**. They show that households typically respond to shocks by substituting child for adult labour in household activities such as gathering firewood and water. They also find that households with assets are better able to offset shocks. **Wealthier households draw down their assets rather than ask children to work**.[10]

[10] This is consistent with Basu and Van's (1998) theory.

While studies on income shocks and/or cash transfers are suggestive of the relationship between poverty and child labour, Bhalotra (2007) studies this issue in a more direct fashion. She directly tests the relationship between child labour (measured as hours of waged work) and poverty by building on the following premise:

> Suppose that children work because their households are very poor in the specific sense that income exclusive of child earnings falls below subsistence requirements, so that child work is necessary. Then children will appear to work towards a target income, which is the shortfall between subsistence needs and other income. In this case, an increase in the wage will induce a reduction in child labour (Bhalotra, 2007, p. 30).

©FAO/Lapo Roffredi

2.3.2. Gendered differences

Studies on child labour generally account for and find gendered differences. For example, similar to Bhalotra (2007), de Hoop and Rosati (2014) find that conditional cash transfers are associated with stronger declines in male child labour, with girls experiencing either insignificant changes or declines in household chores.

In Congdon Fors' (2012) review, she proposes that differences between boys and girls labour supply responses could be due to:

- discrimination at the household level, with parents favouring boys over girls;
- gendered differences in opportunity at the economy level. For instance, skilled labour opportunities for women may be limited, lowering the returns to female education and thus rendering education less attractive for girls; and
- cultural norms where girls are expected to join their future husband's family and not contribute to the future income of their parents' household, hence the returns on female education are low.

©Chris Steele-Perkins/Magnum Photos for FAO

Using data on boys and girls from rural India, Barcellos, Carvalho and Lleras-Muney, (2014) show that families treat boys and girls differently. Households spend roughly 30 minutes more per day on child care with boys than girls. The quality of the child care also appears to be higher for boys. Boys are also found to be more likely to be breastfed longer and given vitamin supplements. Their findings suggest that this behaviour is prevalent in India relative to other developing countries; they provide data that suggest that relative to girls, boys are taller and heavier in India than in other developing countries. This suggests that cultural factors are important.

However, in a related study, De Haan, Plug and Rosero (2014) argue that economic factors are more likely to explain gendered disparities in labour supply. De Haan, Plug and Rosero investigate the effect of birth order on child labour (measured using a dummy variable equal to one if the child undertook work outside the home in the last week) and schooling in Ecuador. They find evidence that suggests that child schooling increases and child labour decreases with birth order. In subsequent analysis, they compare birth order effects for families with firstborn sons compared to families with firstborn daughters. They find that firstborn sons receive significantly less investment in human capital (less education and more child labour) than firstborn daughters. They conclude that this contradicts a son-preference explanation; rather, they argue that these birth order estimates are more consistent with a poverty explanation:

> If older daughters do not make as much money as older brothers, poor parents have fewer incentives to send their oldest daughter out to work, which results in weaker birth order effects in families with older daughters (De Haan, Plug and Rosero, 2014, p. 377).

Edmonds (2006) also focuses on gendered differences in child labour but also household size and sibling order. He argues that home production leads to sibling differences in child labour that are determined by comparative advantage. Older children, for example, are arguably better at caring for other children than younger ones. He argues that if comparative advantage increases with the age gap between siblings, then the difference between siblings' hours worked increases with the age gap. Further, if genders differ in their returns to education or productivity in household production, then we should expect an association between child labour and siblings' gender.

Edmonds (2006) uses household survey data from Nepal to estimate a model that captures the conditional expectation of hours worked for children with different sibling environments. His work not only touches on gendered aspects but also builds on an established finding in the academic literature that larger household

size reduces children's educational participation and increases child labour (Grootaert and Kanbur, 1995).

Edmonds (2006) finds that girls' labour activities are more sensitive to sibling composition than those of boys. Edmonds' work highlights that household size, sibling composition and gender matter. This is an example of how understanding culture, context and economic incentives, such as returns to education or returns to child labour, matter.

2.3.3. Parents' characteristics

Aside from income and wealth, gender and context, parental characteristics –namely education – have also been found to be important determinants of child labour. Most empirical studies include a measure of parental education in child labour models. The expectation is child labour decreases with parental education, although there is some debate as to whether fathers' or mothers' education is more influential in this (Congdon Fors, 2012). Education may influence child labour because educated women have fewer children or because educated parents place a higher value on education (Schultz, 2002). On a similar note, many studies also include parents' age as a potential confounder. Generally, the assumption is that older parents are less likely to send their children to work. One reason may be that older parents may have older children outside of the home helping them financially and may, therefore, be less likely to need younger children to work.

In summary, the empirical literature demonstrates that a multitude of factors can combine to produce a complex web of incentives for and against child labour. Cultural and social norms influence the returns to investment in human capital in girls versus boys and, therefore, affect child labour. Household size, sibling ordering and parents' education level are also important.

2.3.4. Insurance, credit, microfinance and remittances

Landmann and Frölich (2015) analyse the extension of an accident and health insurance scheme offered by a large microfinance institution in India. It was mandatory for all microfinance institution clients, their spouses, and their children below 18 years old to have insurance. In 2009, the programme was extended to include supplementary household members, namely clients' adult children and other household members on a voluntary basis. This was implemented as a randomized controlled trial in 9 of the 13 branch offices in urban Hyderabad. Landmann and Frölich (2015) find that the innovation resulted in lower child labour measured as both incidence and hours of work. The finding suggests that health insurance mitigates health shocks at the household level, which lower the need for child labour.

In a similar vein, there is a relatively large amount of literature showing that financial inclusion mitigates child labour. Access to financial markets allows households to save and borrow, which helps them to avoid using child labour in the aftermath of a shock. For example, Guarcello, Mealli and Rosati (2009) use data from Guatemala on households' access to credit. They defined a household as credit rationed if the members of the household answered that they have not applied for credit due to one of the following reasons:

- institutions offering credit are not available;
- they do not know how to ask for credit;
- they do not have the required characteristics;
- they do not have collateral;
- interest rates are too high;
- there is insufficient income; and
- institutions do not give credit to households in those conditions.

They also classify as credit rationed households that applied for but were denied credit. Their analysis shows that credit constraints increase the incidence of child labour. They also show that health insurance is negatively associated with child labour. In households where at least one member is covered by health insurance, children were 5 percent points less likely to work, or only work and study. A large part of income shocks are associated with health conditions. The study also acknowledges that information on availability of (in)formal insurance and other types of social protection is scarce in the dataset.

Not all studies discover a negative relationship between access to credit and child labour. Indeed, the effect is conceptually ambiguous because credit could be used by households to start a business, which may pull children into work either in the business or as substitutes in household members' other duties. This mechanism seems to be evident in the literature that examines the nexus between microfinance and child labour.

Hazarika and Sarangi (2008), Maldonado and González-Vega (2008) and Islam and Choe (2013), for example, find that household access to microcredit is positively correlated with the probability of child labour, using data from Malawi, rural Bolivia and Bangladesh, respectively. Islam and Choe (2013) also provide evidence that suggests that the potential adverse effects are more pronounced for girls than boys, while younger children are also potentially more adversely affected. Pham and Nguyen (2019) suggest that this effect is likely causal. Using data drawn from Vietnam and an instrumental variable approach to account for possible endogeneity, they show that participation in microcredit schemes encourages child labour, measured in hours of work per day.

These findings potentially highlight broader problems associated with labour market imperfections rather than direct mechanisms. In essence, households could choose to hire children because hiring external adult labour may be difficult, as per Bhalotra and Heady's (2003) aforementioned arguments. Importantly, hiring restrictions are likely more evident in situations where businesses are operating out of homes.

Like microfinance, migrant remittances are also popularly believed to potentially have a positive effect on household labour supply. However, the consensus from this literature is that remittances tend to lower labour supply, particularly for women (Posso, 2012). The literature on remittances and child labour reaches similar conclusions. Remittances are primarily used by households to reach a minimum subsistence standard such that households that receive remittances are less likely to send their children to work.

Alcaraz, Chiquiar and Salcedo, (2012), for example, study the effects of remittances from the United States on child labour in recipient Mexican households. They note that Mexican immigrants were strongly hit by the 2008/2009 global financial and economic crisis, which caused a 20 percent drop in remittances received in Mexico. They argue that the sudden drop in remittances is akin to a significant negative (income) shock. They adopt a differences-in-differences estimation approach, where the treatment group comprises children between the ages of 12 and 16 in households that received remittances prior to the crisis. The control group comprises children of the same ages that belong to households that did not receive remittances. They account for the potential endogeneity of the migration decision, using distance to the United States border along the 1920 rail network. They find plausibly causal evidence that suggests that the shock on remittance-receiving households increased the probability that a child works by approximately 9.8 percentage points.

Coon (2016) reaches similar conclusions using household survey data from Bolivia. He accounts for potential endogeneity in remittances with a variable that captures the share of households receiving remittances in the household's geographical department (a proxy for migrant networks). He finds that children in remittance-receiving households are less likely to work, while the number of hours worked per week declines with the value of remittances received.

Overall, the mechanism through which remittances seem to affect child labour is similar to access to credit and income. Conversely, microfinance potentially increases the opportunity cost of school and leisure (play) time, leading to increasing child labour.

2.4. Child labour and climate-related events

The literature highlights three important and interrelated characteristics of child labour:

- Most child labour exists in the agricultural sector.
- Higher income lowers child labour, while (negative income) shocks increase it.
- Mechanisms that mitigate against income shocks, such as credit and insurance, can prevent or lower child labour.

Taken together, these suggest that shocks to the agricultural sector are likely to result in higher incidences of child labour, particularly in poorer communities where households may be less likely to have insurance or access to credit. Therefore, climate change poses a very serious risk to agricultural households, who are more vulnerable to and more dependent on weather patterns.

The literature agrees with the above. Beegle, Dehejia and Gatti (2006) and Gubert and Robilliard (2008) test the relationship between agricultural shocks and child labour. Beegle, Dehejia and Gatti (2006) show that accidental crop losses can result in increased child labour in Tanzania, while Gubert and Robilliard (2008) show that negative shocks resulting from pests, rodents, birds, locusts or above-average rainfall significantly increase the likelihood of a child dropping out of school in Madagascar. Both studies argue that this finding is consistent with the expectation that agricultural shocks are likely to increase child labour, though they do not test this directly.

Trinh, Posso and Feeny (2020) revisit the proposition in Gubert and Robilliard (2008) by directly examining whether there is a relationship between rainfall deviations and child labour using panel data from rural households in Vietnam. Using child-level fixed effects, they find evidence that positive rainfall deviations are associated with children entering agricultural work and being pulled into (and spending more time doing) household chores.

In addition to short-term climatic shocks, other, long-term effects of climate change can potentially lead to increases in child labour. For example, during slow onset droughts and heat waves, a greater amount of water evaporates, leaving less for agriculture, drinking, hygiene and industry. At the household level, this can lead to a loss of income, food insecurity and malnutrition (Tirado *et al.*, 2013). Depending on which household members are most affected, this can lead to an increase in child labour. Studies have confirmed this with the loss of livelihoods resulting from the

2011 East African drought, which led to an increase in hazardous child labour (Save the Children, 2012). Further, there is evidence suggesting that droughts and failing harvests lead to increased work for children in rural Indonesia (UNICEF, 2013).

Higher temperatures are associated with a greater incidence of disease, while viruses tend to thrive in warm, humid locations. Diseases such as malaria, dengue fever and cholera could all increase with climate change, affecting children directly. However, the relationship between illness and child labour is not always straightforward. Even among the most vulnerable households, the ill or otherwise less healthy are often unable to work. The literature on climatic shocks and child health recognizes that higher temperatures, altered rainfall and extreme weather events have been found to adversely affect child morbidity and health (Helldén *et al.*, 2021). Indeed, it is well understood that compared to adults, children are physically more vulnerable to the direct effects of extreme heat, drought and natural disasters (Currie and Deschênes, 2016). This is particularly true in developing countries where children are more likely to face other health threats coupled with fewer resources and coping strategies (Currie and Deschênes, 2016). In this scenario, worsening child health could potentially lower incidences of child labour.

Sudden-onset events, such as floods, heavy rains and rainstorms, can also potentially result in an increase in unintentional injuries. This could affect children involved in child labour by pushing them out of labour. Thus, simple correlations between health and work may exhibit spurious positive relationships. Careful research must ensure that this type of selection bias is accounted for, which can be done with a series of robustness tests in econometric analysis.

2.5. Conclusion: What are the gaps in the literature with regards to climate-related events?

There is a very large amount of literature on child labour. This literature review highlights that this literature has focused on trends and patterns, theory and understanding the causes of child labour.

The trends and patterns suggest that child labour had been declining since the year 2000, a trend that was reversed in 2016, also in the context of the COVID-19 pandemic (see Figure 3). Further, most evidence suggests that child labour occurs primarily in the agricultural sector.

The literature generally does not include information on child preferences regarding child labour. Some legal scholars have pointed to the possibility that some children may feel a sense of empowerment from child labour, which is generally not captured in quantitative studies (Josefsson & Wall, 2020).[11] Recent evidence in Feeny *et al.* (2021), however, suggests that children involved in child labour are significantly less happy and report a lower level of emotional well being than non-labourers. We feel that these findings potentially contradict the empowerment argument, though further exploration on this topic is warranted.

Another important gap in the literature on child labour has to do with climate-related events. The literature focuses on crop failure due to unexpected climate events, such as above-average rainfall. Current research in this field is limited to one case study, published by the authors of this report, on Vietnam. We build on that work with a more comprehensive approach focusing on four developing countries: Ethiopia, Peru, Côte d'Ivoire and Nepal. Furthermore, the existing work adopts only quantitative techniques. In this study we adopt a mixed-method approach which allows us to discuss the policy recommendations born out of the quantitative sections with experts.

[11] This topic is treated theoretically by Baland and Robinson (2000), who assume that a child may want to work to help their parents.

©FAO/Patrick Meinhardt

Chapter 3
Methodology: a mixed-method approach

This chapter studies the relationship between shocks associated with climate change and child labour. Our study focuses on dry spells and heavy rains in the quantitative analyses. In the qualitative analyses, we do focus on drought and heavy rains, similar to prior literature on this topic.

We adopt a dynamic structure that addresses how households respond to recent, medium-term and long-term shocks. "Recent" is defined as a dry spell or a heavy rain that occurred within three months prior to the survey, "medium-term" is defined as these occurring within six months prior to the survey, and "long-term" is defined as these occurring within 12 months prior to the survey. We also address issues related to farmers' adaptive expectations by studying deviations in the frequency of rainfall using various periods as the comparative basis to reflect farmers' potential adaptation to climate-related events.

The study adopts a mixed-method approach combining quantitative and qualitative data collection and analyses. More information on the two methodological approaches and the respective datasets can be found in Appendix A and B.

Furthermore, as mentioned in Section 1, we use a more simplistic measure of child labour. The definition of child work, i.e. in terms of the specific activities encompassed, employment status, and child's age range, as well as the reference period vary from a survey to the other. We thus adopt for each country-specific case study and analysis the corresponding definition of child labour/work, as displayed in Table 1 below.

Table 1. **Child labour/work definitions used in the study**

	Child labour/ work type	Child labour/work definition	Reference recall period
Côte d'Ivoire	Child labour	1) All children economically employed under the age of 14 years (unpaid and illegal work and work in the informal sector) 2) All children involved in child labour 14–17 years of age doing hazardous work	Seven days prior to the survey
Ethiopia	Child work	Children between 5 and 17 years of age inclusive undertaking any paid or unpaid activity in a family business, and/or outside the home in other sectors for at least one hour	Two weeks prior to the survey
Nepal	Child work	Children between 6 and 17 years of age inclusive reported to have worked	Twelve months prior to the survey
Peru	Child work	Children between 5 and 17 years of age inclusive undertaking any paid or unpaid activity in a family business, and/or outside the home in other sectors for at least one hour	Two weeks prior to the survey

Sources: Côte d'Ivoire: ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; Ethiopia and Peru: Huttly, S. & Jones, N. undated. Young Lives: an international study of childhood poverty 2002, round 1. Washington, DC, World Bank, Development Data Group. https://microdata.worldbank.org/index.php/catalog/study/WLD_2002_YLSCP-R1_v01_M; Nepal: The World Bank. undated. Household risk and vulnerability survey, full panel 2016-2018. In: World Bank, Development Data Group. https://microdata.worldbank.org/index.php/catalog/study/NPL_2016-2018_HRVS_v02_M.

3.1. Quantitative methodology

3.1.1. Econometric framework and data sources

We have panel data available to us from Ethiopia, Peru and Nepal. When using panel data, the following equation is estimated:

$$CL_{i,j,t} = \beta_1 Shock_{j,t} + \beta_2 \boldsymbol{K}_{i,j,t} + \beta_3 \boldsymbol{H}_{i,j,t} + \beta_4 \boldsymbol{\theta}_{j,t} + \alpha_i + \lambda_j * trend + \vartheta_t + \varepsilon_{i,j,t}, \quad (1)$$

where i, j and t refer to child i in region j at time t. CL is a dummy variable equal to one if the child worked for at least one hour in the corresponding reference period, following the definitions displayed in Table 1. In a second model, we also replace the binary variable CL in Equation (1) for a continuous variable capturing the amount of time (number of minutes or hours) that a child worked in the corresponding reference period. We use both the aforementioned binary and continuous variables CL because the binary variable can be used to estimate the probability of child labour,

while the other variables measure the change in the amount of child labour time. The former variable allows us to estimate the probability of a child entering work after a shock. As displayed in Table 2, the data also allows us to assess in some countries the effect of a shock on the probability of a child to undertake hazardous work or household chores as well as the time spent on hazardous work. *Shock* is a dummy variable equal to one if the household is located in a lower local level that has experienced a heavy rain or a dry spell.

Table 2. **Different types of child labour assessed in each country case study**

	Child labour/work		Hazardous work		Domestic chores	
	Status (Binary)	Amount of time (Continuous)	Status (Binary)	Amount of time (Continuous)	Status (Binary)	Amount of time (Continuous)
Côte d'Ivoire	Yes[a]	Yes[a]	Yes[a]	Yes[a]	Yes	No
Ethiopia	Yes[a]	Yes[a]	No[a]	No	Yes	No
Nepal	Yes[a]	Yes[a]	No	No	No	No
Peru	Yes[a]	Yes[a]	No	No	Yes[a]	No

Notes: [a] Analysis also disaggregating the results by children's gender.

The coefficient estimate, β_1, gives the estimated effect of a shock on child labour. This coefficient is interpreted as follows: an increase in a given shock is associated with a change in child labour by β_1, where the latter is measured in either the probability scale when *CL* is a binary variable or in hours or minutes when we use a continuous variable.

Control variables included in each country-specific model are shown in Table 2. The vectors $\boldsymbol{K}$ and $\boldsymbol{H}$ represent child and household-level controls, while $\boldsymbol{\theta}$ is a vector of regional-level controls. The term α_i is a set of child fixed effects, which control for unobserved time-invariant features that can influence the probability and time that a child works. For example, a child that has a higher aptitude for school may, all things being equal, be less likely to work. If aptitude for schooling does not change through time, then the child fixed effects controls for this variable. Child fixed effects also control for child gender, which is known to be a very good predictor of child labour (boys are more likely to work). Since the data for Côte d'Ivoire are cross-sectional, child fixed effects are not included for this country. In subsequent analysis, we divide the sample by gender to ascertain if a differential effect exists. Finally, α_i also captures time-invariant attitudes towards child labour at the household level.

The variable ϑ_t represents time fixed effects, which controls for time-variant factors that have affected all regions simultaneously (where panel data are available). This may include, for example, policy initiatives that were equally rolled out in a country each year, or large covariate weather shocks that affected all households. Using panel data, we also include sentinel site-specific linear time trends ($\lambda_j * trend$), which capture changes in economic conditions (e.g. regional growth) and policies (e.g. improvements in education) that may confound the relationship between child labour and shocks. The model clusters standard errors at the regional level for Ethiopia, the department level for Peru, the district level for Nepal and the household level for Côte d'Ivoire. Finally, $\boldsymbol{\varepsilon}$ is an idiosyncratic error term.

Controls, such as vectors $\boldsymbol{K}$, $\boldsymbol{H}$, $\boldsymbol{\theta}$, α_i, ϑ_t and $\lambda_j * trend$, are important in this setting because they allow us to estimate the effect of a shock after keeping constant other factors that may influence the relationship between the variables of interest. The factors we are able to control for vary across the different datasets. For example, using the Young Lives data for Ethiopia and Peru, the vector $\boldsymbol{K}$ includes child-level individual controls such as age and the amount of time in minutes that a child must travel to get to school. If we do not control for time to school, for example, we could incorrectly attribute any variation in child labour due to distance to school to a correlation that can exist between the probability of suffering a shock and distance. For example, very remote communities may be both more likely to be far from school, so children would be more likely to work, and more likely to suffer a type of shock. A simple correlation between the shock and child labour would not be able to hold distance constant and may attribute too much of a movement in child labour to the shock. Other controls included in the model operate in a similar fashion. For example, household-level controls using Young Lives data, $\boldsymbol{H}$, include a household wealth index and mother's education.

Finally, building on the available data, we investigate whether social protection programmes in Ethiopia and Peru can play a role in mitigating the potential effect of climate-related events on households. We do so by implementing regressions that interrelate the social protection measures accounted for in the corresponding datasets and the shock(s) previously found to be statistically significant in each country (Table 3).

Table 3. **Control variables included in country-specific models**

	Type of data	Independent variables	Social protection
Côte d'Ivoire	Cross-section	Child's age, child's gender, household size, household income, district fixed effects	No[a]
Ethiopia	Panel	Child's age, child's gender, time to school, wealth index, mother's education, child and community fixed effects, year fixed effects and community-specific time trends	Yes[a]
Nepal	Panel	Child's age, child's gender, distance to primary school, distance to secondary school, wealth index, household head education, child fixed effects, year and regional fixed effects and specific time trends	No[b]
Peru	Panel	Child's age, child's gender, time to school, wealth index, mother's education, child and community fixed effects, year fixed effects and community-specific time trends	Yes[a]

Sources: Côte d'Ivoire: ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; Ethiopia and Peru: Huttly, S. & Jones, N. undated. *Young Lives: an international study of childhood poverty 2002, round 1.* Washington, DC, World Bank, Development Data Group. https://microdata.worldbank.org/index.php/catalog/study/WLD_2002_YLSCP-R1_v01_M; Nepal: The World Bank. undated. Household risk and vulnerability survey, full panel 2016-2018. In: *World Bank, Development Data Group*. https://microdata.worldbank.org/index.php/catalog/study/NPL_2016-2018_HRVS_v02_M.

[a] Analysis also disaggregating the results by children's gender.

[b] While data were available, the coefficient on the interaction variable could not be estimated due to collinearity.

3.1.2. Extreme weather and climate data

We use monthly precipitation data at the local level based on the ERA5 satellite reanalysis. These data come from the European Centre for Medium-Range Weather Forecasts (ECMWF). The ERA5 data combine information from weather balloons, satellites, ground stations and other input sources with climate models to estimate various weather variables across grids (Dell, Jones and Olken, 2012). ERA5 provides hourly estimates of several climate-related variables, including precipitation, which we use for this study, at a grid spacing of around 31 km globally. We merge rainfall data with household surveys at the regional level for Côte d'Ivoire and Ethiopia, the district level for Nepal, and the department level for Peru.

Our measure of rainfall shocks is consistent with the literature that defines rainfall shocks for a local level (i.e. region) in a given year as the difference between observed rainfall in that year and the long-run average for the same location, divided by the long-run standard deviation (Björkman-Nyqvist, 2013; Maccini & Yang, 2009; Rocha & Soares, 2015) Facing recurrent water scarcity. This is likely to become an

even more common situation with climate change. This paper analyzes the impact of rainfall fluctuations during the gestational period on health at birth in the Brazilian semi-arid region, highlighting the role of water scarcity as a determinant of early life health. We find that negative rainfall shocks are robustly correlated with higher infant mortality, lower birth weight, and shorter gestation periods. Mortality effects are concentrated on intestinal infections and malnutrition and are greatly minimized when the local public health infrastructure is sufficiently developed (municipality coverage of piped water and sanitation). Most studies define the long run to be around 40 years. We divert from this definition and adopt a dynamic structure by addressing how households respond to recent, medium-term and long-term shocks. "Recent" is defined as a dry spell or a heavy rain that occurred within three months prior to the survey, "medium-term" is defined as these occurring within six months prior to the survey and "long-term" is defined as these occurring within 12 months prior to the survey. We also considered farmers' expectations about the weather by studying deviations in the frequency of rainfall using various periods as the comparative basis. We use different periods to identify long-run average rainfall – 5, 10, 20 and 30 years. We then identify heavy rains if the deviation is greater than two standard deviations and dry spells if the deviation is less than two standard deviations.

3.1.3. Limitations

Due to the nature of the ERA5 data, we do not assess in the quantitative analyses the effects of climate-related events through droughts and floods, as done in most of the prior literature. Instead, our study focuses on dry spells and heavy rains.

Since the Young Lives Surveys, which are among the best data to capture childlevel information and data, data do not include respondents' and households' geo coordinates, and the assessment of the effects of heavy rains and dry spells is done at the lower administrative level covered in each of the surveys analysed, using more aggregated data. While a specific lower administrative level may have been affected by one (or two) of these climate-related events in a specific time frame, this may not necessarily reflect whether specific households and individuals were affected (and to which extent) by these specific events. As using good quality on child-level information was prioritized, using fewer granular data may lead to less precise estimates but noisier estimates, which increases the confidence in the statistical significance of the evidence found in the analysis.

3.2. Qualitative methodology

Qualitative data were collected from 15 experts in the four countries included in this study to provide some contextual references to the quantitative study. The research team was particularly interested in understanding how the phenomena of climate-related events and child labour in agricultural households are perceived. The qualitative analysis also identifies policy insights, which are juxtaposed to the quantitative component.

This section begins with an outline of the methodology, followed by a detailed summary for each country. Countries are introduced in the order in which data were collected and analysed. Each country section is presented using the same reporting structure. First, a general account of the country's geography, agrarian structures and modes of production is presented, all from the experts' perspectives. This helps to set the stage for the discussion, which begins with the experts' perceptions of the main characteristics of child labour. This is followed by a description of how climate-related events affect farming households. We finish with current and future mitigation strategies that communities and governments devise. The latter touches on and compares our own policy recommendations with the experts' views. This section ends with a comparative overview.

It is important to note that the information presented in this section comes exclusively from the accounts provided by the 15 country experts. It is also important to note that the interviewees were heterogeneous in terms of area of expertise. In Ethiopia and Nepal, all experts were specialized in either agrarian issues or climate change, while in Côte d'Ivoire and Peru, all experts were mostly child labour experts, with the exception of a Peruvian expert who was a climate expert. Also, note that some of the experts may not be aware of the availability of data or the latest thinking on these issues. The views summarized here do not reflect those of the research team, but of the experts. The next chapter produces policy recommendations that reflect our views and are borne out by the overall findings of this research.

Therefore, the emphasized topics are different for each country. However, there are several thematic synergies, which suggests recurring patterns around how rural communities are being affected by climate-related events.

We gathered data from experts that hold positions in either government, international non-governmental or inter-governmental organizations, or research institutions, or are independent consultants. The interviewed experts work on issues that revolve around child labour, children's rights, agriculture and climate change. The research participants were identified by an FAO contact in each of the relevant countries and were interviewed individually for one hour through the videoconference function of the MS Teams platform between June and August 2021.

Interviews were digitally recorded. Data were collected from a total of 15 experts (11 males and 4 females) using a semi-structured questionnaire (see Appendix A) that covered the following topics: effects of climate-related events such as droughts, floods, pests or frosts on agricultural households' economies; community and government-led prevention and mitigation strategies; child labour situation in the country and strategies to address it; and effects of climate-related events on children's work.

Interviews were conducted in English, French or Spanish depending on the country. Audio recordings were automatically transcribed and translated into English (when needed) using an artificial intelligence platform called Sonix. Data were uploaded to NVivo V12 for thematic analysis.

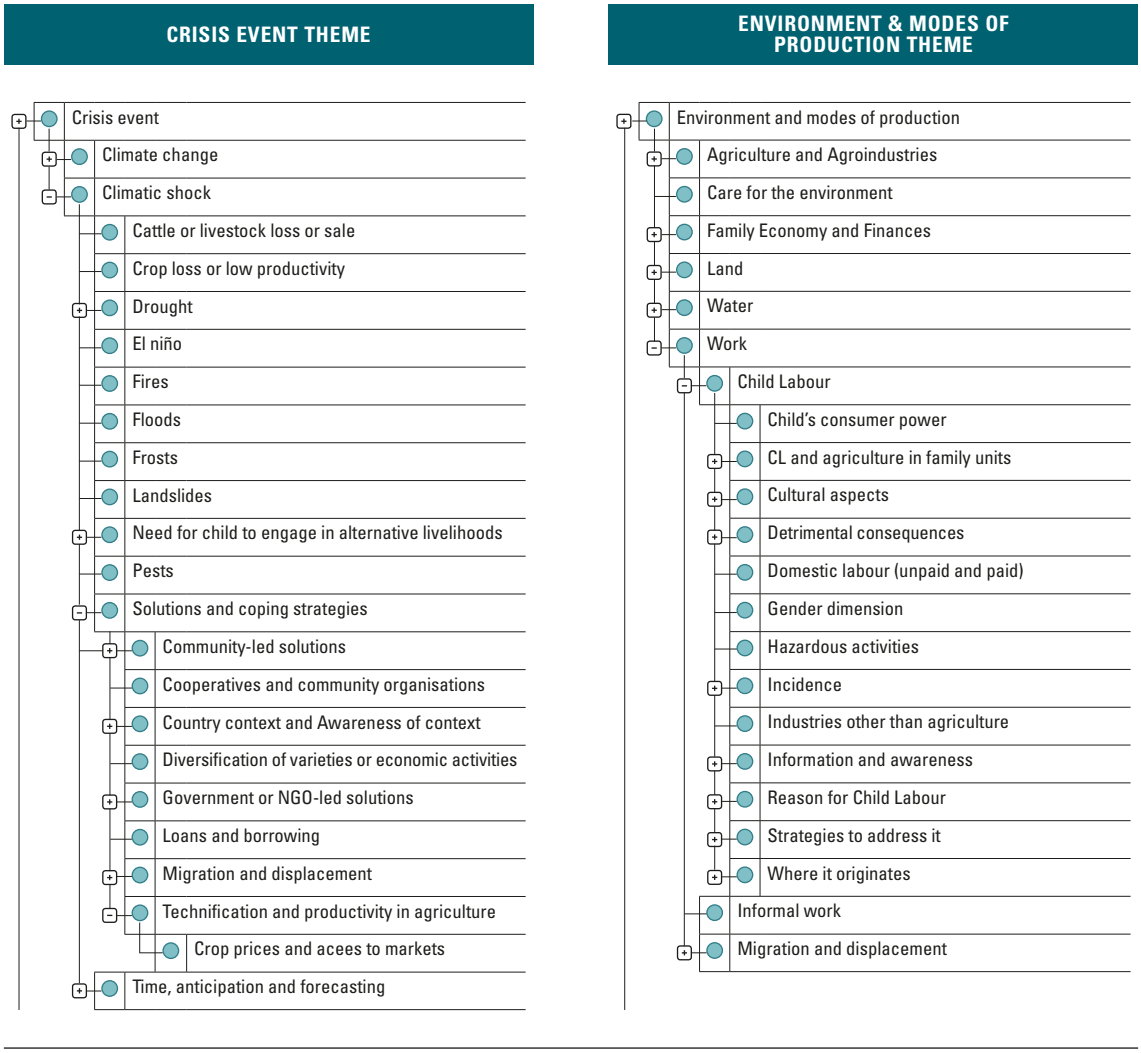
A wide range of themes were identified during the analysis. Most of these were grouped and organized hierarchically into two main thematic clusters: "crisis events" and "environment and modes of production". The coding structure is summarized in Figure 5. This figure illustrates the themes and first- and second-level sub-themes that emerged from the data and were linked to the two core clusters.

In the following sections, we provide an account of the connections, meanings and implications that these themes suggest with respect to the following research question:

- Are climate-related events such as droughts or floods considered by experts as a factor for increased child labour, and what would be the best strategies to address increased use of child labour during climate related events and prevent this from occurring in future?

It is important to highlight that the research team does not include a literature review in this section to complement the discussion of the experts. Doing so would add our own and other author's views and interpretation to the analysis, which would bias the findings. For a literature government-led, please refer to Chapter 2.

Figure 5. **Coding structure**



©FAO/Laure-Sophie Schiettecatte

Chapter 4
Results

4.1. Côte d'Ivoire

4.1.1. Quantitative analysis

4.1.1.1. Data

Data on child labour for Côte d'Ivoire come from the National Survey on the Situation of Child Labour in Côte d'Ivoire (*Enquête nationale sur la situation de l'emploi et du travail des enfants*/ENSETE, 2013). This provides information on 15 152 children 5 to 17 years of age inclusive collected from 6 591 households. The survey sought to identify children under the age of 14 years who work or children under the age of 18 years who are engaged in work that should be abolished for this age group: hazardous work.[12]

4.1.1.1.1. Child labour

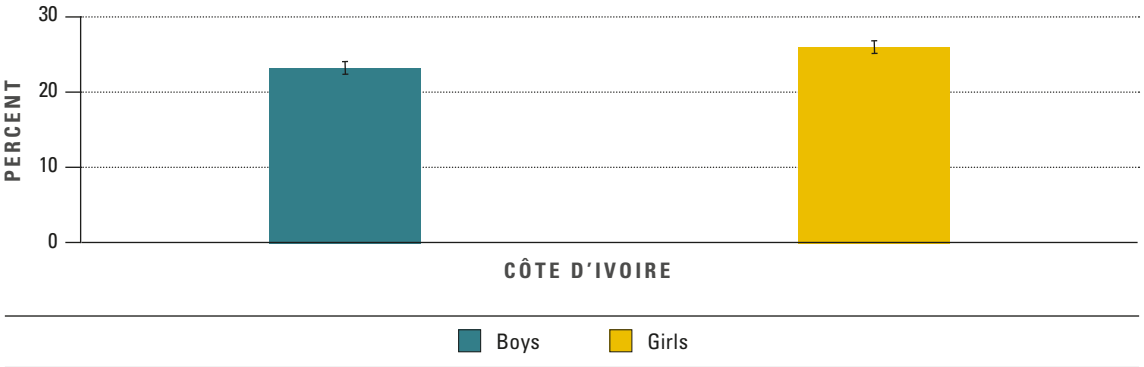
While the survey provides cross-sectional data, it allows for the identification of two types of child labour for analysis: (i) all children economically employed under the age of 14 years (unpaid and illegal work and work in the informal sector) and (ii) all children involved in child labour between 14–17 years of age doing hazardous work (work in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives) (see Table 1).

[12] It is difficult to identify those children who just work in agriculture in these data since the survey has an open-ended question asked about specific tasks children have undertake, and children sometimes undertake multiple tasks.

Figure 6 provides the percentage of children in Côte d'Ivoire that can be classified as children involved in child labour based on this study's applied measurement and classification, by gender. It shows that, again based on the applied measurement and classification, 25.7 percent of girls would be classified as children involved in child labour compared to 23.1 percent of boys. While small, the difference in the incidence of child labour by gender is statistically significant at the 5 percent level.

Figure 7 demonstrates that most of the child labour undertaken in Côte d'Ivoire is hazardous in nature. Again, the incidence of hazardous child labour is higher for girls (22.7 percent) than for boys (20.5 percent). The hours relate to the number of hours worked in the week prior to the survey.

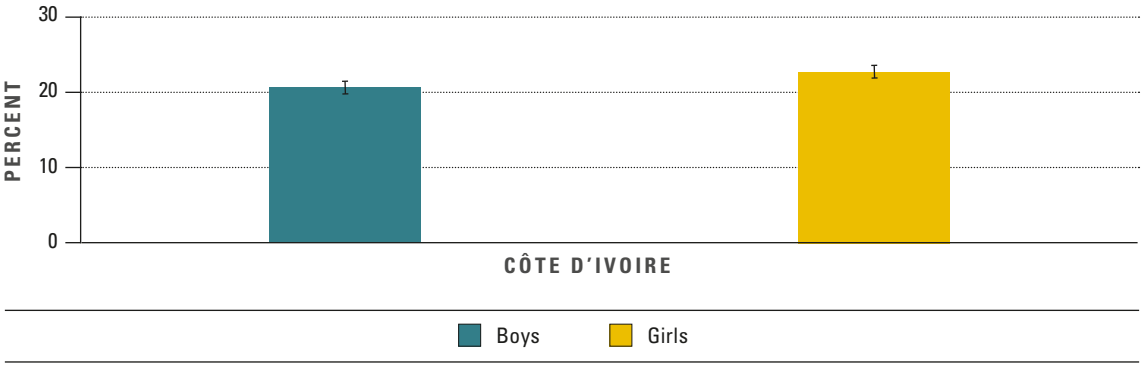
Figure 6. **Percent of children that can be classified as children involved in child labour by gender**



Notes: 95 percent confidence intervals. A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work.

Source: ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization.

Figure 7. **Percent of children that can be classified as being involved in hazardous child labour by gender and cohort**

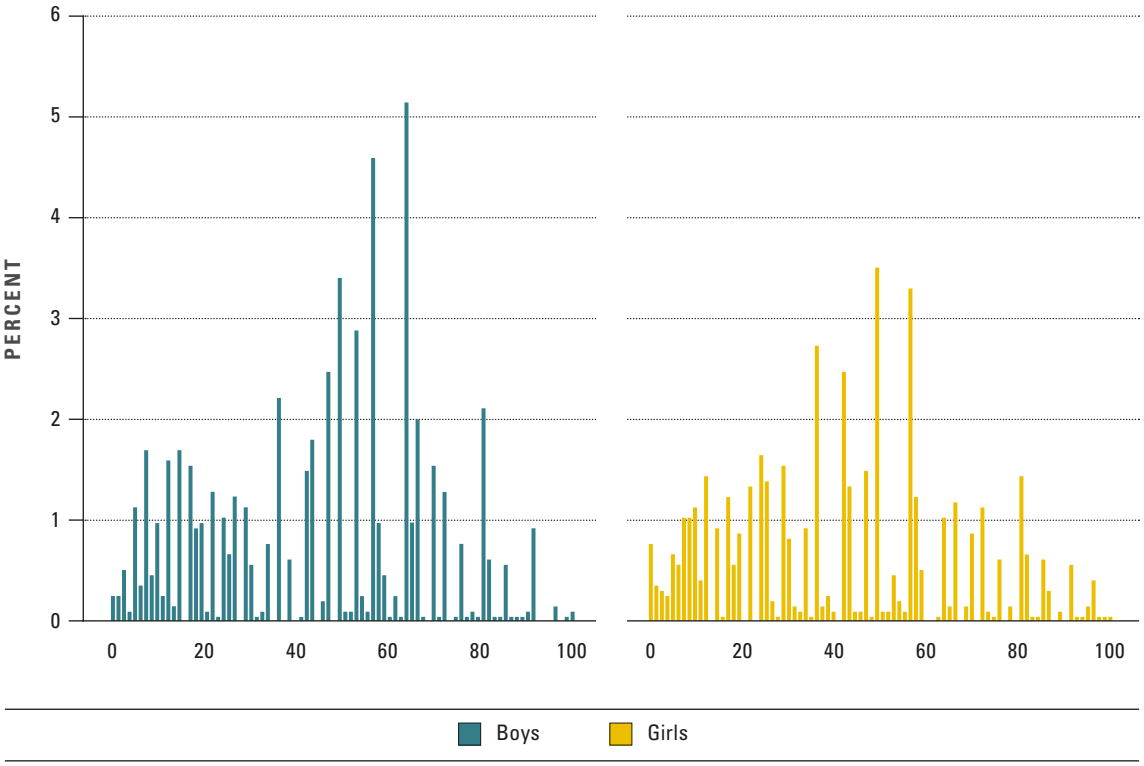


Notes: 95 percent confidence intervals. A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work. Children in hazardous work are those employed in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives.

Source: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization.

Figure 8 provides the percentage of children involved in child labour by their hours of work and gender. On average, boys reported working slightly longer hours than girls (36.3 hours in the past week versus 34.5, respectively). A very similar relationship exists for hazardous labour (see figure 9).

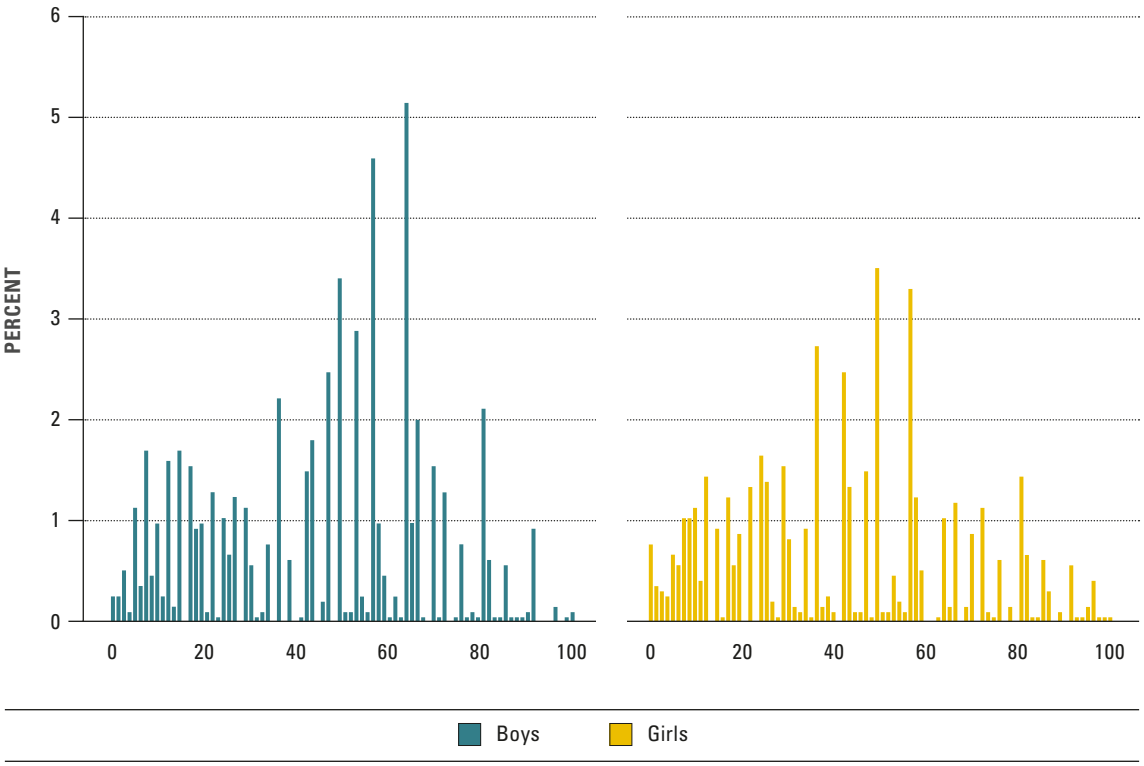
Figure 8. **Share of children that can be classified as children involved in child labour by hours of work and gender in Côte d'Ivoire**



Notes: A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work.

Source: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization.

Figure 9. **Share of children in hazardous work that can be classified as children involved in child labour by hours of work and gender in Côte d'Ivoire**



Notes: A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work. Children in hazardous work are those employed in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives.

Source: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization.

4.1.1.1.2. Extreme weather/climate events

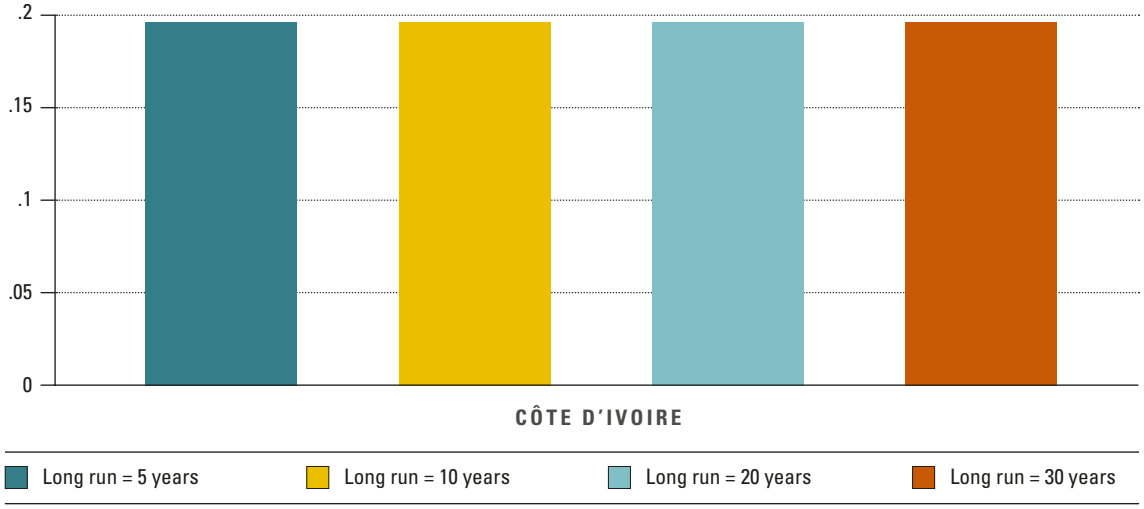
Using ERA5 data, Figures 10 and 11 show the average number of dry spells and heavy rains over a 12-month period using various long-run definitions. Figure 10 indicates that households experienced an average of approximately 0.05 dry spells during the past 12 months when using deviations from a five-year trend. No dry spells are experienced when judged against deviations from longer trends. Figure 11 indicates that households were on average subject to 0.2 heavy rains with no variation in this incidence across the different time periods used for the calculation of long-term averages.

Figure 10. **Average number of dry spells over a 12-month period using various definitions of the long run**

Notes: Heavy rainfall events are the difference between observed rainfall in that year and the long-run average for the same location, divided by the long-run standard deviation. Long-run average rainfall is defined over a 5-, 10-, 20- and 30-year period.

Source: ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5

Figure 11. **Average number of heavy rains over a 12-month period using various definitions of the long run**



Notes: Heavy rainfall events are the difference between observed rainfall in that year and the long-run average for the same location, divided by the long-run standard deviation. Long-run average rainfall is defined over a 5-, 10-, 20- and 30-year period.

Source: ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.1.1.2. Model and results

As indicated in Table 2, the control variables used in the case of Côte d'Ivoire included child age, gender, household size, household income and district fixed effects. Standard errors are clustered at the household level. The equation follows the structure of Equation (1).

Figures 12 and 13 present the results from estimating versions of Equation (1) using climate-related shocks. Figure 12 uses the child work dummy as the dependent variable, such that coefficient estimates can be interpreted as changes in the probability that becomes classified as children involved in child labour.

The top (or bottom) panel of the Figure 12 provides the relationship between child work and dry spells (heavy rains) defined over different periods. The left panels calculate climate extremes over three months relative to a long-run average, the middle panels over six months relative to a long-run average and the right panels over 12 months relative to a long-run average. The long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom). In the case of Côte d'Ivoire, households only experienced a dry spell in the three months prior to the survey and heavy rain 12 months prior.

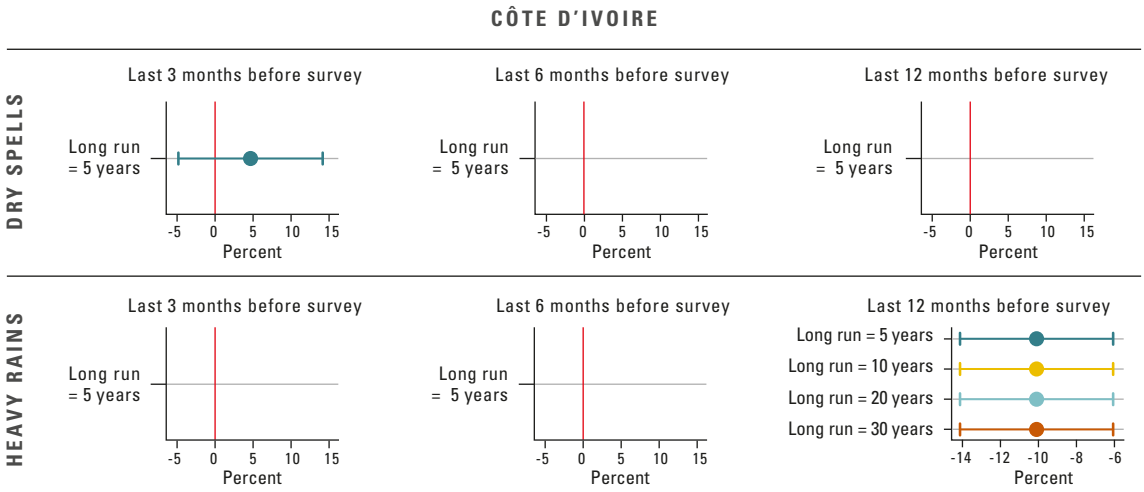
In all these figures, the points in the figures represent coefficient estimates, while the lines show their corresponding 95 percent confidence intervals. Together, a positive (or negative) point suggests that a given shock is associated with an increase (or decrease) in children's work. If the confidence intervals span over zero, the effect is interpreted as not statistically significant, and we cannot conclude the effect on children's work is statistically different from zero.

- There is evidence that a climate-related event in the form of heavy rain reduces the incidence of children found working in Côte d'Ivoire. One explanation for this finding is that heavy rains can destroy the agricultural crops that child labour is used for. Unfortunately, the data do not allow us to identify the exact mechanism through which heavy rains are associated with a reduction in child labour in Côte d'Ivoire. The results show no statistically significant effect of dry spells.

The exercise is repeated for hazardous labour and the results presented in Figure 13.

- There is evidence that a climate-related event in the form of a heavy rain reduces the incidence of hazardous work of children in Côte d'Ivoire. Again, there is no evidence of the effect of a dry spell on the hazardous work of children.

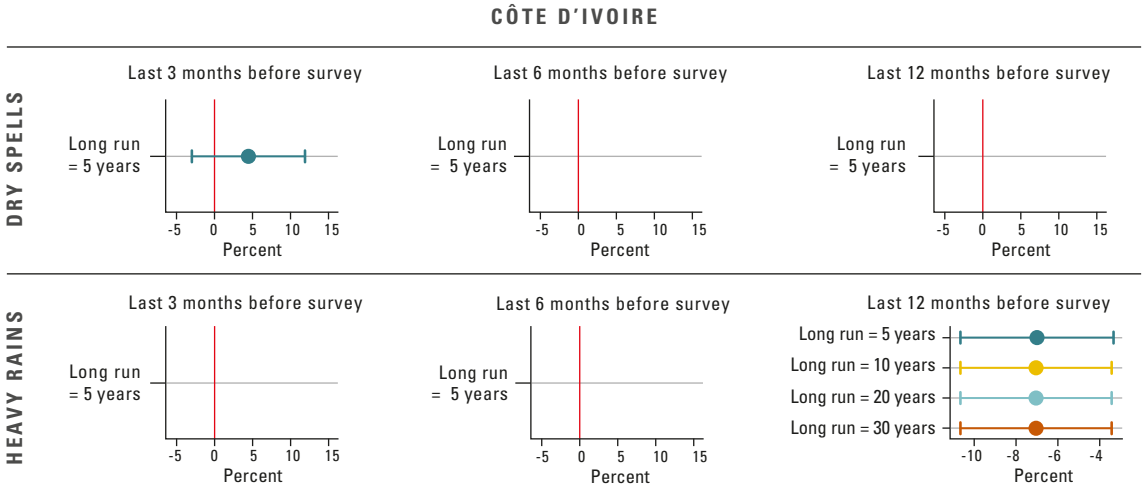
Figure 12. **Incidence of child labour versus climate extremes reported in satellite data**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Standard errors are clustered at the household level. A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work. Children in hazardous work are those employed in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

Figure 13. **Incidence of hazardous work for children versus climate extremes reported in satellite data**



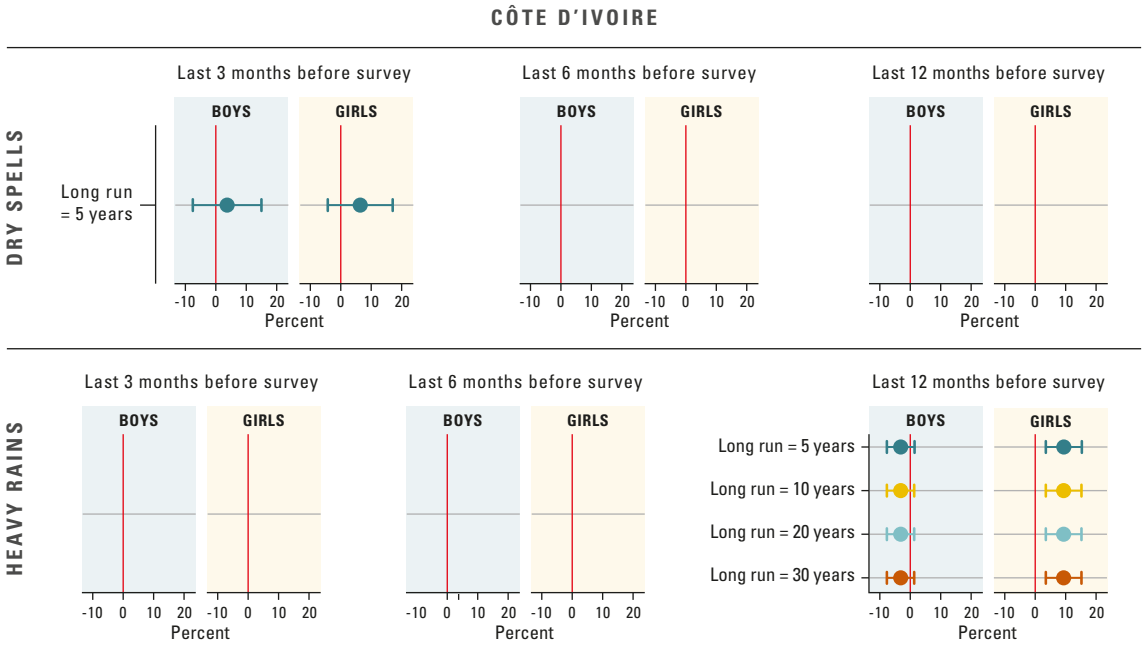
Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Standard errors are clustered at the household level. A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work. Children in hazardous work are those employed in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5).

Recognizing that the incidence and intensity of child labour in response to the hazard might differ for boys and girls, Figures 14 and 15 present results pertaining to extremes by gender. Figure 14 indicates that there is an important gendered response to heavy rains. While there is a negative association between heavy rains and child labour for boys, results suggest that girls are 10 percent more likely to work in response to this extreme. The results are very similar for hazardous child labour (see Figure 15).

- Heavy rains are associated with an increase in the incidence of child labour and hazardous child labour for girls but a reduction in the incidence for boys. Thus, households substitute the fall in labour for boys with increases in labour for girls.

Figure 14. **Incidence of child labour versus climate extremes reported in satellite data by gender**

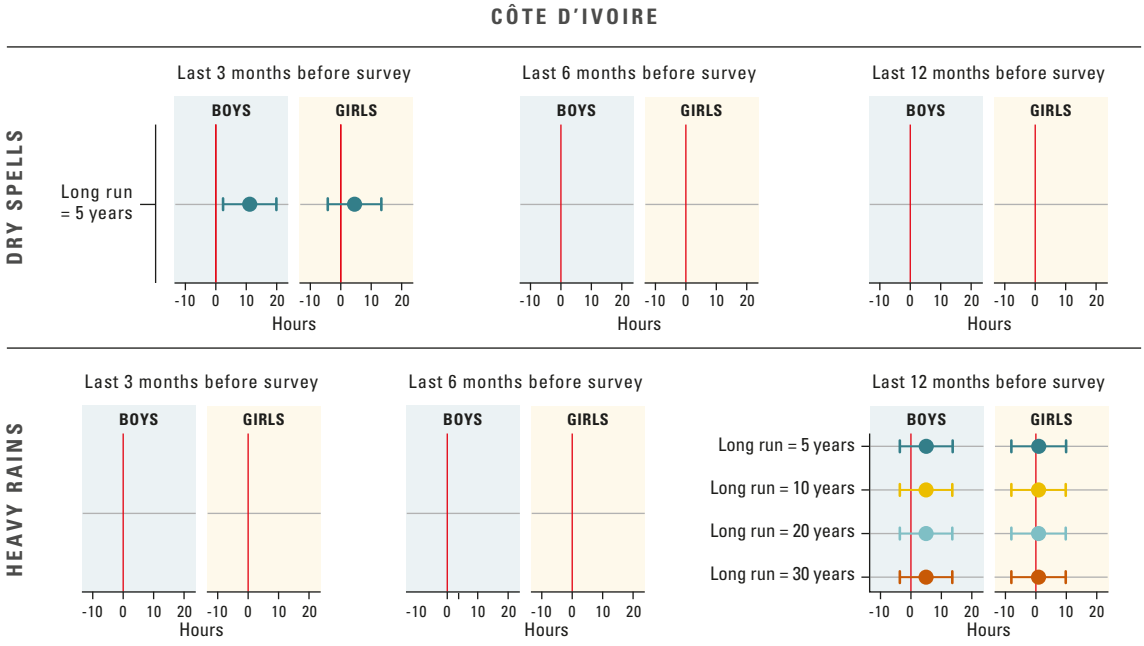


Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Standard errors are clustered at the household level. A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work. Children in hazardous work are those employed in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

We conjecture that heavy rains negatively affect activities more commonly undertaken by boys. It is likely, therefore, that boys work predominantly in farms, and heavy rains prevent them from undertaking their usual tasks. Households can potentially compensate for the lost output by asking girls to work in other activities, predominantly non-farm work or household enterprises. Unfortunately, the data do not allow us to test these hypotheses.

Figure 15. **Incidence of hazardous work for children versus climate extremes reported in satellite data shocks**

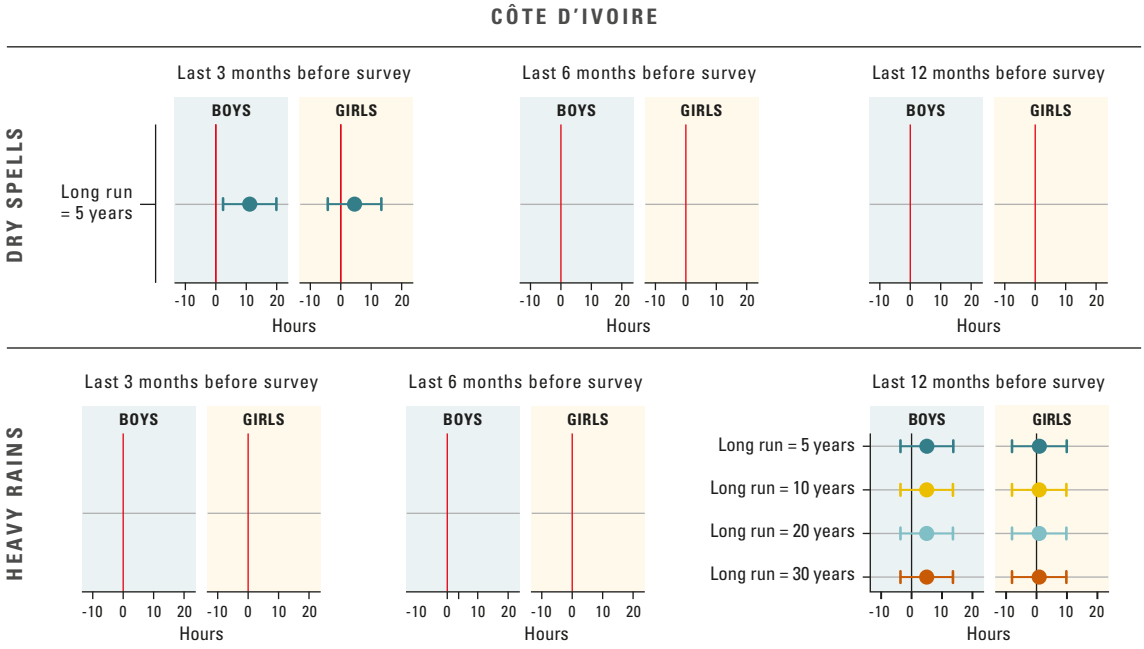


Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Standard errors are clustered at the household level. A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work. Children in hazardous work are those employed in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

Results examining the number of hours of child labour and hazardous child labour by gender are presented in Figures 16 and 17. Findings from the top panel of Figure 16 suggest that boys are associated with an increase in labour of about ten hours per week in response to a dry spell. While girls have a positive association with the number of hours worked in response to a dry spell, the findings are not statistically significant. Very similar findings are found for hazardous child labour (see Figure 17).

Figure 16. **Time working in child labour versus climate extremes reported in satellite data by gender**



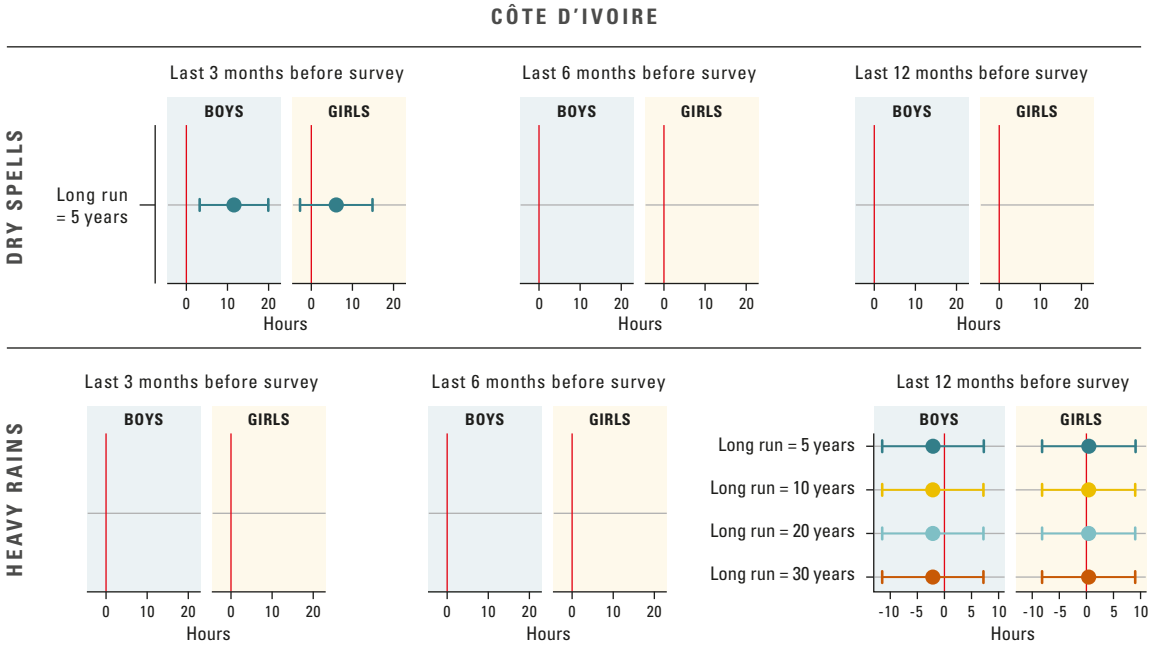
Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the household level. A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are 14–17 years of age and doing hazardous work. Children in hazardous work are those employed in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: *ECMWF*. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

In line with the previous results on the probability of being in child labour, results show no statistically significant effects of dry spell.

- Boys work more hours of child labour and hazardous child labour in response to a dry spell compared to girls. This may be due to additional work being required to keep the agricultural sector viable during these periods.

Figure 17. **Time working in hazardous work for children versus climate extremes reported in satellite data by gender**

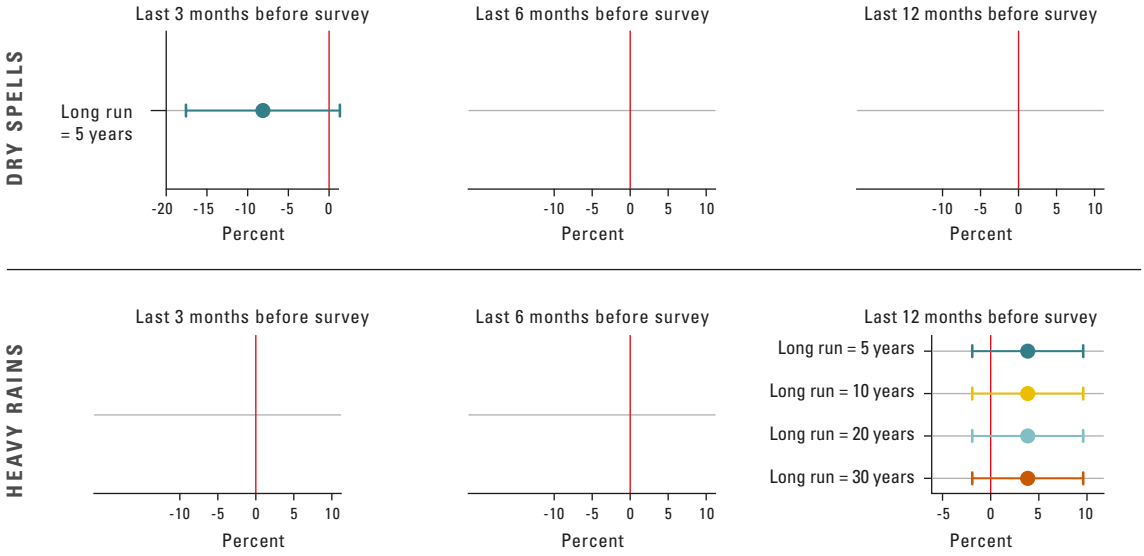


Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the household level. A child is a labourer if, in the past seven days, they are under 14 years of age and employed, or if they are aged 14–17 years of age and doing hazardous work. Children in hazardous work are those employed in dangerous or unhealthy conditions, work at night, work for more than 40 hours per week, or work with exposure to dangerous factors such as dust, gas, excessive noise, chemicals and/or explosives. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: *ECMWF*. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

Finally, we examine the effect of climate-related shocks on children undertaking household chores in Côte d'Ivoire. A child is classified as undertaking chores if, in the past 30 days, they collected water, undertook household management activities, prepared or served meals, disposed or recycled household waste, cleaned, decorated, gardened, maintained the dwelling, or gave care, education and transport to others.[13] The results presented in Figure 18 suggest there is no statistically significant relationship between climate-related shocks and children undertaking household chores.

Figure 18. **Incidence of children undertaking household chores versus climate extremes reported in satellite data by gender**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the household level. A child is classified as undertaking chores if, in the past 30 days, they collected water, undertook household management activities, prepared or served meals, disposed or recycled household waste, cleaned, decorated, gardened, maintained the dwelling, or gave care, education and transport to others. The top (or bottom) and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from ILO. 2015. Côte d'Ivoire's national survey on the situation of child labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants [ENSETE 2013]): rapport descriptif sur le travail des enfants. Geneva, International Labour Organization; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

[13] We note that some but not all household chores may be linked to agriculture and that making a clear distinction is difficult.

4.1.2. Qualitative analysis

Three experts were interviewed separately for Côte d'Ivoire: a senior official of a government programme to tackle child labour and two staff members from an international development organization with offices in Côte d'Ivoire, specialized in issues around agriculture (mostly cocoa production) and labour. As the three interviewees work predominantly on issues related to cocoa production, this section is heavily oriented towards this crop.[14]

4.1.2.1. Environment and modes of production

Interviewees explained that agricultural activities in Côte d'Ivoire are undertaken predominantly on small landholdings using mostly family labour. Cocoa farmers, in particular, rely on family labour. The reliance on this major export crop has made cocoa farmers quite vulnerable, especially when the price of the crop falls significantly.

4.1.2.2. Child labour in Côte d'Ivoire: characteristics, incidence and cultural factors

The data and discussion on child labour in this section are highly inclined towards the cocoa industry and/or towards cocoa-producing regions as this is the sector the three interviewees are mostly involved with. The interviewees highlighted that child labour in the cocoa industry is rampant and has raised international concern, as one Senior government official stated in this interview:

> The cocoa production in Côte d'Ivoire employs 790 000 children, and we have figures for that from a recent report commissioned by the United States Government, but in terms of child labour in various other sectors of economic activity, we do not have a recent study. In a national 2013 survey, the main sectors identified as utilizing child labour were the agriculture sector, the mining sector and the domestic work sector, among others. So, according to that report, ***about one 1.4 million children in Côte d'Ivoire are involved in child labour*** … We can look at the rural and urban dimension. … the agricultural sector is the most affected … clearly cocoa is grown in rural areas, so the proportion of children who are involved in labour is much higher in rural areas than in urban areas (Senior government official, child labour programme, male).

[14] The research team faced difficulties in getting interviewees from Côte d'Ivoire with two potential respondents deciding to opt out at the last minute.

Interviewees also noted a lack of reliable and updated statistics on child labour, including data that discriminate the incidence of child labour per region or industry:

> The difficulty for us is that there has not been a specific multisector study where we can see each sector of economic activity ... and for specific areas (Senior government official, child labour programme, male).

However, the interviewees noted that at least 70 percent of child labour in Côte d'Ivoire is engaged in agriculture, with most occurring in the informal sector:

> The high level of working children, both in the agricultural and service sectors, is mainly due to the structure of the economy. In this region of Africa, most of the economy happens in the informal sector ... [In Côte d'Ivoire] about 70 percent of our economy is structured informally, through small businesses in the agriculture, services and craft industries. Children help their parents as a survival strategy for the family unit (Senior government official, child labour programme, male).

One interviewee mentioned that 85 percent of the child labour associated with cocoa production happens within family units whose businesses depend on child labour:

> [Cocoa production] is an activity that happens within the family setting. The cocoa producer would not have the means to hire adult labour force (Senior government official, child labour programme, male).

As in other countries in this study, child labour is culturally accepted, expected of young children as a way of socialization and provides assistance for households' economic survival:

> ... what we say here in Côte d'Ivoire, [is that] work as such is not forbidden to children. What is prohibited are the worst forms of child labour ... work that puts the health and survival of the child at risk ... work that affects the child's school attendance ... So in terms of the cultural aspect, the work allows the parents, the father or the mother, to instil social values in the child ... For example, if the father was a farmer ... on a day when there is no school, the child may accompany his father to the fields or his workshop ... What must be retained is the cultural aspect; it is the learning ... to inculcate in the child the values of work, the social values of work ... Generally, in Africa, work contributes to a child's education (Senior government official, child labour programme, male).

> In most cases, [people think of] child labour as the phenomena of domestic servants ... But in the fields ... the notion of child labour is not really known to parents. And it must also be understood that the child has to be found working ... but it doesn't have to be a dangerous job. [Work] is a real socializer that will help the child ... It was this nuance that initially made people in the child labour communities very sceptical because they felt that we were asking them not to put the shutter on (NGO representative, female).

Nevertheless, one interviewee suggested that around 20 percent of children in the country are involved in work that is hazardous and should be abolished. The use of pesticides was a particular issue of concern:

> [We need to work on] raising awareness ... because people have not yet understood how dangerous it is to use [sic] expose children to pesticides (NGO representative, female).

> Most parents are unaware of the work that is forbidden to children. Children come with their parents to the field, when parents don't know that certain tasks are forbidden for children or can cause injury. Parents are not aware about the dangers of handling pesticides, for example, and may entrust this type of activity to their child (Senior government official, child labour programme, male).

To meet the cocoa industry's labour needs, according to interviewees, a significant proportion of child labour comes from neighbouring countries:

> The other thing we can say is that much of the child labour [in cocoa] has been identified as children that have come from elsewhere, from neighbouring countries that were brought to work here (NGO representative, female).

> When I think of child labour, ... in many cases it is children who come from outside [Côte d'Ivoire] ... from countries of the subregion ... Fighting against child labour also means addressing the source of child labour (NGO representative, male).

Migrant children, especially non-accompanied minors, are more vulnerable to hazardous work. It was mentioned that exposure to pesticides or other chemicals used in agriculture, but also a lack of guardianship, put this particular group at much higher risk of exposure to dangerous situations:

> For these [migrant] children, what are we doing in this country? [These are] children who are from outside ... from bordering countries. There are cases declared as in danger (NGO representative, male).

Illegal, clandestine mining also seems to be an occupation that involves children, and it was mentioned as an area of concern in terms of hazardous work:

> We do not have a specific study to measure the extent of child labour in this sector [illegal gold mining], but the observations show there are children who come from the subregions and who are involved in illegal gold mining ... with adults who come and occupy those areas illegally to mine gold (Senior government official, child labour programme, male).

The experts highlighted that there is international pressure for Côte d'Ivoire to deal with the very high proportion of children involved in cash and export crop production in the country (mostly cocoa and coffee), and a series of enforcement measures, information campaigns and government strategies have been launched in recent years to deal with the phenomenon:

> Côte d'Ivoire ... is developing a strategy that will take into account all the requirements of consumer countries such as the United States, [or] the European Union, to ensure the transparency and traceability of cocoa and coffee ... Ivory Coast is setting up a national system of traceability which makes it possible to check and control ... All the cocoa farmers are known to us. We know where they live. We know how many children they have. We have all the information about their families and their plantations in the cocoa fields (Senior government official, child labour programme, male).

One of the main challenges in the campaigns to raise awareness of child labour has been dealing with the different conceptions farmers have about child labour, including lack of awareness about detrimental effects to children's health, or the value of school:

> The whole child labour issue has started to come to the fore internationally ... [but] farmers are a bit sceptical about the issue ... All this child labour discussion is not really known to farmers. And when cases of child labour ... are identified in the communities, the current practice is to have rules that are amicable to farmers ... Themes [around child labour] need to be redefined ... we need to specify whether we are talking about work for socializing purposes, about hazardous child labour, etc., people need to understand in a comprehensive way. It is misunderstanding of these nuances that make people in the child labour communities very sceptical because they feel they are being asked to fully remove their children from work ... We have to make sure that the existing laws are lenient towards the work of children because until now, communities feel they will go to jail because they've engaged in child labour (NGO representative, female).

A main finding that emerged from data analysis is that child labour is a substantial part of the Ivorian economy, especially cocoa production, but there is also increasing international pressure to better monitor, regulate and reduce children's involvement in the production of this crop.

4.1.2.3. Climate-related events and their effects on agricultural livelihoods

Interviewees indicated that climate change has serious consequences that affect livelihoods. However, climate-related events were not identified as a pressing issue to the same extent as the other countries in this report:

> For the last couple of years, we have not known droughts that are significantly affecting the agricultural production, to the point where there is a food deficit. Our markets have been well supplied of food crops, subsistence crops ... [but] they [droughts] still impact the daily life of the populations ... and are affecting agricultural production and the high cost of food in the markets is noticeable (Senior government official, child labour programme, male).

> Droughts have not led to displacement but have reduced the vital resources of production of these producing families and [the production of] food has reduced (NGO representative, male).

As for floods, it was mentioned that these mostly occur towards the east of the country and it is urban and peri-urban areas with poor planning that suffer, with devastating effects and population displacement:

> Floods are rather an urban phenomenon, [affecting] precarious neighbourhoods that settle in risky areas, in flood zones and in seasons of large rainfall [these] have quite dramatic consequences for people (Senior government official, child labour programme, male).

> Climate-related events can lead to population displacement. With floods, people may have to move elsewhere and they become much more vulnerable, [and] they may not have the financial means to survive and access the basic needs such as food, rent and school for their children. They become poorer (NGO representative, female).

Deforestation was raised as the main environmental concern, as it is the phenomenon that is most affecting agriculture and productivity, and further accentuates the effects of climate-related events:

> [For Côte d'Ivoire] climate change is linked to deforestation (NGO representative, male).

> It's all about the politics of agroforestry ... They [farming families] cannot use land that has been damaged [to deforestation], that has led to a decrease in productivity (NGO representative, female).

The experts noted that climate-related events are disrupting the livelihoods of farmers and pushing them further down the poverty line:

> These climate issues ... cause financial stress. They are not just climate-related events; they are financial shocks. [During normal times] they can sell their products to address their basic needs. But from the time their livelihood systems are put on hold due to a climate-related event, those exposed find themselves with an abrupt limitation to their resources (NGO representative, female).

4.1.2.4. Discussion of the quantitative findings

Interviewees had mixed views regarding the possible link between child labour and increasing climate-related events. The government official claimed he could not think of a relation between the two phenomena, while the non-governmental organization (NGO) representatives established an indirect relationship derived from the impoverishment of households during situations of extreme weather conditions:

> When we think of climate change, climate-related impacts and child labour, [at] first we think there is no connection. But one of the main causes of child labour is family poverty. And families are not always prepared to face these climatic shocks. So these shocks can increase the incidence of child labour of a farming family during a drought when there is a lack of food. You're going to have to find money to feed the kids ... [and], to reduce the burden, so why don't [sic] make them [the children] work or take part in earning money? [So] to reply to this question [on the link between child labour and climate change] I say, "Yes", because for a long time the landscape, the context of cocoa in Ivory Coast, climate change, deforestation and child labour have been key themes in our country (NGO representative, female).

> Droughts cause the reduction of vital sources for these agrarian families, and their means for nutritional resources are reduced. Therefore, the whole family, including the children are exposed, and this leads them to engage in work that sometimes is not decent, to secure food. These shocks can lead to child labour (NGO representative, male).

4.1.2.5. Community and government-led strategies to mitigate climatic shocks

It is important to note that the interviewees are not experts on climate change and therefore they did not identify climate change or climate-related events as imminent threats to agricultural production in Côte d'Ivoire. Although they did mention some traditional food preserving habits to prepare for trying times, most of their answers shifted towards strategic and future-oriented measures around environmental education, awareness raising about child labour in farming communities and empowering women, and government action plans to address child labour.

This section will first focus on some practices implemented by households and communities to mitigate the effects of climate events, followed by NGO and government-led strategic, future-focused campaigns and action plans that may lead to the economic development of farming families and diminish child labour.

Food preservation was mentioned by two interviewees as a traditional, well-established mechanism used by Ivorian families to store food for a long time in anticipation of a drought or other climate events that would impede them from working or growing their own food:

> One of the things families do with the little means they have is, for example, organize storage of food ... They have the habit to dry the food to avoid it becoming rotten ... It is done in a traditional way ... to transform it ... For example, they have several ways of transforming the manioc so it can be preserved for a long time (NGO representative, female).

> Droughts have revealed that producing families use varieties [of crops] they can dry out ... Sometimes, families that were not used to consuming cereals are now able to produce cereals for their consumption because they know that [cereals] can be preserved for much longer than the tuber or starchy foods. In [a] sense, this is a strategy that is implemented at the level of the producing families (NGO representative, male).

In cocoa-producing regions, introducing new crops that are more adaptable to changing climate conditions was also mentioned as a common strategy:

> Climate-related events are tied to a limitation of the use of the land ... this promotes the cultivation [in other areas] of new crops such as the ones grown in the lowlands, crops such as rice and sweet potato ... People are varying their diet. [Climate change] has made communities diversify crops. If cocoa, for example, didn't yield enough for the year, people think of what other crops can provide extra income ... That's an innovation. We work with the community to make them aware [of options] (NGO representative, male).

Cooperatives in the cocoa industry seem prominent in Côte d'Ivoire. However, interviewees mentioned that these have governance issues and need to refocus to properly address poverty and productivity issues:

> It is interesting that all [cocoa] producers are integrated into cooperatives ... but what we see on the ground is that they have governance problems and problems facilitating access to their data and services ... But cooperatives have the power to collect funds from farmers ... so cooperative insurance and cooperative law, [and] cooperative health insurance would be very good strategies. What we most need is a diversification of the economy and people's incomes, and policies to support this (NGO representative, female).

Moving to NGO or government-led solutions, insurance was referred to as a good way of mitigating the detrimental effects suffered by farmers during extreme climate events. However, mechanization was referred to as the most efficient solution to increase productivity and, importantly, significantly reduce the need for child labour:

> It would be interesting to have insurance at any time to [mitigate] climatic shocks, but what would be more interesting is the implementation of an intensive and modern agricultural system. A modern agricultural system, thinking of mechanization in the plantations to fill the tasks of family members, would also directly help with the fight against the work of the children (NGO representative, male).

> [We need to be] supporting the mechanization of agriculture ... supporting the transformation of materials into finished products in an industrial way (NGO representative, female).

> Cocoa has to be produced in conditions that do not destroy the forest and that respect the environment, and that does not rely on child labour and that entails decent work for the cocoa producers, and includes mechanization ... [To address this] we have started by conducting a census of cocoa producers in Côte d'Ivoire (Senior government official, child labour programme, male).

In the effort to assist farming families and address poverty, cash transfer strategies to incentivize diversification and women's empowerment are also being implemented by the government:

> We also have social productivity networks that allow the state to give money directly to families, to empower them to develop income-generating activities. We have the Côte d'Ivoire Women's Support Fund, which is an initiative of the First Lady of Côte d'Ivoire that allows women to benefit from microcredit. And all this is to fight poverty (Senior government official, child labour programme, male).

An important theme that stood out in interviews was the need to educate communities about the care for the environment, climate change and how best to utilize resources. Protection of forests was mentioned as a key component of environmental education awareness campaigns:

> It's all about the politics of agroforestry ... agroforestry plus community. So we are working to help communities; we are sensitizing them on good environmental practices such as the fight against bushfires and climate change, [information about] soils, crops, ... good environmental practices. We sensitize them; we [promote] replanting to use community forests, open spaces ... we can make communities aware of the need to use improved fireplaces ... that use less wood and are more economical, with local materials ... We need to instil conservation values (NGO representative, female).

> [We need to work on] the promotion of diversification and the awareness of climate change. This information and awareness need to go together with good agricultural practices, including [understanding] the value of setting up a community forest, reforestation, and setting up bushfire prevention and control brigades within their community (NGO representative, male).

The NGO representatives suggested that to tackle environmental awareness, diversification and child labour, community capacity building is the place to start:

> [We need to focus on] community capacity building ... since nothing is done without the support of the community. We need to provide information about how to preserve energy sources ... The new forestry code asks us to work with our women in this regard [preservation of energy and avoiding deforestation] (NGO representative, male).

References to education campaigns also covered the need to educate parents on the detrimental effects child labour may have on their children:

> Parent education is something that needs to be done to combat child labour. It is really necessary to educate parents because often people can be violent towards children or take children to do dangerous jobs. But when you're in the community and start communicating with them, people begin to understand ... we must continue (NGO representative, female).

> Côte d'Ivoire has a national strategy to combat child labour, called the national action plan.[15] The first line of action in this strategy is the prevention of child labour. We have developed activities for the sensitization of the populations, [which entail] communication at the level of the media, the local radios and visits to the terrain to speak directly to the population ... The second axis of this strategy is the protection of children ... the third part of our strategy is enforcement (Senior government official, child labour programme, male).

A push to expand access to education for children was also mentioned as a key component of improving the conditions of children and breaking the cycle of poverty. Further, as with the other countries in this study, access to free education and a more relevant curriculum, including teaching children about climate change, were mentioned as needed policies:

> About 70 percent of children go to school in Côte d'Ivoire. We are working so that children are not forced to engage in activities that impede their education or schooling. In Côte d'Ivoire, school is compulsory and free for all children from the ages of 6 years old (Senior government official, child labour programme, male).

---

15 The research team was unable to find additional information on this National Action Plan.

> We used to learn about agriculture formally in school [but] this programme is no longer on the agenda, but it should be. The current problem is the parent who sees their child going to school and sees no relevance ... Schools need to prepare [children] for future climate-related events, for understanding food security, that it is also a question that the public authorities need to think about (NGO representative, male).

> Children can also be made aware of the [climate change] issue at an early age ... already in primary school. We should think about talking about this with children by setting up, for example, environmental clubs in schools, bringing children to plant trees at their level in schools ... talking about children's rights ... These are notions that we can already start to communicate to children (NGO representative, male).

The government official emphasized all the work the Ivorian Government is undertaking to improve the conditions of farmers and environmental protection. He also referred to the certification of cocoa and other export crops, to indicate these were produced ethically and sustainably:

> We have geo-located them [farmers], and this will constitute a basis to be able to set up the mechanism of traceability which will be completed by a label, an Ivorian label to say it is certified cocoa, [that] it did not destroy the forest and that it respects the social and environmental standards. It is a serious programme that the government is implementing, developed through the Coffee Cocoa Council (Senior government official, child labour programme, male).

Addressing poverty – the main predictor for child labour – remains the biggest challenge for the country:

> Poverty is at the base ... the causes are many and varied. [And] it is the causes that must be addressed. We must already think about modernizing our food production systems, to protect the environment. We need to create access to finance, access to credit, access to quality and affordable child care. Access to primary health services, access to basic education services ... all this for the development of the farming families so that they can reduce the level of poverty we observe in the producing communities (NGO representative, female).

> Poverty must be fought. Côte d'Ivoire ... is truly committed to this social struggle. First, schooling has to be compulsory for all children, and universal health coverage extended to all social categories of the population. Côte d'Ivoire is developing a new strategy based on the fight against child labour, the fight against deforestation, and the fight against poverty of other cocoa producers ... This strategy will be in collaboration or partnership with the European Union and other stakeholders such as the World Bank (Senior government official, child labour programme, male).

4.1.2.6. Other important issues for consideration

A salient topic for Côte d'Ivoire was the reference to poverty in agrarian societies as a problem that needs to be tackled holistically by various levels of policy, not only policy related to improving food security and productivity affected by climate-related events and deforestation. However, there seems to be an urgent need to improve access to healthcare and education for children and raise awareness levels of child protection (especially hazardous child labour).

The fact that most of the economy operates in the informal sector (around 70 percent as mentioned by one interviewee) poses a huge challenge for the country, and one interviewee commented that including more agrarian producers in the formal economy is a starting point for reform:

> Our economy is dominated by the informal sector. We believe that in order to fight child labour in the long term, to have sustainable jobs, … the informal economy must be gradually transformed into a formal economy … We have to allow the state to be able to apply the legislation of work correctly and provide passage out of the informal economy. This transition will also allow us to work on the mechanisms of social protection policies … [provide] universal health coverage to rural populations. We need to … improve the living conditions of people who live in a rural environment (Senior government official, child labour programme, male).

Finally, the issues of migrants and illegal child labour were mentioned by all interviewees as serious and requiring urgent attention, and the incipient cooperation on this matter with neighbouring countries was considered a promising strategy:

> [We are engaging in] subregional cooperation with border countries to fight against the wave of migrant child labourers. We have an agreement with Mali, Burkina and Ghana, and we have developed other cooperation agreements, so we can fight against trafficking and cross-border child smuggling (Senior government official, child labour programme, male).

4.2. Ethiopia

4.2.1. Quantitative analysis

4.2.1.1. Data

We use data from the Young Lives Project to analyse the relationship between climate-related events and child labour. Young Lives is a longitudinal survey focused on childhood poverty in four low- and middle-income countries: Ethiopia, Peru, Vietnam and India. Children were selected by the surveyors from 20 sentinel sites in each country. The children were sampled in geographic clusters, which were selected through a semi-purposive approach. Within each cluster, children were randomly selected. The Ethiopian data covers four regions: Amhara, Oromia, the Southern Nations, Nationalities and Peoples (SNNP), Tigray, and one city administration (Addis Ababa).

The surveyors capture two cohorts in each country. The younger cohort is made up of 2 000 children per country, between 6 and 18 months of age at the start of the survey. The older cohort is a sample of 1 000 children per country between 7.5 and 8.5 years of age at the start of the survey. The data is captured over five rounds held in 2002, 2006, 2009, 2013 and 2016.

The surveyors gather both household and child-level data providing one of the richest sources of information available for child labour research. Young Lives administers two sets of questionnaires in every survey round: a household questionnaire typically answered by the child's main caregiver and a child questionnaire answered by the Young Lives child.

Child labour questions are only introduced in the second round (2006) and are answered by the child. Young Lives oversamples poor families, meaning that incidences of child labour will be higher than in a nationally representative sample. In this report we restrict our sample to children between 5 and 17 years of age, as per ILO's statistical definition, given that very young children are unlikely to work and those older than 18 are no longer technically children. We also restrict our sample to focus on rural areas, where most child labour exists globally. After dropping non-responders, our final sample of usable data from Ethiopia comprises 2 500 observations from 764 children.

4.2.1.1.1. Child labour

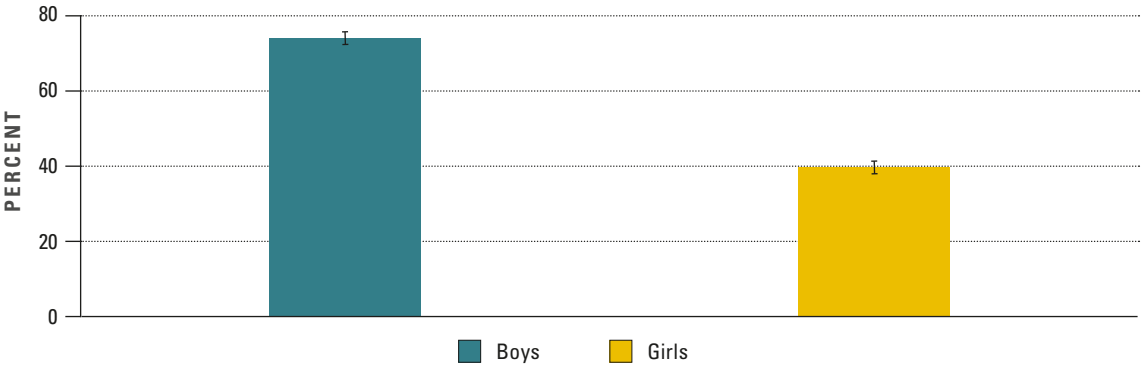
We measure child labour using the Young Lives dataset. We adopt a definition that is markedly different to UNICEF's (see Section 1) and records higher incidences of child labour. We classify a child as working using a dummy variable equal to one if the child has undertaken any paid or unpaid activity in agriculture (such as working on a family farm, cattle herding or shepherding), in a family business (such as making and selling handicrafts), and/or outside the home in other sectors for at least one hour in the two weeks prior to the survey. Overall, 58 percent of children in the Ethiopian sample are classified as working according to this definition. The data also reveal gendered differences:

In Ethiopia, 74 percent of boys and 40 percent of girls work.[16]

In our sample, 94 percent of children at work in Ethiopia work in non-remunerated activities, implying that our results pertain to agriculture and family business (unpaid) activities. Figure 19 summarizes data on the proportion of children that can be classified as children at work by gender. Figure 20 decomposes those data by hours of work. The data reveal that when children work, they work for an average of four hours in a two-week period.

[16] These figures do not take into account domestic labour and care chores. We treat chores explicitly below for Ethiopia and Peru. We are unable to do so for the other two countries because of data unavailability.

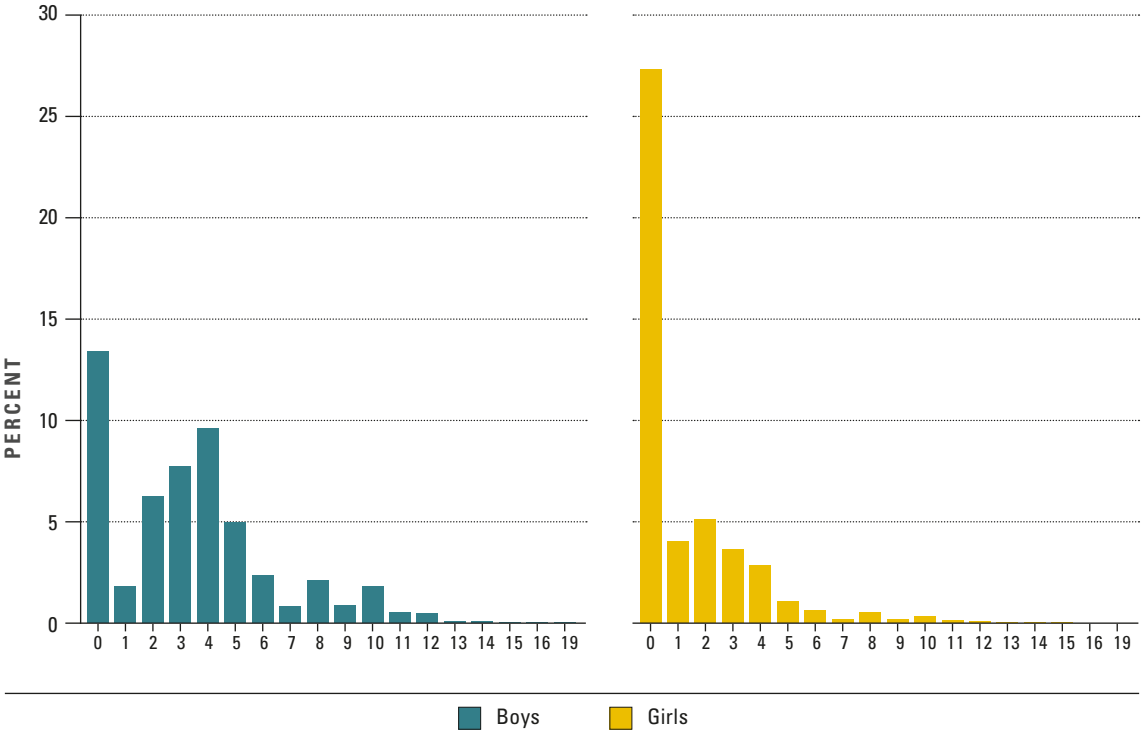
Figure 19. **Percent of children that can be classified as children at work in Ethiopia by gender and cohort**



Notes: 95 percent confidence intervals. A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. Figures are estimated using data from surveys held in 2006, 2009, 2013 and 2016.

Sources: Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford.

Figure 20. **Percent of children that can be classified as children at work in Ethiopia by hours of work and gender**



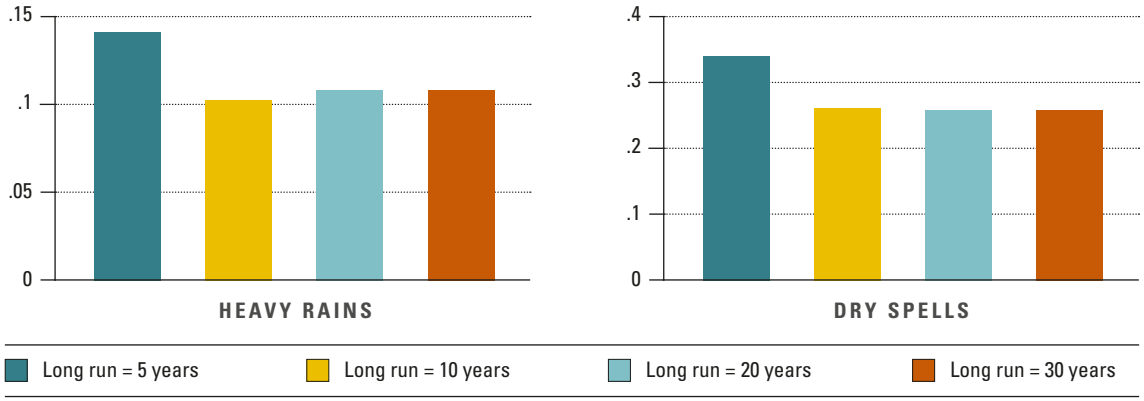
Notes: The figure shows the percentage of children at work (vertical axis) against the number of hours of work (horizontal axis). A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. Figures are estimated using data from surveys held in 2006, 2009, 2013 and 2016.

Source: Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford.

4.2.1.1.2. Extreme weather/climate-related events

Figure 21 shows the average number of heavy rains and dry spells over a 12month period using various long-run definitions for Ethiopia. The figure shows that the definition of average matters; using a shorter period to define the average makes extreme weather events more common. Intuitively, farmers with longer memories are less likely to be shocked by an extreme weather event compared to farmers with shorter memories.

Figure 21. **Average number of heavy rains and dry spells over a 12-month period using various definitions of the long run**



Notes: Rainfall shocks are the difference between observed rainfall in that year and the long-run average for the same location, divided by the long-run standard deviation. Long-run average rainfall is defined over a 5-, 10-, 20- and 30-year period.

Sources: ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.2.1.2. Results

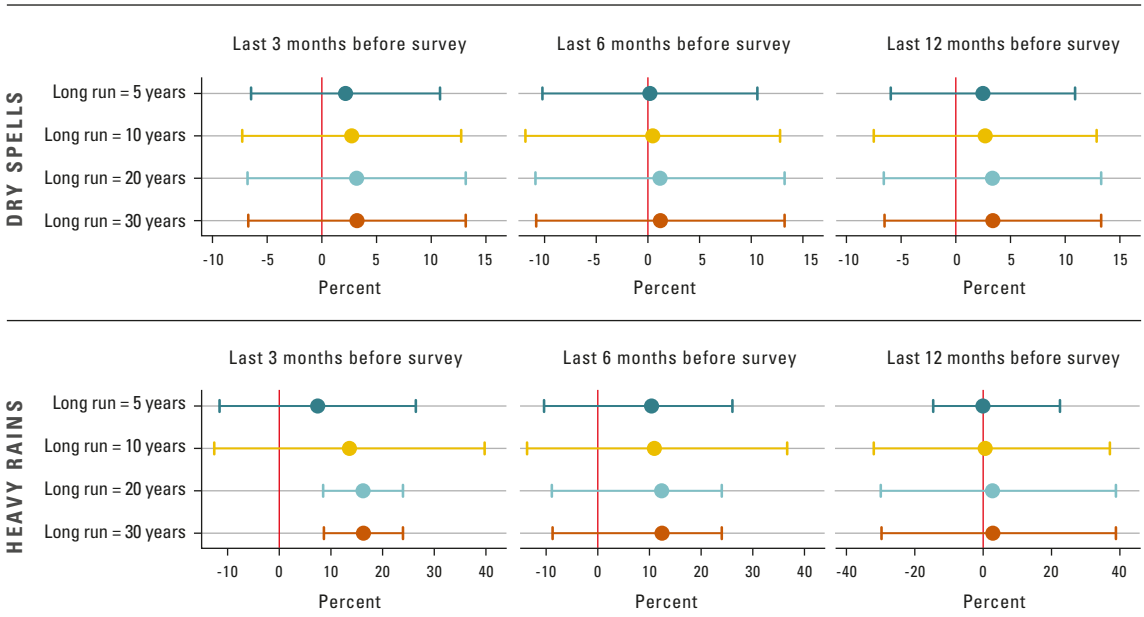
The top (or bottom) panels of Figure 22 show the relationship between children's work and dry spells (heavy rains) defined over different periods. The left panels calculate shocks over three months relative to a long-run average, the middle panels over six months relative to a long-run average and the right panels over 12 months relative to a long-run average. The long-run averages are estimated over a period of 5 years (top), 10 years, 20 years and 30 years (bottom), respectively.

While the output mostly highlights statistically insignificant relationships, a number of important patterns arise. Figure 22 shows that in Ethiopia, recent heavy rains (in the three to six months prior to the survey) can result in an increase in the incidence of child work, when these are defined over a 20- or 30-year period. The coefficient estimates suggest that a recent heavy rain is likely to increase children's involvement into work in an affected region by between 10 percent and 25 percent.

We also estimated models that resemble those summarized in Figure 22 but replace the child labour dummy variable with the number of hours children work. Those models find:

- consistent results between the incidence and extent of child labour models; and
- that the analysis using Ethiopian data shows that recent heavy rains (in the three or six months prior to the survey) can result in an increase in the amount of time that children work over a two-week period by one to two hours, when the long run is defined over a 20- or 30-year period.

Figure 22. **Incidence of child labour versus satellite data shocks in Ethiopia**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the regional level. A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

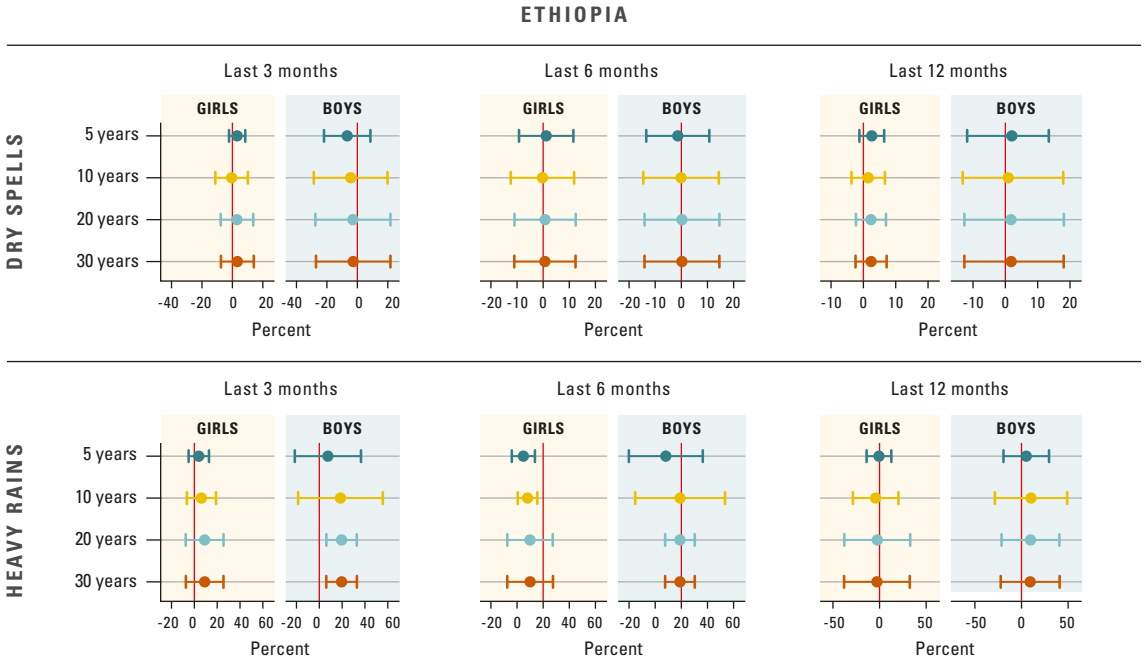
Sources: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5

4.2.1.2.1. Results by child gender in Ethiopia

We re-estimate the models summarized above by child gender. Figure 23 presents the results of the incidence of child labour against rainfall shocks defined over various periods. We show evidence that the positive relationship between heavy rains and child work in Ethiopia is driven by boys. Recent heavy rains (in the three or six months prior to the survey) can result in an approximately 20 percent increase in the probability of boys entering work. This effect is not found for girls.

Figure 24 replicates the analysis in Figure 23 using time of work. The figure summarizes findings consistent with those found above. However, we uncover additional evidence suggesting that recent heavy rains can potentially increase the amount of time that girls work by about 30 minutes over a two-week period. This finding is only evident when defining the long run as a five-year period.

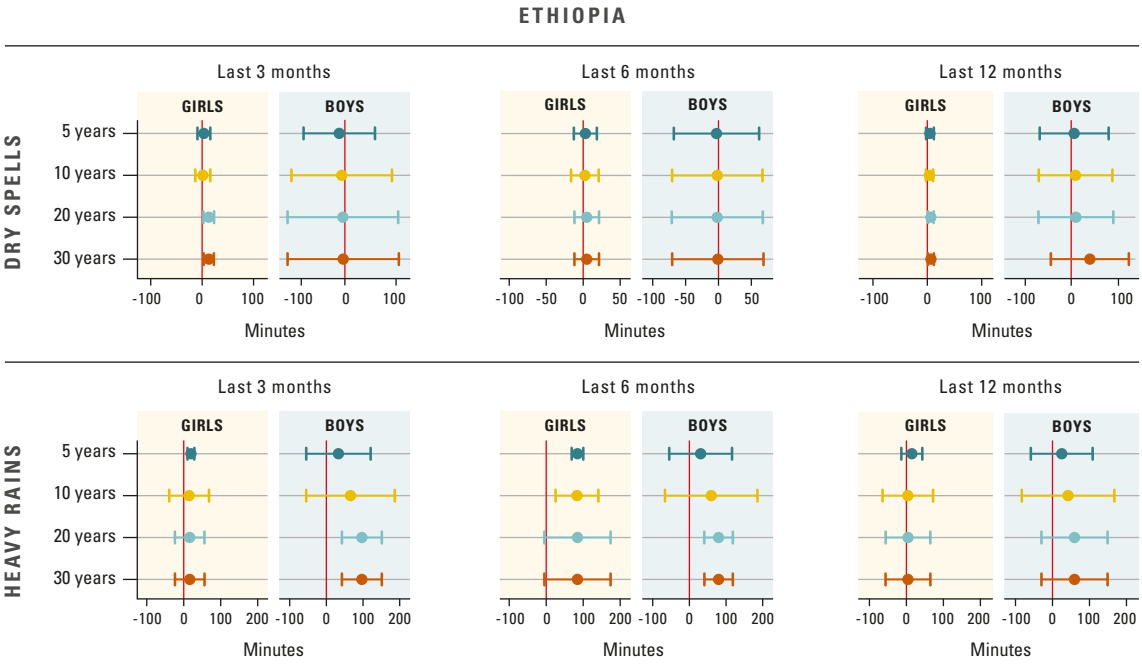
Figure 23. **Incidence of child work versus satellite data shocks by gender in Ethiopia**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the regional level. A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

Figure 24. **Time working in child work versus satellite data shocks by gender in Ethiopia**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the regional level. A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. The top (or bottom) panel shows the relationship between child labour and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.2.1.2.2. Household chores and climate-related events in Ethiopia

In this section, we expand on our definition of child labour to include household chores.[17] Households are likely to perceive differences between child labour and household chores. Chores are ubiquitous in our sample, with approximately 82 percent of children undertaking them in the Ethiopian sample.

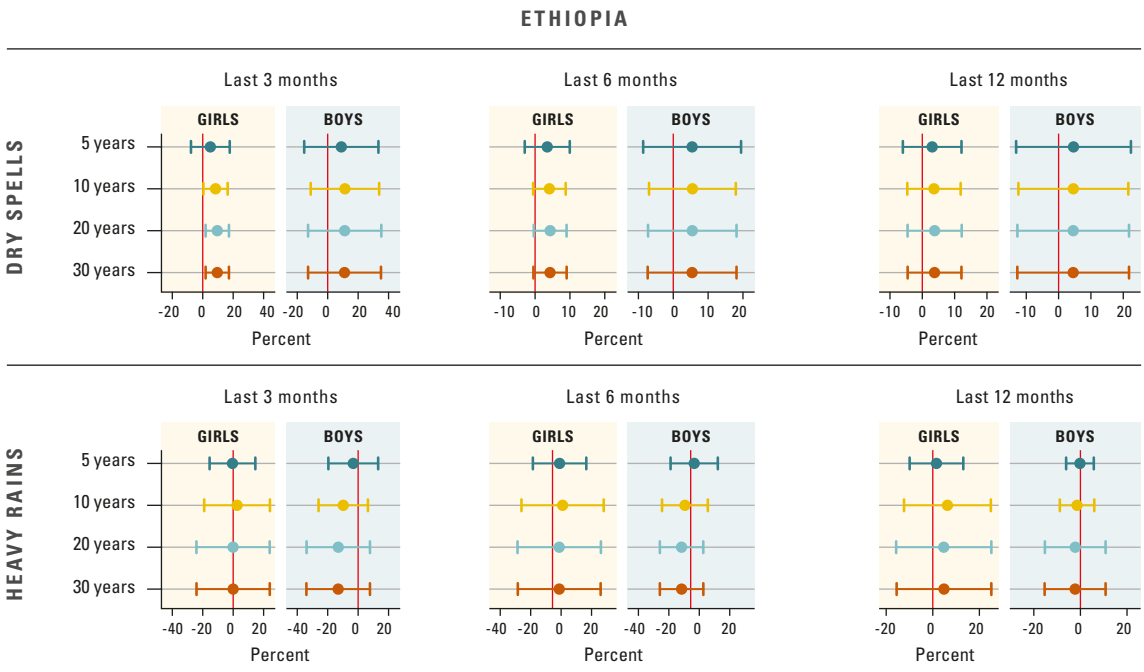
Household chores include activities such as fetching water, gathering firewood, cleaning, cooking, washing and shopping. As such, chores are likely to be perceived as different from work, which includes farming, cattle herding and shepherding. It is important to note that while both child labour and chores can be potentially dangerous, agricultural work is likely to be significantly more so given that children are more likely to be unsupervised. Chores are relevant to the current analysis

[17] Household chore data are only available for Peru, Ethiopia and Côte d'Ivoire.

because climate-related events that affect agriculture are likely to pull or push not only children but also adults in the household to work. If adults and children are substitutes in the domestic labour market, then movements of adults in and out of work could significantly affect child labour.

To test this proposition, we re-estimate versions of Equation (1) substituting child labour for chores. The latter variable is measured with a dummy variable equal to one if over the last two weeks the child undertook chores for at least one hour. Figure 25 replicates the results summarized in Figure 23, replacing child labour with chores. Overall, the results suggest that shocks are not likely to influence the incidence of children undertaking household chores. The figure shows some evidence suggesting that recent dry spells can push girls in Ethiopia into household chores but only when these are measured over three or six months prior to the survey and relative to the last 20 or 30 years.

Figure 25. **Incidence of chores versus satellite data shocks by gender in Ethiopia**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the regional level. The variable chores is measured as a dummy variable equal to one if over the last two weeks the child undertook chores for at least one hour. The top (or bottom) panel shows the relationship between chores and dry spells (heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.2.1.2.3. Child labour, social protection programmes and climate-related events

In this section, we investigate whether social protection programmes can play a role in mitigating the potential effect of climate-related events on households.

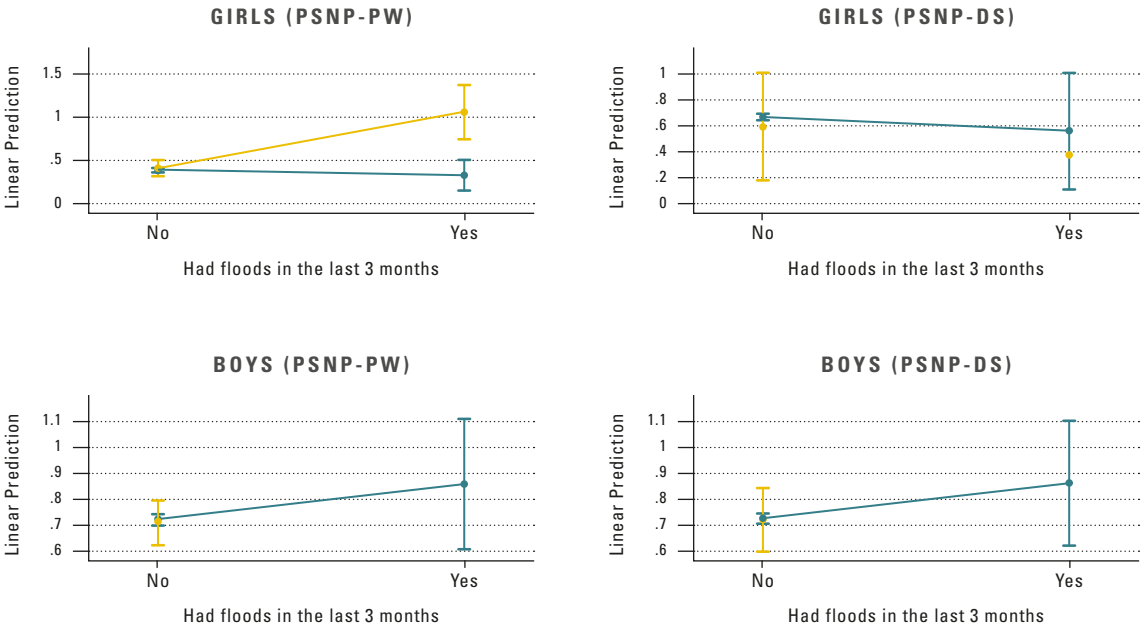
The Ethiopian sample allows us to test the effect of the productive safety net programme (PSNP). PSNP programmes are designed to provide food and cash transfers to food-insecure households. The Young Lives dataset provides information on whether, in the past 12 months, households have received support from the PSNP Public Works (PW) programme or PSNP Direct Support (DS) programme. The PSNP provides payments and food assistance to able-bodied members for participation in labour-intensive PW activities or free transfers to those who cannot work through the Direct Support (DS) programme. In our sample, approximately 15 percent and 3 percent of children have a family member registered with PSNP-PW or PSNP-DS, respectively.

We test whether PSNP reduces the burden of shocks on child labour with regressions that interrelate the social protection measures and the shock we previously found to be statistically significant – heavy rains in the three months prior to the survey relative to a 20-year average period. If the social protection measures are effective, then recipient households should be significantly less likely to experience an increase in child labour in the aftermath of shocks. Figure 26 shows the results of child labour and PSNP interacted with heavy rains. The results show that:

- girls from PSNP-PW-registered households that have suffered a heavy rain in the last three months are significantly more likely to enter child labour than children from non-registered, heavy rain-affected households.

A potential explanation for this result stems from the possibility that adult and child labour are substitutes. In the aftermath of heavy rains, agricultural households may require additional labour for clean-up and maintenance work. Households that rely on the PSNP-PW programme may have less flexibility regarding available hours of work. Under this constraint, it is likely that children work. The programme could, therefore, benefit from in-built flexibility mechanisms that grant workers paid leave in times of crisis.

Figure 26. **Incidence of child labour versus satellite data for heavy rain shocks and engagement with social protection programmes by gender in Ethiopia**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the regional level. A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. PSNP is the productive safety net programme provided through Public Works (PW) or direct support (DS).

Sources: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

©FAO/Michael Tewelde

4.2.2. Qualitative analysis

Four experts were interviewed separately for Ethiopia: two senior officials at the Ministry of Agriculture (one specialized in agriculture and one in climate change), a national senior consultant for the World Bank and an ILO senior official.

4.2.2.1. Environment and modes of production

The experts showed concern and awareness of the effects of climate change for Ethiopia. Climate change plays a leading role in domestic policy discussions, something that came up in all interviews. Experts noted that without critical measures being taken, climate change will affect the country's landscape, agricultural productivity and food security:

> Climate change has a huge effect on the economy of Ethiopia because it is an agrarian economy and people in the rural area are highly affected by climate change because of their capacity mechanisms and lack of economic strength to ... withstand the impacts of climate change ... The climate-change impact is very huge, and it should be addressed in a systematic way with the support of the government, with the support of the local level governments, different institutions and strong coordination at the local government structures (National consultant, World Bank, male).

> [We need to] be promoting low-emitting techniques, … and also watershed management, … in order to mitigate the greenhouse gas emissions from the farmland … We emit from the agricultural land, especially nitrous oxide. We use different fertilizers in order to improve or increase our productivity and improve our food security. But we try to promote watershed management in the area which is adjacent to the farmland … in the highest slopes … [Also] improving rangeland management and improving livestock feed is very important because one of the driving forces of the emissions of methane is the quality of livestock feed … We have to embrace "agroecology". We need to work with nature rather than … against nature. We have worked for a thousand years against nature. We have seen the results. So currently we have agreed on a strategy to follow an agroecological approach (Climate change specialist, Ministry of Agriculture, male).

4.2.2.2. Child labour in Ethiopia: characteristics, incidence and cultural factors

Interviewees explained that child labour is more prevalent in subsistence farming, where ordinary farmers engage their children for different farming, ploughing and related activities. Children are also often involved in livestock care. Interviewees indicated the lack of technification – added to engrained cultural practices and lack of awareness of the value of formal education – as a key driver of child labour in Ethiopia:

> The main drivers of child labour in Ethiopia have to do with supporting families … farming and also herding livestock (Senior official, ILO, male).

> Farmers need additional labour force, which includes their children. This could be reduced if we had technologies as an intervention (Agriculture specialist, Ministry of Agriculture, male).

> … there's no other solution for keeping the family economically viable (National consultant, World Bank, male).

Interestingly, one interviewee made a comment in relation to children's special skills for completing specific tasks such as weeding or sowing:

> In our rural area, they [children] will participate in sowing time because humans [children] are effective in planting [together] with women. Women and their children are also involved in weeding time … in some parts they will be involved in harvesting maize and sorghum; children are involved because they have the capacity to pull the crops easily. So in harvesting maize and sorghum they are involved. They are also involved with cattle, taking it to the grazing area, or to the water areas; these types of things are be done by children (Climate change specialist, Ministry of Agriculture, male).

This understanding of children as key pieces of agricultural processes is in line with a seemingly engrained cultural appreciation of children being economic assets who must develop special skills and become an integral part of households' economic survival:

> In Ethiopia, and maybe in many other parts of Africa, children are considered assets ... They are a means of getting resources, income. So it's a kind of unwritten and written revelation ... that children should serve their families, their parents. So they are considered as insurance to the family. So they are obliged to serve the family, to get some skills so that they are integrated into the community (Senior official, ILO, male).

Children's involvement in agricultural tasks appears to be so crucial that one interviewee mentioned that during certain times of the year, such as harvest time, some schools may close to allow for children to assist:

> We close schools for a week or two weeks if it is harvest time, ... every school will be closed ... almost every year [children work] to prepare the plant defence process ... in different places so children are so important in this response (Agriculture specialist, Ministry of Agriculture, male).

Existing in the context of families, this same expert explained this sort of child labour is unpaid, suggesting that this is a natural way for children to contribute to agrarian households and insinuating this type of work is not detrimental:

> If you go to rural areas, there is no paid labour for children. But they are family workers ... children are engaged in fetching water ... because the family has their cattle ownership, they have their house, and they [children] would do these things, but it will not affect their livelihood ... in rural areas (Agriculture specialist, Ministry of Agriculture, male).

There was also reference to child labour in bigger, agro-industrial plantations. Coffee, tea and flower plantations were mentioned by two interviewees as agroindustries that use a significant amount of female and child labour:

> These places are far from where these families live. [Children] they just leave when they hear of this situation. You know that there are these pull and push factors. So when there is a farm somewhere, they get the information, and they just fly there. They're thinking that they will get a good situation and pay conditions. Then they end up being exploited. You know, so it is the children that are receiving the money, not the family. So there is no contact with the family or anything. It's just the children on their own (Senior official, ILO, male).

Incidence of child labour in Ethiopia was perceived as high. According to interviewees, half of all children between 5 and 17 years of age are engaged in work, and of those, about 80 percent work in the agricultural sector, with boys being more involved than girls and apparently performing more dangerous jobs.

The interviewees also mentioned that children are more likely to be involved in more dangerous jobs. One interviewee mentioned that about one quarter of children involved in child labour in Ethiopia are involved in hazardous work:

> In small farming units, hazardous activities could be long working hours … carrying heavy loads … dealing with livestock in difficult terrain and the difficult climatic conditions, and exposure to pesticides (Agriculture specialist, Ministry of Agriculture, male).

> Up-to-date information is not available. We only have the 2015 national estimate … but the situation is worse now, and [we also need] some regional statistics. So if you take the northern region, and the Somali region, [affected by] drought particularly, there is no rain in those areas … In the Amhara region [child labour] is about 55 percent, followed by Oromya region with around 49 percent and then Afar, 46 percent, and Tigray region about 44 percent. I'm talking about these regions because they are affected by these climate issues, by extremes (Senior official, ILO, male).

The experts indicated that to address child labour, one must first increase families' awareness of the detrimental consequences for children and reinforce the value of education:

> Our awareness level is very low … in those communities [there is no consideration] that children should go to school. What are the consequences of child labour? They don't understand. So they give more value to the cultural [aspect], to the nature of having children to serve the communities and the family. So these are really critical issues and a lot of support is required in terms of addressing this awareness … and also dealing with alternative sources of income for the family so that they start to allow their children to go to school … [There is little] public awareness … on the causes and also consequences of child labour in Ethiopia … [there is] a lack of knowledge and understanding on how severe the consequences might be in families that are sending children to work (Senior official, ILO, male).

4.2.2.3. Climate-related events and their effects on agricultural livelihoods

Droughts, followed by flooding and pests, were identified by interviewees as the main climate-related events in Ethiopia:

> The two main shocks each year are … drought and flooding. Drought is a more prominent shock, … happening on a yearly basis, even though the magnitude of the shock and magnitude of people affected by drought differs from year to year; since 2016 [the country has been affected] due to El Niño and La Niña. The most recent flooding we've had was in 2020 in the eastern part of Ethiopia. [It affected] a huge segment of the population (National consultant, World Bank, male).

> Rain is highly interlinked with climate change. This is [the area] where most of the climate change-related impact is happening [leading to] floods. Currently, the issue of locusts is also manifesting. [It] is related to the changing of the temperature, which creates the environment for the locusts themselves. [It is] one of the major climate-related impacts affecting the agricultural sector (Climate-change specialist, Ministry of Agriculture, male).

> In the last couple of years, the issue of the desert locust has been very serious in Ethiopia, which has affected all the country from the southern region to the Somalia region, and then to the north-central region. It has really damaged crops (National consultant, World Bank, male).

The effects of climate-related impacts on agricultural families were clear to the experts:

> So even at times, the drought is also another serious issue in connection with the climate-related event. So people tend to ... even sell their livestock to cope with this situation (Senior official, ILO, male).

> Yes, I think climate-related events, especially, as mentioned, pests and floods really affect the livelihood of rural households very much. I mean, this is something that we observe also from time to time in Ethiopia (National consultant, World Bank, male).

4.2.2.4. Discussion of the quantitative findings

The interviewees had not thought of a direct connection between climate-related events and child labour. However, all agreed that climate shocks profoundly affect agrarian families' livelihoods, as these crises entail diminished access to, or lack of, water in the case of droughts, as well as significant crop losses:

> Yes, the impact at the household level is very high because ... the impact of the climate event ... will affect their food supply first. They have to work more to get more water, because if it is a dry time, they need to go more distances because the smaller rivers will be dried ... And children will be part of this also. So ... the work on the farmers will increase. At that time utilization of family labour will increase too ... children work after school, they may even leave the school to support their family. [Climate extremes affect] children's lives, education, and their social interactions. And the fact is, when climate-related events are increasing in that area, everybody should work on [securing] water. So, family-level activities really increase, so that affects children's lives (Agriculture specialist, Ministry of Agriculture, male).

> ... climate extremes and the impacts of climate change have a huge impact on the livelihood of a household and any household's children basically are affected by it ... Shocks affect the schooling. Children have little chance of going to school, and then the probability of engaging in trade becomes higher (National consultant, World Bank, male).

One interviewee made the point that the relationship with child labour seems to be very clear in Ethiopia and should be further studied:

> [If I think of] surveys and studies that have proxy relations with climate issues and so on, and I really consider that this assessment (how climate-related events can affect child labour) is realistic and is in line with the situation I have observed in Ethiopia ... from what we observe there is a very clear link between climate-related events and child labour in Ethiopia ... I think that this needs to be further studied and confirmed (Senior official, ILO, male).

The experts also mentioned coping strategies, such as temporary or permanent migration by individuals, including unaccompanied children, or whole families during situations of extreme financial stress due to a climate extreme:

> And some even migrate to towns, ... particularly from the north, with their families, with children. ... When you ask them on the road, they just tell you, "No, there is no rain, we couldn't farm, we have nothing to eat". So they decide to come down to the different towns and start to beg on the streets. ... And, you know, there is no insurance, microinsurance or social insurance to help them cope with this situation. It really affects them, and most of them send their children to towns to help them out and to send some income back to their village ... So boys and girls have to resort to some kind of activities, ... go as domestic workers, cleaning, babysitting ... And the boys do quite a number of activities, cleaning cars, shoe shining and other stuff. This is highly observable (Senior official, ILO, male).

4.2.2.5. Community and government-led strategies to mitigate climate-related events

This section presents the mitigation strategies described by interviewees to confront climate-related events. These where elicited after a discussion of our quantitative findings and recommendations.

Water conservation measures, with the goal of anticipating future droughts, was mentioned as one of the strategies farmers implement in drought-affected areas:

> [Farmers] get a gut feeling and practice irrigation of water, by harvesting the water during the rainy season (Climate-change specialist, Ministry of Agriculture, male).

There was agreement among interviewees that improving technologies for farming is critical for mitigating the effects of extreme climate events and improving livelihoods of rural Ethiopians:

> The government is taking a range of strategies to mitigate the impacts of climate in agriculture [such as] small-scale irrigation ... helping farmers to use drought-resistant crops, including hybrids. Or using the right fertilizer for their farming activities ... Those are implemented by the government that get[s] support from development partners, like the landscape approach to sustainable land management programme [for] water harvesting, [so that] the environment can catch up with the changes, including climate change (National consultant, World Bank, male).

> One of the strategies is around conservation measures, which is part of a national campaign and international policy intervention ... [it is a strategy through which] farmers and community workers work together to improve the climate of their area by doing physical water conservation practices, planting suitable crops [and] establishing physical structures. This will also help improve the water availability of the area and creating closure areas [to improve] grazing land ... This is a national campaign which will be done yearly ... This will also improve the community practice. And it is a policy intervention to work on soil conservation practice (Agriculture specialist, Ministry of Agriculture, male).

> [We need] better technification to improve people´s involvement in the agriculture sector. To support families, we need to work on mechanization technologies so farmers can be supported during planting time. [This] can improve their livelihoods. We have to engage in sustainable development, [and] sustainable land management. [We need to] support workers in soil conservation, plantations and the use of climate-based advisories for the farming community. This will improve the livelihood of the family, which improves the livelihood of the children, which improves the time that [children] don't have to engage in agriculture and can instead focus on education (Climate-change specialist, Ministry of Agriculture, male).

> [We need] drought-tolerant, productive varieties in order to boost the productivity, then secure our food security. This is an adaptation intervention, but it has a mitigation benefit because if you are increasing the productivity on existing land, you are not pushing the expansion of the farmland to the forest ... Promoting irrigation is one of the areas we are focusing on ... because if you are increasing the frequency of production three, two times in the year, there is no need of expansion into the forest (Climate-change specialist, Ministry of Agriculture, male).

The lack of access to credit to assist agricultural households to reinitiate farming activities after devastation was also mentioned as an area where the government should intervene. In many cases, affected farmers can only access usurious informal loans (referred to by one interviewee as "evil loans"). Providing access to microcredit and improving farmers' access to markets are financial strategies that the Ethiopian Government is working on:

> We have a new project which is focusing on agriculture and food ... "the proagro project" ... we're supporting ... the communities, ... adding value to their agricultural produce so that these can be marketed. [This] helps communities, especially by organizing themselves as cooperatives ... Financially, microfinance, our very small banks have catered to the needs of these groups; [they] should be there in place so they [farmers] can access this (Senior official, ILO, male).

> Cooperatives are working on [ensuring] credit availability (Agriculture specialist, Ministry of Agriculture, male).

One interviewee referred to the need to make these strategies gender sensitive, given the critical role women play in agricultural households:

> It is difficult to attain our development without gender-sensitive strategies ... When we conduct vulnerability assessments, women come first. And we try to engage them [women] even when we are developing our packages for the agricultural sector; we deliberately identify the technologies that can easily be implemented by women, for example, in the poultry [industry] (Climate-change specialist, Ministry of Agriculture, male).

Interviewees agreed that providing weather forecast information to farmers to aid them in preparing for potential climate-related events is critical and has already been initiated for some farming sectors. However, how to make the information accessible to and trusted by farmers are problematic aspects:

> It really helps ... giving information on the coming floods and ... getting this information in advance. Now, the problem is, what is the mechanism to communicate this information to the villagers? ... That should be looked into. If [it is through] rural cooperatives or associations of farmers, or local community groups, that will make sense because sometimes they will not get the information directly from radio or from

> television. They may not have access to these things. So it must be a trusted source. Sometimes they may not even believe what is being told to them. So we should [do this] through trusted elders in the area, or community groups that can really convey this to them and help them (Senior official, ILO, male).

4.2.2.6. Other important issues for consideration

Other issues were mentioned around the problem of children involved in child labour. Education, coordinated government approaches and the effects of the COVID19 pandemic were brought up as critical issues to consider.

Firstly, accessibility and appreciation of education were aspects of great concern. Formal education not being compulsory in Ethiopia is something to consider when considering any policies to improve the wellbeing and future prospects of children in the country:

> Promoting education, promoting children to have a compulsory primary education is also a very important policy measure ... by the way, education is not compulsory in Ethiopia. It's free, but it's not compulsory. So one of the policy measures that needs to be taken should be a universal free primary education for all. ... in some cases, even the schools are inaccessible. [There is also] lack of interest or lack of confidence in the schooling system; these are also some of the factors that contribute to getting children into child labour (National consultant, World Bank, male).

> There are school dropouts ... some schools are far away from home and also they [parents] are not in a position to buy the required materials. I mean, even the school uniforms, and then also they travel that much ... they get tired when they reach the schools and they don't have anything to eat. They fall asleep in the class. So I think there are some programmes, feeding programmes that the government has instituted in some areas and some schools. I think these kinds of interventions should be expanded, especially in times of COVID, so that more children and families can send out their children to the schools (Senior official, ILO, male).

> Poor families ... don't want to send children far, out of touch. Even if they graduate [from school], that doesn't mean they don't need them; they need their children to produce as much as possible. [For some farming families] school is not practical, and it is far from the home (Agriculture specialist, Ministry of Agriculture, male).

There was also mention of the COVID-19 pandemic as an added burden to the already difficult situation experienced by families due to climate-related events:

> The COVID-19 pandemic ... has compounded the problem of child labour ... children are even more exposed now to child labour in addition to the climate-related events. This is also adding additional burden on families, and they cannot cope anymore to

> support the children. And so children are more exposed to this kind of situation. So I think it's very important that this is taken also into account in addressing the issues of labour in Ethiopia (Senior official, ILO, male).

Finally, as is often the case with public policy, a lack of coordinated government initiatives needs to be considered:

> The climate-change impact [in Ethiopia] is very huge, and it should be addressed in a systematic way with the support of the government, with the support of the local-level governments, different institutions and strong coordination at the local government structures (National consultant, World Bank, male).

> [There are] different actors operating on child labour issues. But there is no coordination of efforts, and there are no clear guidelines or a clear institutional framework in place … We have a national action plan against child neglect and the worst forms of child labour … the 2021 to 2025 strategy will be launched soon by the Ethiopian Government, the one we had ended last year. So having that kind of national vision is very important … country coordination is really, really key because having policies, laws and institutions is not going to guarantee success (Senior official, ILO, male).

As mode of conclusion, the following quote encapsulates the core of child labour in Ethiopia, suggesting how research and policy initiatives can best approach the problem:

> An economic strategy for households should not be based on helping them cope with daily incomes or fulfill their daily needs, but it should empower them to invest more in economic activities and in diversifying their incomes … to support their children, to go to school and also change their way of life. So [building their] economic capacity has to focus on the needs of individual farmers to have a better future for their lives in terms of knowledge, in terms of skill, in terms of technology, in terms of fertilizers, in terms of hybrid crops and market, access to markets; all these factors have an impact in terms of building the capacity of a household. Without addressing the social economic capacity of the household, [to help them] detach themselves from poverty and increase their productivity, it will be very difficult to address this [child labour] … Promoting education and promoting children to have a compulsory primary education is also a very important policy measure that has to be taken (National consultant, World Bank, male).

4.3. Nepal

4.3.1 Quantitative analysis

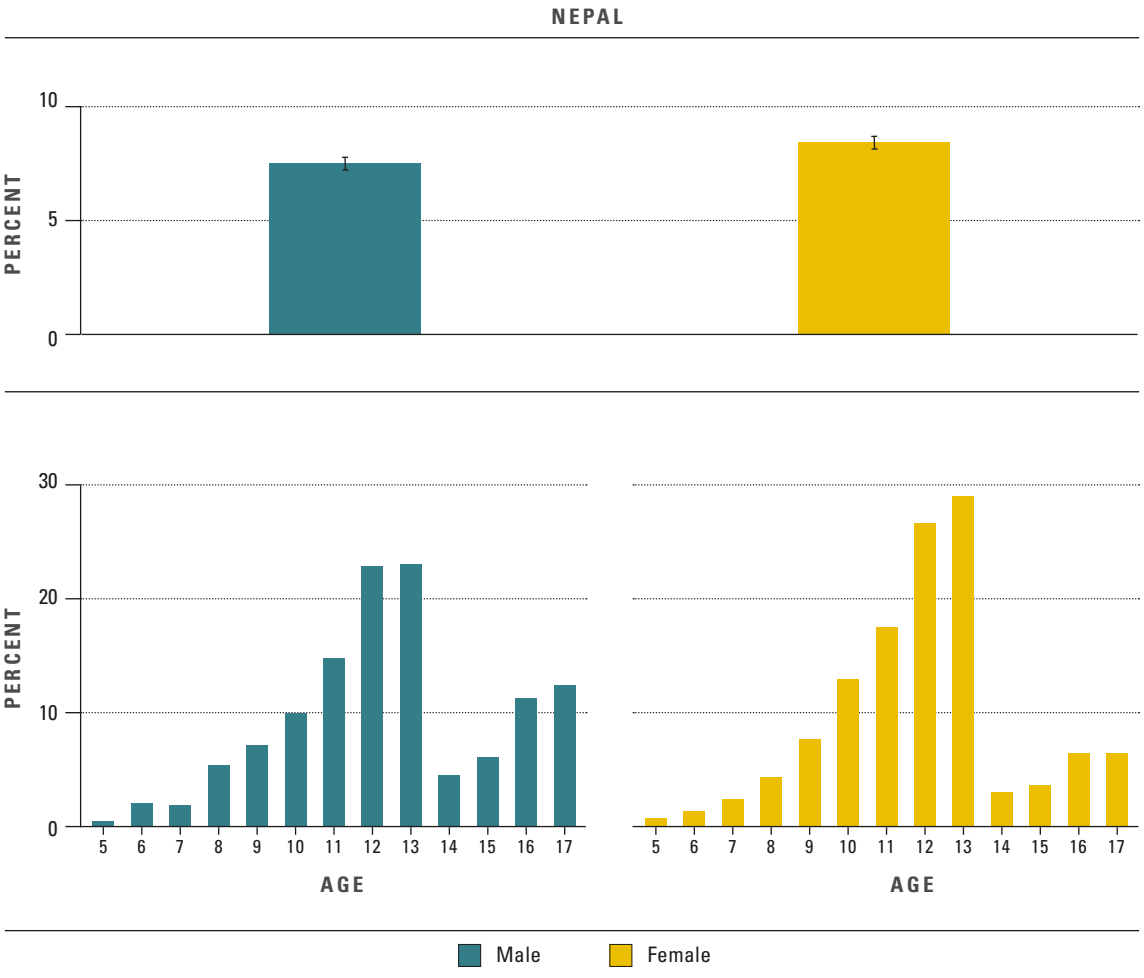
4.3.1.1. Data

This report uses the Household Risk and Vulnerability Survey (Full Panel, 2016–2018) to examine climate-related events and child labour in Nepal. The three-year survey was designed to provide the Government of Nepal with information on household vulnerability to shocks. The survey covers over 32 000 individuals from more than 6 200 households in non-metropolitan areas of Nepal. By tracking the same children through time together with a module on labour, the experts who created the survey provide an excellent resource for this report.

4.3.1.1.1. Child labour

For the purposes of this report, in Nepal, a child is a labourer if they are between 6 and 17 years of age inclusive and are reported to have worked in the past 12 months. According to this definition, between 7.0 percent and 9.4 percent of children worked across the three years. Figure 19 provides the incidence of child labour by gender using the three waves of data. The incidence of child labour was slightly higher for girls (ranging from 7.4 percent to 10.1 percent) than for boys (ranging from 6.4 percent to 8.7 percent). However, the difference is not statistically significant at the 5 percent level. The primary occupation of child labour is (non-waged) self-employment in agriculture (82.4 percent). An estimated 14.6 percent of children involved in child labour received a wage during the period.

Figure 27. **Percent of children that can be classified as children involved in child labour by age and gender**

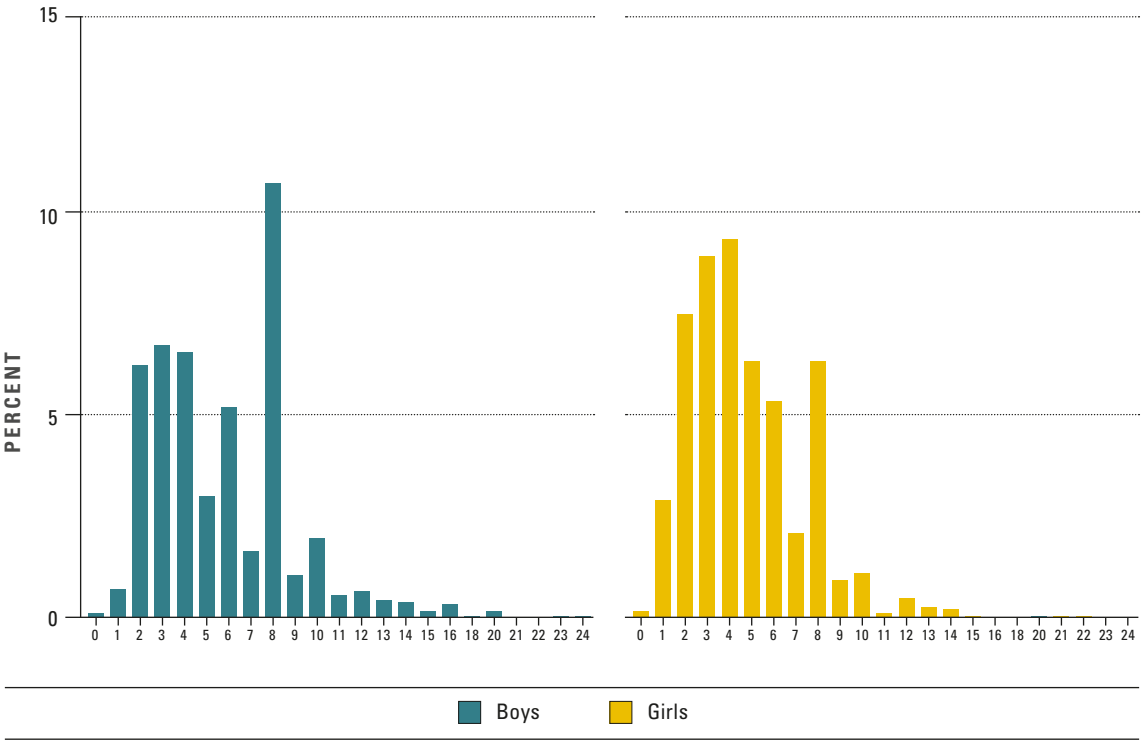


Notes: 95 percent confidence intervals. A child is a labourer if they are between 6 and 17 years of age inclusive and reported to have worked in the past 12 months.

Sources: ILO. 2021. Nepal child labour report 2021 (based on the data drawn from Nepal Labour Force Survey 2017/18). Geneva, International Labour Organization. www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-kathmandu/documents/publication/wcms_784225.pdf.

Figure 28 shows the distribution of work hours children involved in child labour undertake in a week in Nepal. There is a great deal of variation in the data. When children work, boys work for an average of 4.75 hours per week compared to 3.7 hours for girls.

Figure 28. **Percent of children involved in child labour by hours of work and gender in Nepal**



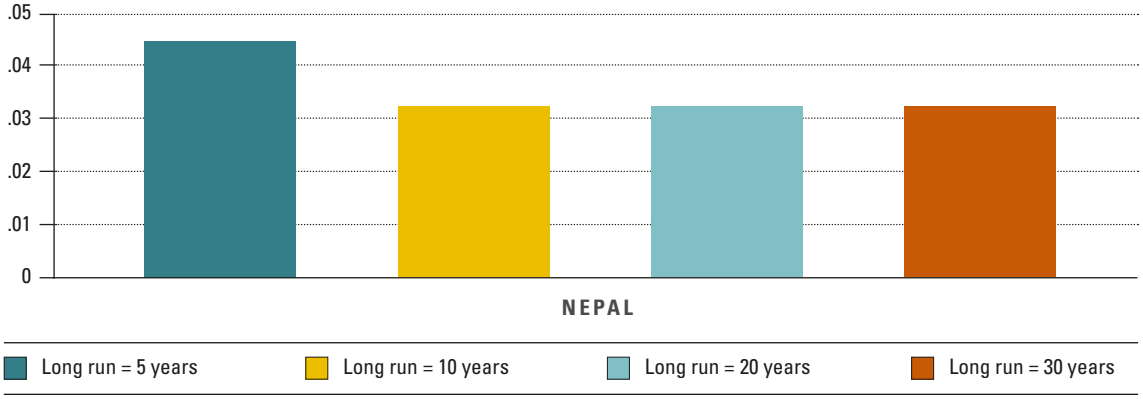
Notes: The figure shows the percent of children involved in child labour (y-axis) against the number of hours of work (x-axis) in a day. A child is a labourer if they are between 6 and 17 years of age inclusive and reported to have worked in the past 12 months.

Source: Calculations based on data from The World Bank. undated. Household risk and vulnerability survey, full panel 2016-2018. Washington, DC, World Bank, Development Data Group. https://microdata.worldbank.org/index.php/catalog/study/NPL_2016-2018_HRVS_v02_M.

4.3.1.1.2. Extreme climate events

We use weather data that is monthly precipitation data at the local level based on the ERA5 satellite reanalysis. Figures 18 and 27 show the average number of dry spells and heavy rains over a 12-month period using various long-run definitions. Figure 29 indicates that households experienced an average of 0.45 dry spells during the past 12 months when using deviations from a five-year trend. This falls to a little over 0.3 when judged against deviations from long trends. Figure 30 indicates that households experienced an average of more than 0.5 heavy rains with little variation in this incidence across the different time periods used for the calculation of long-term averages.

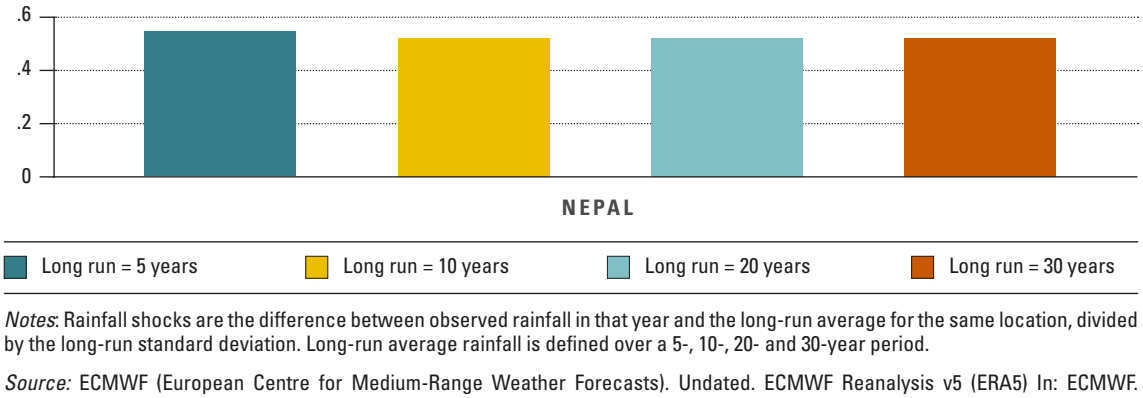
Figure 29. **Average number of dry spells over a 12-month period using various definitions of the long run**



Notes: Rainfall shocks are the difference between observed rainfall in that year and the long-run average for the same location, divided by the long-run standard deviation. Long-run average rainfall is defined over a 5-, 10-, 20- and 30-year period.

Source: ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

Figure 30. **Average number of heavy rains over a 12-month period using various definitions of the long run**



Notes: Rainfall shocks are the difference between observed rainfall in that year and the long-run average for the same location, divided by the long-run standard deviation. Long-run average rainfall is defined over a 5-, 10-, 20- and 30-year period.

Source: ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.3.1.2. Model

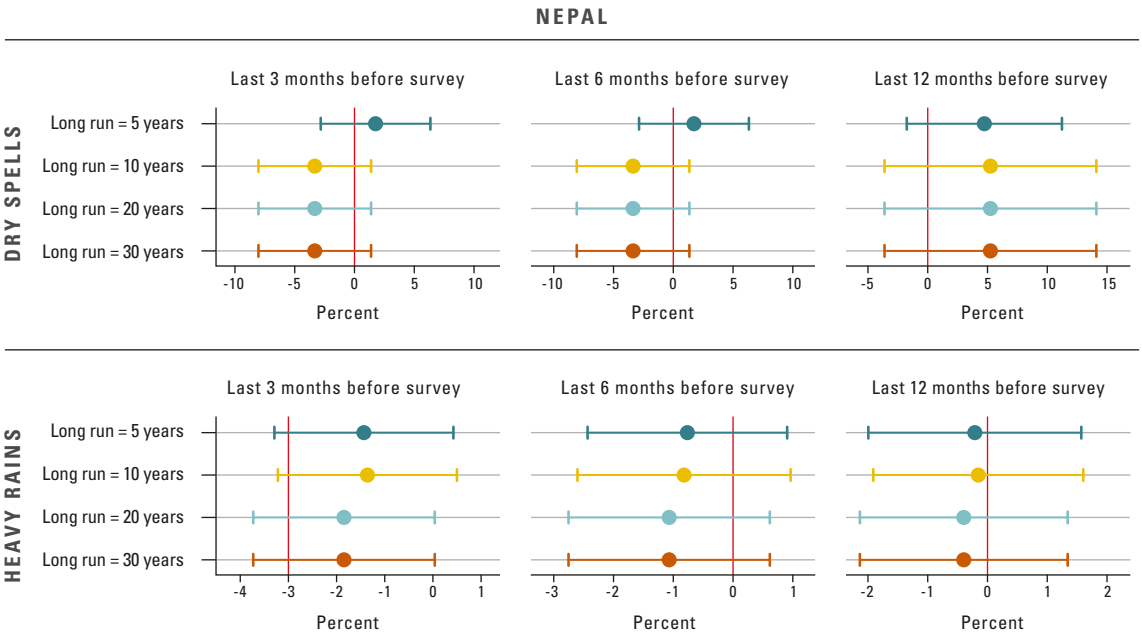
The control variables used in the case of Nepal included child age and gender, the distance to a primary school, distance to a secondary school, whether the household head had received an education, a wealth index and year fixed effects. The wealth index combined information on health conditions; housing materials; whether a household owns a mobile phone or television; and access to a kitchen, garden, safe water and sanitation, electricity and internet. The composite index is constructed using weights from principal components analysis. District-specific linear time trends are also included to capture omitted factors that may confound the relationship between child labour and shocks. Standard errors are clustered at the village level. The equation estimates are akin to Equation (1).

4.3.1.3. Results

Figure 31 presents the results for the climate-related events using the ERA5 satellite data. The top (and bottom) panel provides the relationship between child labour and dry spells (and heavy rains) defined over different periods. The left panels calculate shocks over three months relative to a long-run average, the middle panels over six months relative to a long-run average and the right panels over 12 months relative to a long-run average. The long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom). All associations are statistically insignificant.

- There is no evidence that climate-related events affect the number of hours worked by children on average.

Figure 31. **Incidence of child labour versus satellite data shocks**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the village level. A child is a labourer if they are between 6 and 17 years of age inclusive and reported to have worked in the past 12 months. The top (and bottom) panel shows the relationship between child labour and dry spells (and heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

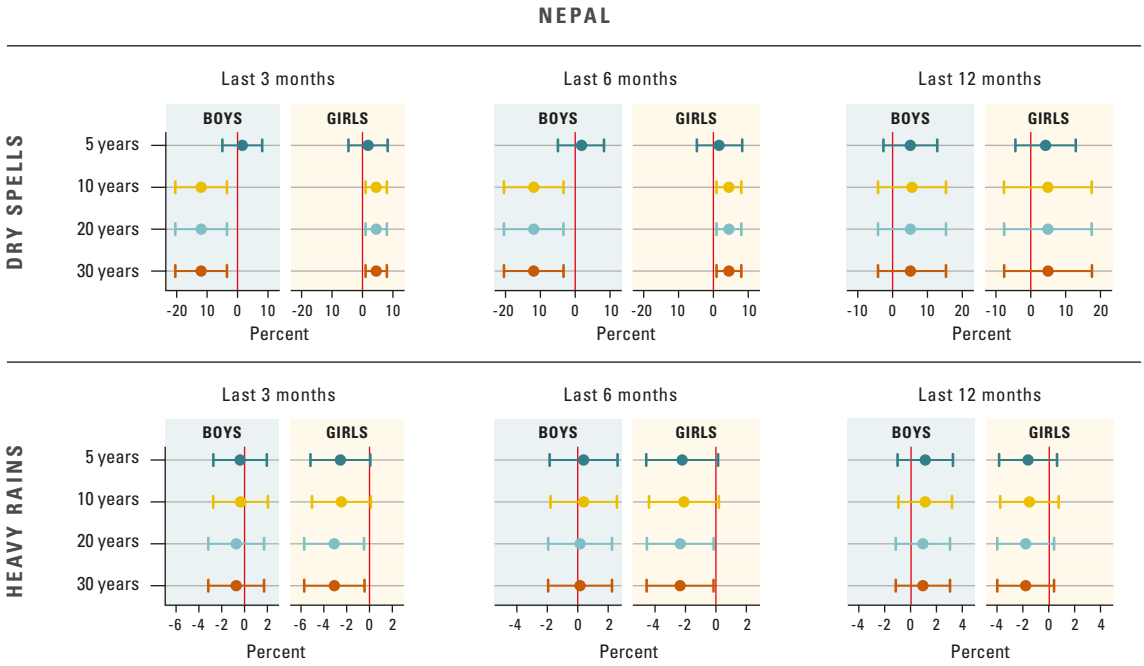
Sources: Calculations based on data from The World Bank. undated. Household risk and vulnerability survey, full panel 2016-2018. Washington, DC, World Bank, Development Data Group. https://microdata.worldbank.org/index.php/catalog/study/NPL_2016-2018_HRVS_v02_M.); and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5

Recognizing that the incidence and intensity of child labour in response to shock might differ for boys and girls, we also undertake analysis by child gender using the ERA5 satellite data with results presented in Figures 32 and 33. Findings suggest that there are important gendered effects of shocks in the case of Nepal. The top panel of Figure 32 suggests that while dry spells (occurring in the past three and six months) are associated with falls in the incidence of child labour for boys by about 10 percent, the incidence of labour for girls increases by around 5 percent (when using weather data from 10–30 years prior as historical norms). These findings suggest that households substitute child labour during periods of dry spell, with girls more likely to work but boys less so. Interestingly, results from the bottom panel of Figure 32 suggest that heavy rains have an opposite effect. Girls are 3–4 percent less likely to work in response to a heavy rain (occurring in the past three months and when using weather data from 20–30 years prior as historical norms).

- There is evidence that dry spells lead to an increase in the incidence of child labour for girls and a decrease in the incidence of child labour for boys.
- There is some evidence that heavy rains reduce the number of hours of child labour for girls.

While our data does not allow us to test the mechanisms behind these, we conjecture that they stem from a gendered division of child labour akin to the patterns hypothesized for Côte d'Ivoire.

Figure 32. **Incidence of child labour versus satellite data shocks by gender**



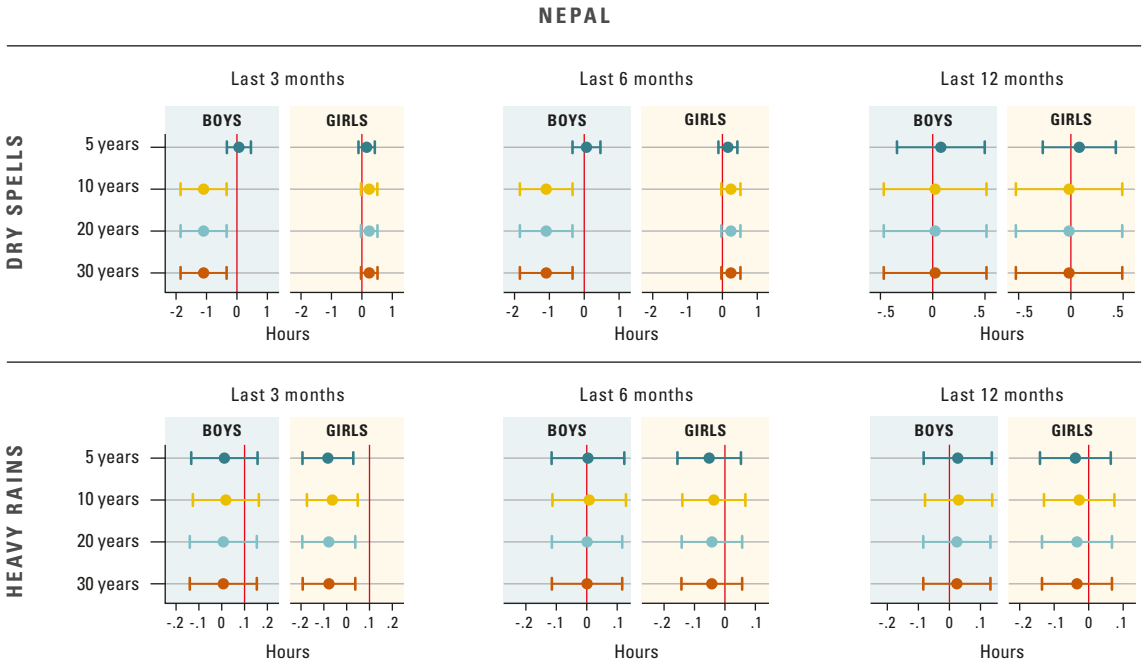
Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the village level. A child is a labourer if they are between 6 and 17 years of age inclusive and reported to have worked in the past 12 months. The top (and bottom) panel shows the relationship between child labour and dry spells (and heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from The World Bank. undated. Household risk and vulnerability survey, full panel 2016-2018. Washington, DC, World Bank, Development Data Group. https://microdata.worldbank.org/index.php/catalog/study/NPL_2016-2018_HRVS_v02_M.); and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5

Results using the number of hours of child labour by gender are presented in Figure 33. Findings from the top panel suggest that boys are associated with an approximately one hour per week reduction in labour in response to a dry spell when using a 10- to 30-year reference period for long-run averages. Girls have a positive association with the number of hours worked in response to a dry spell in the last three and six months, though the findings are not statistically significant. The same is true for response to heavy rains, presented in the bottom panel of Figure 33.

- There is evidence of a reduction in the number of hours worked by boys in response to a recent dry spell.

Figure 33. **Time working in child labour versus satellite data shocks by gender**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the village level. A child is a labourer if they are between 6 and 17 years of age inclusive and reported to have worked in the past 12 months. The top (and bottom) panel shows the relationship between child labour and dry spells (and heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using five years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on data from The World Bank. undated. Household risk and vulnerability survey, full panel 2016-2018. Washington, DC, World Bank, Development Data Group. https://microdata.worldbank.org/index.php/catalog/study/NPL_2016-2018_HRVS_v02_M.; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5

Nepal's Household Risk and Vulnerability Survey also provides information on whether households received public assistance during the past 12 months. We test whether this form of social protection reduces the effect of shocks on child labour with regressions that interact the receipt of government assistance and the shocks we previously found to be statistically significant – dry spells defined as the six months prior to the survey relative to a 10-year or more average period. The coefficient on the interaction variable in this model could not be estimated due to collinearity.

4.3.2. Qualitative analysis

Four experts were interviewed separately for Nepal: two senior officials from the Department of Agriculture and Livestock, an independent consultant specialized in agriculture economics and a senior executive from the National Bureau of Statistics of Nepal.

4.3.2.1. Environment and modes of production

One interviewee mentioned that between 60 percent and 70 percent of Nepalese households rely on agriculture for their livelihoods, with about 50 percent of agricultural households owning very small parcels of land. Despite the high proportion of the population engaged in agriculture, climate change and changing population patterns have increased the concern for food security:

> So farming is done by a large number of smallholder farmers. They hardly grow food enough for a year. And most of the farmers grow food for six to eight months ... very few small farmers can grow food for a full year. There is an impact on productivity, with yields going up or down depending on the availability of rain and the increasing temperatures (Independent consultant, male).

Outmigration to urban centres and India was mentioned by interviewees as an issue of concern that may drive food scarcity. As a result, in some areas the agricultural population is increasingly comprised of the elderly, women and children:

> Many people are migrating seasonally ... particularly in the mountains due to scarcity of water. ... For the farmers in the upper regions sometimes there is no drinking water. There is a scarcity of water causing migration (Senior executive, Bureau of Statistics of Nepal, male).

> There are less youth and men in the communities. So mostly, rural areas have aging people, and children, women ... [Agriculture] has been disrupted due to the outmigration. There are a lot of hazards, uncertainties in Nepalese agriculture (Independent consultant, male).

Interviewees highlighted that Nepal is a country whose population heavily relies on subsistence agriculture using family or community labour, with very little capacity for producing surplus and poor access to markets.

Climate change is causing pressing challenges for Nepalese farmers, with increasing loss of productivity. Migration was mentioned by all interviewees as an increasing survival strategy that at the same time leaves diminished labour capacity in the landholdings left behind. The structure of landholdings itself is an issue on its own, with two interviewees highlighting that families' holdings are not only very small but also scattered, in the mountain areas and away from farmers' dwellings.

4.3.2.2. Child labour in Nepal: characteristics, incidence and cultural factors

All interviewees mentioned that, given the country's high reliance on agriculture and subsistence farming and limited technification of agricultural production, family labour is necessary for the survival of small farming units. Children have traditionally been involved in many productive tasks, and interviewees referred to this as a common and non-concerning characteristic of the agricultural landscape in Nepal:

> Most of child labour is for supporting the family … like the raising animals, water collection for family, firewood collection, grazing animals, food preparation … They come from subsistence, poor farming families. That is what I find in my observations, when I go to field (Agricultural economist, Ministry of Agriculture and Livestock, male).

> Nepalese children work mostly as unpaid family labour in light activities, for example, in the kitchen garden; they do watering … they also help the family in transplanting … When the rice seedlings are uprooted from the nursery, children do the cleaning of the rice seedlings … [and] distribute the cleaned rice seedlings to the transplanters in the field … specially girls … the children also help families give fodder to the livestock, cows, buffalo and put horses in the shed, when their parents [are] away from the house (Independent consultant, male).

Children's economic roles in agricultural households are, therefore, culturally expected and accepted, with two interviewees mentioning they were themselves involved in these tasks as children:

> Culturally, we do not feel that if our children work for the family, we are exploiting our children … because they are supporting the family. … They need to support the grandfather, the grandmother, or they need to support their younger brother, or sister. After the age of 10 or 12 years they support the family. I also come from a farm family. In our system school starts at 10:00 o'clock and finishes at 4 o'clock and my school was almost half an hour walking distance. I had to leave at 9:30, and before 9:30 I used to work for the family, planting, planting grass and weeding grass, manuring the grass and caring for the animals. And after coming from school, I used to work for the family too (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

> I come from a very remote rural area. And when we harvested corn, all the children in the family gathered together in a circle and started shelling corn and taking out grain from the cob by hand. Even myself, with my brother and sister, we used to do that … So it was very hard work (Independent consultant, male).

These child activities were not considered as child labour by two interviewees. They saw these as occurring within a family setting and culturally expected.

The interviewees had a generally good understanding of child labour. One interviewee mentioned that 1.1 million out of seven million are engaged in work, with girls dominating in agricultural and domestic tasks and boys in all other activities, mostly those in urban centres:

> [Child labour figures in the 2018–19 report] show a decline compared to the 2008 survey. The report says there is almost 20 percent of child labour in rural areas and almost 12 percent in urban areas; 87 percent of child labour is in agriculture. The main factor that diminishes child labour is sibling number (Agricultural economist, Ministry of Agriculture and Livestock, male).

> Some are engaged in the hazardous work, around 3 percent, and they are basically based in the urban areas ... In female-headed households, there is more child labour, and low education status [of parents] [predicts] a high chance of child labour. If it is subsistence agriculture, there are high chances of being involved in child labour; if it is in the commercial sector, there is less child labour (Senior executive, Bureau of Statistics of Nepal, male).

> [To me] child labour means paid labour. So there are few children employed as [sic] child labour. They are also paid less. About one quarter of the cost of a male, even of women labour [sic], and if a male gets 100 rupees, a child will get only 20 (Independent consultant, male).

Poverty was mentioned as the key driving factor for children to engage in work. However, in Nepal, structural poverty is not just related to economic disadvantage but also to caste. One interviewee mentioned how caste is a predictor for child labour:

> All the children in labour situation[s] are essentially from poor households. Poverty itself is the manifestation of their caste discrimination; [some castes] are traditionally very poor. They are denied access to opportunities and productive resources (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

Given the social and geographical complexity of Nepal, this same interviewee said there is a need to be precise when considering links between child labour and climate-related events, as there are various factors that lead to children's work in the country:

> Why are they becoming poor? Which portion [of the poor] are coming from the climate-related disaster that creates poverty? Or is it chronic poverty that is due to the severe exclusion of caste (Senior agricultural economist, Ministry of Agriculture and Livestock, male)?

Interviewees argued that hazardous child labour is not prevalent in Nepal. Given that most child labour occurs within the family setting, children are likely to be engaged in activities that their parents assign to them, mostly around cultivation, but also fetching water, gathering firewood and looking after animals. Two interviewees mentioned the use of pesticides is not widespread in Nepal and that only a small proportion of illiterate farmers did not understand the dangers of pesticides to children. Other hazardous activities mentioned were animal handling or falls from high areas.

Illiteracy, or lack of education (for farmers but also for children), was mentioned by two interviewees:

> [Some children] don't go to school because there is no school at all in the rural areas, in the remote areas. Schools can be in other communities that are really very far. They have to travel through the forest, adapt to that. There are no bridges … They have to walk across the rivers and streams on foot. There are so many, so many risks. You know, first, if these schools are located in the immediate area. In that way, they get confined to the house, and that's why they help with the parents (Independent consultant, male).

But, for those who can access school, combining education with work seems to be a common pattern:

> Even children who are attending a school are working. They attend the school at the daytime and then in the early morning and evening they work. That's interesting because they are not fully child labourers but are assisting school (Senior executive, Bureau of Statistics of Nepal, male).

The number of siblings in a household was also mentioned as a factor that may deter children from attending school, as older children are tasked with caring for infants while their parents go to work:

> [Many children] below 15 years, they still stay at home instead of going to school because they have to look after those infants and other small children at home (Senior consultant, male).

Interviewees mentioned that Nepal does have strong policies on child protection and children's rights to free education and healthcare. However, both recent decentralization processes and a lack of sensitization campaigns about the rights of children have meant that policy implementation has been limited:

> If we are talking about child labour we have to sensitize [the population] to protect them and then fulfil the fundamental rights of the children, because the Constitution is noble and talks about this. But at the national level, … implementation is poor due to limited capacity (Agricultural economist, Ministry of Agriculture and Livestock, male).

> There are many regulations which govern protecting the children from child labour. But ... there are issues with the implementation. We have very good policies in our Constitution. We have the Ministry of Labour, which also looks after child labour; we have the Ministry of Women and Children, which deals with the different types of issues between the ministry and the provincial governments; we do what we can but the implementation is difficult (Senior executive, Bureau of Statistics of Nepal, male).

Data collected from interviewees suggest that many children in Nepal (about 20 percent) are engaged in work, but the majority of this work is undertaken within family settings and is culturally accepted and expected as part of subsistence agrarian households. The fact that most agricultural activities in Nepal occur in very small landholdings with no mechanization, and are tied to subsistence with no surplus produce, means that human labour is critical for the survival of agrarian households. Weak monitoring or implementation of policies around children's right to education added to the inaccessibility of schools in remote areas seem to contribute to making child labour available in agricultural settings.

4.3.2.3. Climate-related events and their effects on agricultural livelihoods

All interviewees agreed that climate change is severely affecting Nepal, with climate-related events becoming more frequent and destructive. Besides droughts and floods, which were prominent for other countries in the study, wildfires, landslides and hailstorms were mentioned as having devastating effects for farmers.

Given Nepal's diverse terrain, interviewees highlighted how climate-related events are affecting different areas of Nepal in different ways. While the higher regions are very prone to landslides, the lower lands are prone to floods in the summer and drought in the winter:

> Nepal is very prone to climate change ... we have seen many, many changes during the past years. The pattern of rainfall has been changing, and the temperature has been increasing in some areas. We have seen also the floods increasing and droughts also (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

> Storms are also common on the hills ... and are affecting the agriculture, but [their effect] varies from crop to crop. For example, storms may not affect wheat much but even the smallest one will affect other crops. That's why these climate-related events differ from area to area. ... in some places, the floods may occur. In some places, drought may occur, in another place, there may be a fire. In another place, there may be lightning. And [the effect] is quite diverse already (Agricultural economist, Ministry of Agriculture and Livestock, male).

> Most of the most cultivated lands are in the hills, and mountains [which] are very much under pressure … When the mountain is degraded, the arable land is also degraded due to climate change, limiting the absorption capacity of the land. So, whenever the rain comes, it causes floods and landslides … Water sources are also degrading very fast (Independent consultant, male).

There was agreement that extreme climate events are increasingly leading to loss of lives and property and severely affecting agriculture and land productivity:

> Nepal is mostly an agriculturally-based country. If the climate-related events, like rainfall patterns and the number of floods increase, then automatically the impact goes to farmers. We have seen so many events impacting the farmers' livelihoods and incomes, their financial situations (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

> Most people don't have enough food to eat at those particular periods … Sometimes there is scarcity of food [due to] the low productivity of crops in the mountains and hills. If there is a drought, there is almost no production, … then the productivity goes drastically down. And then in that case, everything is affected (Senior executive, Bureau of Statistics of Nepal, male).

4.3.2.4. Discussion of the quantitative findings

The effects of climate-related events on children's work in agricultural settings was unsurprising for all interviewees. Given the drastic consequences that climate-related events can have for small farming units, children, as productive members of households, are expected to assist:

> During a climate-related extreme there is more child labour because they [children] need to support the family. In subsistence, poor farm families, [children] will work most of the day; they walk [for] water collection, grazing animals and food preparation, and firewood collection (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

> During these pressing times, especially when there is no rain, children are engaged in collecting water from springs, which are mostly located away from their own community … Climate-related events like droughts, floods, pests and diseases reduce the quality and quantity of production, and this definitely takes tremendous financial stress on households because they were not able to grow enough produce for the year. So they [farmers] go for non-farm activities, and children have to stay at home because parents are taking part in other activities. And then their work for their parents, their child labour is higher, yes, and it increases for the children … It might increase their working hours in household activities because the parents will have to go for work on [other] activities to supplement food production, reduced due to climate-related events (Independent consultant, male).

> When they [farmers] face food an insecurity situation in their home, they [may] send their grown-up child to the landlords for domestic work. This is a very common practice and in some cases, they [farmers] send their children to the cities, even Kathmandu for that, expecting that they may get the opportunity to continue their education … in the morning and evening they work for household jobs, and then in the daytime, some benevolent landlords [allow them to attend] school also … But even when children don't go to work at someone else's house, they need to make a living as well. They work in child labour in their house as well because they have to look after livestock, gathering food from the forest so. [This] costs them their education because they are failing to go to school by doing those jobs (Agricultural economist, Ministry of Agriculture and Livestock, male).

> [In Nepal] droughts, are a slow onset disaster, but cover a large part of the area. Floods are high in intensity but often have less land coverage. When the households are affected by these climate-related events, the productivity of their crops is reduced … most of the farmers are subsistence farmers and they don't get much savings and then there is no production and they will be insecure. … Households can bring out their children [sic] from school and can send them to work on development work, or other infrastructure projects that are being built everywhere (Senior executive, Bureau of Statistics of Nepal, male).

One interviewee warned against making direct links between climate-related events and increased child labour without considering other factors that also affect child labour and discriminating climate-related events per region:

> As a poor country, we do not have a strong response mechanism when disasters occur, and people immediately become poor. And then when the household becomes poor, the first sufferers are the children. They have to earn something so that they can support their family somehow, or even to survive themselves. So there is a direct connection, but how much of the poor population is coming from climate-induced disaster, if we disaggregate [the data]? … Ethnicity, religious minority groups [such as] Muslims … are also becoming poorer, and those households are forced to make their own children [engage in] child labour (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

Migration for adult males seems to be a common outcome. In cases of property destruction, resettlement was mentioned by experts as a common outcome of devastating climate-related events:

> In some areas there is a need for resettlement for families, of relief from the disaster zone … we have seen there are so many landslides in the rainy season. … We have seen whole villages that have collapsed. So for many families … we have to plan for the resettlement for those families (Agricultural economist, Ministry of Agriculture and Livestock, male).

> The [farming] families use mainly their family labour, and they have limited choice when there is a climate-related event. They cannot borrow money from the banks (Independent consultant, male).

> [Due to climate-related events] … a lot of households every year are displaced from their original fields. We do not have a very strong response mechanism … so that people are just managing themselves, displaced from one place and then they find another place, which can also be vulnerable to the climate … So recurring floods and landslides, droughts … Drought[s] [that] force smallholder farmers to find alternative jobs in nearby cities are mostly in India. They move to India to find seasonal works because they cannot sustain it [farming] due to droughts. And there is no provision for irrigation for them. They cannot plant, and they cannot grow crops, so they move to India. And then they get into a really, really terrible situation in India (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

4.3.2.5. Community and government-led strategies to mitigate climate-related events

Experts noted that in some areas, farmers develop water-saving strategies to mitigate the effect of droughts. However, displacement and seasonal migration seem to be the most prevalent coping strategies for farmers affected by climate-related events:

> I have seen the families trying to mitigate the climate-change impacts. In the flood-prone areas ... they are preparing the flood barriers in the river's banksides, which could help to prevent floods. And in small lands [there is] microirrigation using plastic ... In some areas, water is getting limited ... farmers are preparing plastic ponds, and they collect rainwater during the rainfall season, and they use that water during the dry season ... They started to [experiment] with cropping patterns: If there is frequent drought, they start planting crops that do not need much water ... And sometimes they change the varieties of rice ... that can be grown in other conditions. And in some areas, they started to plant drought-tolerant varieties of food (Agricultural economist, Ministry of Agriculture and Livestock, male).

> Temporary migration is quite common. [They will] go to India, ... earn some money. Even sometimes they bring back the seed, improved seed, or seedlings sometimes. And then in that way it improves their livelihoods because if they can bring improved seeds then they can grow more per hectare. But not all farmers are that clever, [and] only the ones who are educated will know about the importance of these seeds. They bring those over here (Senior executive, Bureau of Statistics of Nepal, male).

> They also borrow [money] from friends, relatives. If they cannot find [money], or if they don't get money from relatives and friends, they go for a local money lender (Independent consultant, male).

> [When] they suffer from the drought-related issues, they cannot grow their crops in their land, and they start to move for seasonal wage work opportunities in nearby towns ... In the east of the country, almost all poor households move to India for the seasonal labour works. They go for apple picking or something like that (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

> [Some] people ... are so poor that there is no way to find shelter. They move to the riverbank and they engage in sand-mining in the river basins (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

One interviewee mentioned that there exists traditional community knowledge for developing efficient irrigation systems to guarantee provision of water during droughts. However, these systems are difficult to maintain due to the lack of a stable working-age population throughout the year due to migration:

> Farmers use water-saving technology such as drip and sprinkle irrigation, especially for the vegetables. They also, historically, have managed irrigation systems. Communities have developed such systems for centuries now but youth and males are migrating out of rural areas, away from their farm communities, so fewer farming irrigations systems are being developed. That's why they are requesting the government, or other non-government partners, to help them develop these irrigation systems (Independent consultant, male).

Experts mentioned a series of incipient government-led strategies that could eventually lead to more strategic mitigation solutions. These include mobilizing community groups, providing training to farmers, irrigation and technification of agriculture, assisting with access to markets and better weather forecasting systems. National and local climate adaptation plans were mentioned by all interviewees but, again, well-developed programmes and policies do not seem to offer viable ways for implementation:

> NAPA (National Adaptation Plan), LAPA (Local Adaptation Plan), vulnerability assessments, everyone talks about these things in the rural areas. Development agencies carry out vulnerability assessments and disaster risk strategies, but implementation is the problem. There are also some community organizations, the Farmer's group and the women farmers' group. They are quite active, and they have been initiated by the government (Senior executive, Bureau of Statistics of Nepal, male).

> We also train farmers for [coping with] climate change, what the impact would be and how we can work with these changes. We organize training programmes, and they know about climate change and the how they can start some smart agriculture farming. Some started planning drought-tolerant varieties … and we support for them like this. And more importantly, we do support agriculture insurance and we subsidize 75 percent of the premium … In Nepal insurance is getting better, especially for livestock farming. They [farmers] are getting very interested (Agricultural economist, Ministry of Agriculture and Livestock, male).

Several future-oriented and more strategic initiatives were also mentioned by interviewees as possible solutions to prevent rather than mitigate the damage of climate-related events:

> [The government] could implement an insurance programme in the more climate change-prone areas. The government could store the grain, and it could be distributed to the community at a low price to support them during crises (Agricultural economist, Ministry of Agriculture and Livestock, male).

> We have to support income-generation programmes. Cooperatives could be good; we could mobilize cooperatives for mitigating climate-change impacts. If cooperatives could work efficiently, they could provide information and set a good price [for crops], and they could buy the products produced by the farmer at a good price. I have not seen cooperatives being much involved in Nepal yet (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

Loan programmes to incentivize production, surplus and connection to markets were mentioned as incipient and promising measures that are being implemented in some regions. However, the reach of these initiatives is limited and remote areas are not being covered by such programmes:

> We have "soft loan" programmes, and we subsidize agricultural loans with a 5 percent subsidy for the bank's interest. But the coverage of this programme is low. We also have a market support programme ... constructing markets and collection centres in local areas ... And we have 11 major markets in major cities, built by the government. [Farmers] can also get their stock at a low price because the market is owned by the government. They are not profit-oriented markets; they are just to support the consumer and... the farmer. We have a plan [to build] another 25 markets and many collection centres ... It will be completed in four years. We have programmes like this, but the coverage is low (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

In terms of addressing the massive seasonal migration, one interviewee mentioned that government infrastructure job programmes could deter men and youth from leaving their regions. In terms of assisting with land productivity and resilience, experts mentioned the promotion of crop varieties more resistant to weather shocks, which many farmers seem to already be doing, as mentioned previously. Other measures such as providing meshes to protect crops from hailstorms were also mentioned, as well as the obvious need to introduce mechanization in farming so that human labour can be reduced:

> And we can also promote appropriate labour savings and costs so that the human labour and animal labour used in agriculture (that also includes child labour) can be reduced tremendously (Independent consultant, male).

Finally, faced with the question of whether weather forecasting for farmers would help them implement mitigation measures, experts commented that this would be ideal as long as it is long-term (rather than short-term forecasting, which farmers already access) and reliable:

> Reliable weather forecasting … we don't have that in Nepal. But our meteorological division gives some information like very broad information, for example, the potential to have very heavy rain in a particular location. Those announcements are every day on the radio or television. But we don't have very precise radar, or a weather forecast system in Nepal. [Forecasts] do not deliver localized information. Early warning systems [such as] whether the floods are starting somewhere [such as] the east side of the river, people are benefitting from that type of system directly, but not from the forecasts. Forecasts are very generic (Senior agricultural economist, Ministry of Agriculture and Livestock, male).

> Long-term forecasting is limited. [We have] short-term forecasting like three days or seven days; it's quite popular. And now the reality is of quite high days, three days forecasting. People can use their smart apps that can give you information on the rainfall, but long-term forecasting is still an issue. The Department of Meteorology has recently utilized a very good … weather forecasting system through the assistance from the World Bank, from the beginning of this year. They already forecasted [this year] we can expect more floods and landslides. A lot of bridges have been already swept away by the floods, and even the drinking water systems and irrigation systems have also been swept away. At least the information they have given to us is very good. It's realistic; at least it's becoming real (Senior executive, Bureau of Statistics of Nepal, male).

The peculiarities of the farming population in Nepal pose challenges for these forecasts being accessible to everyone who needs them. One interviewee mentioned that since not all farmers have access to mobile phones and many are illiterate, suitable ways of communication should be considered for successful reception of information. Radio broadcasts, for example, would work better than mobile phones in remote areas:

> Text messages [are] not very helpful for the uneducated farmer. We have to train farmers on how they can get the local frequency modulation (FM). If the information is broadcasted from the local FM, they can listen [and] prepare accordingly. I think it could be the best source of information (Senior agricultural economist, Department of Agriculture and Livestock, male).

For any of these initiatives, the role and continuous support of the government was mentioned as key. Having such a poor and technology-deprived population means long-term plans that include different sectors of government are needed:

> For example, preparing an irrigation canal: that's beyond the capacity of the household and it has to be built either by the local government and the federal government or by some donors. The same applies for mechanization, irrigation canals and access to markets. And that's why people are more focused on coping rather than mitigation (Senior executive, Bureau of Statistics of Nepal, male).

A combination of strategic initiatives such as the ones listed in this section would assist farmers with more predictable livelihoods and increased productivity. Connecting them to insurance, credit and markets would also significantly increase their standard of living and help release their children from some agricultural work. This, together with generating awareness about the potentialities offered by education and making schools more accessible, could help their children break the cycle of poverty:

> Free child education is going to help diminish using children as family labour ... And the government or some other agencies can support rural communities in remote areas establishing and operating schools ... Even in my community, in my rural area in far west Nepal, we had the school, but some families were not sending children to school because they don't have money to buy books ... we [could] have free education, including books ... There are now these school feeding programmes so that parents are sure that their children are eating even though they are not at home ... [And there could be] some cash incentive to send children to school so that farmers are sending their children to school (Independent consultant, male).

Interestingly, this same interviewee commented on the role that child care centres in rural areas could play in terms of relieving older siblings from childminding and allowing them to attend school:

> So if we can establish day care centres in rural communities, I know then they [older siblings] will be happy, too happy to take the children out of the house so that others can take care of the children. So we could start from the establishment of day care centres (Independent consultant).

4.3.2.6. Other important issues for consideration

Nepal offers a very complex scenario in terms of how climate-related events may be affecting agrarian households. A salient aspect of the information analysed was the picture of a farming population that is extremely vulnerable to climate-related events, not only because of the severity of these events but also because of the vulnerability of the Nepalese farming population in terms of minimal landholdings, lack of surplus, limited education, limited access to technology and poor access to government support.

Seasonal migration was presented as a widespread phenomenon – a coping strategy when climate-related events occur but one that puts even more pressure on the families left behind.

An aspect to bear in mind in terms of policy development is the emphasis experts placed on the difficulties related to implementing policies:

> And the government has many policies. You know that in Nepal we have many policies, water policies, climate-change policies, agricultural policies and child protection policies. We have many strategies and policies, but the main issue is that investment is very low and implementation is quite weak (Senior executive, Bureau of Statistics of Nepal, male).

There was a suggestion that besides more investment, a more efficient decentralization of government and empowerment of local authorities would be a good place to start:

> In my opinion, we need to place major trust in the capacity of local bodies, [allow them] to plan according to their contextual needs first ... They are very sensitive to the risks, [but] we don't have that type of sensitivity in our development interventions. We are very responsive after disasters but not in the anticipation [of disasters]. So we need to make that happen (Senior executive, Bureau of Statistics of Nepal, male).

4.4. Peru

4.4.1. Quantitative analysis

4.4.1.1. Data

Our Peruvian data also comes from Young Lives.[18] The most recent poverty map of the 1 818 districts in Peru was used to select 20 sentinel sites. Factors such as infant mortality, housing, schooling, road networks and access to services determined the ranking of districts. To achieve the aim of oversampling poor areas, the team discarded the highest ranking 5 percent of districts, enabling a systematic selection of the remaining districts, which were subsequently divided into equal population groups. These units were ordered by a poverty index and were systematically sampled with randomization of the starting place. The team ensured that the sampling cover rural, urban, peri-urban, coastal, mountain and Amazon areas. Once the districts were chosen, a random population centre (i.e. a village or hamlet) was chosen within the district. In each district, approximately 100 adults and 25–50 children were enrolled for the Younger and Older Cohorts respectively. The project team included a total of 2 751 children. After dropping non-responders, our final sample of usable data from Peru comprises 2 500 observations from 758 children.

4.4.1.1.1. Child labour

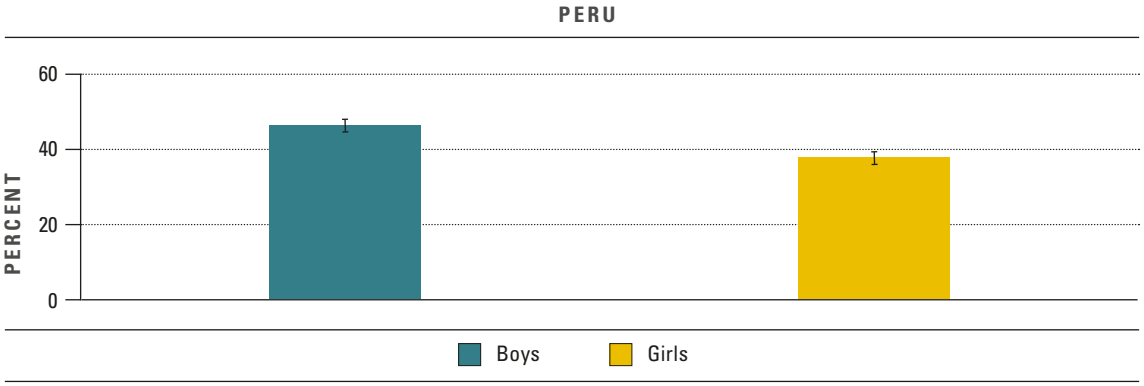
We measure and classify child labour in a similar fashion to the Ethiopian case study. Overall, 41 percent of children in the Peruvian sample can be classified as children involved in child labour. The data also reveal gendered differences:

In Peru, 46 percent of boys and 38 percent of girls are children involved in child labour.

Approximately 92 percent of children involved in child labour in Peru work in non-remunerated activities. Figure 34 summarizes data on the proportion of children that can be classified as children involved in child labour by gender. Figure 35 decomposes those data by hours of work. The data reveal that when children work, they work for an average of two hours in a two-week period.

[18] For more information see https://www.younglives.org.uk/content/peru.

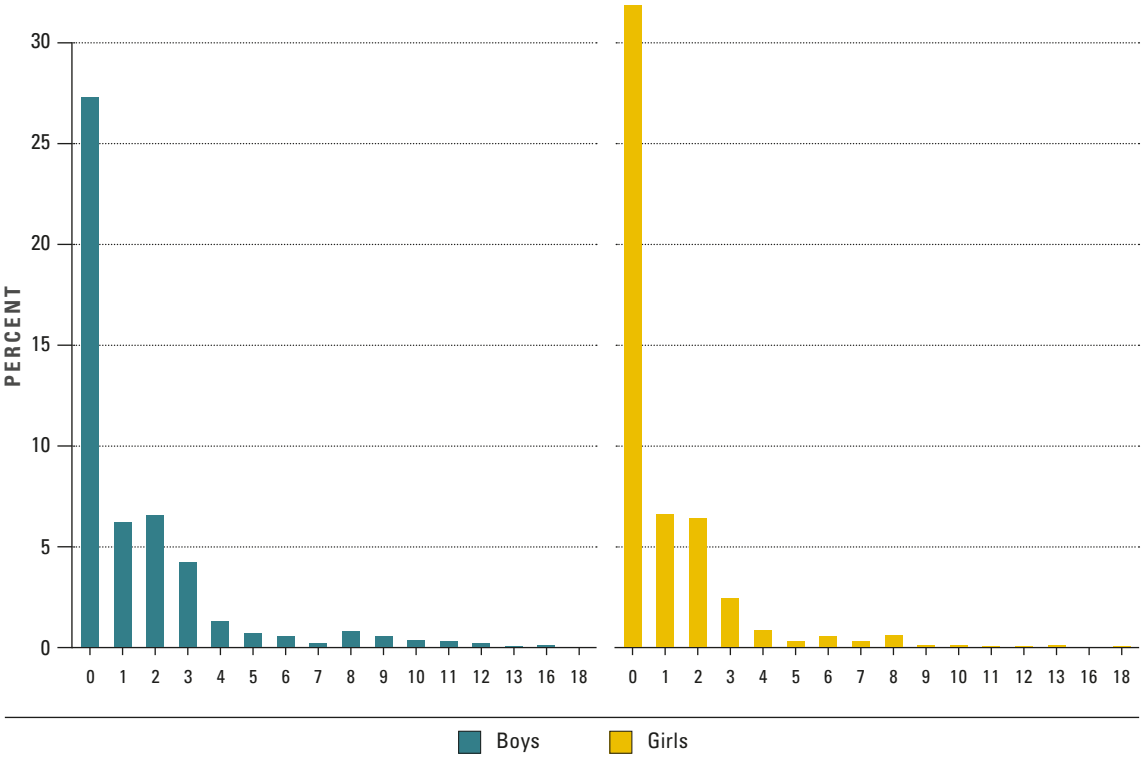
Figure 34. **Percent of children that can be classified as children involved in child labour by gender and cohort in Peru**



Notes: 95 percent confidence intervals. A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. Figures are estimated using data from surveys held in 2006, 2009, 2013 and 2016.

Source: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford. Young Lives data.

Figure 35. **Percent of children that can be classified as children involved in child labour by hours of work and gender**



Notes: The figure shows the percent of children involved in child labour (vertical axis) against the number of hours of work (horizontal axis). A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. Figures are estimated using data from surveys held in 2006, 2009, 2013 and 2016.

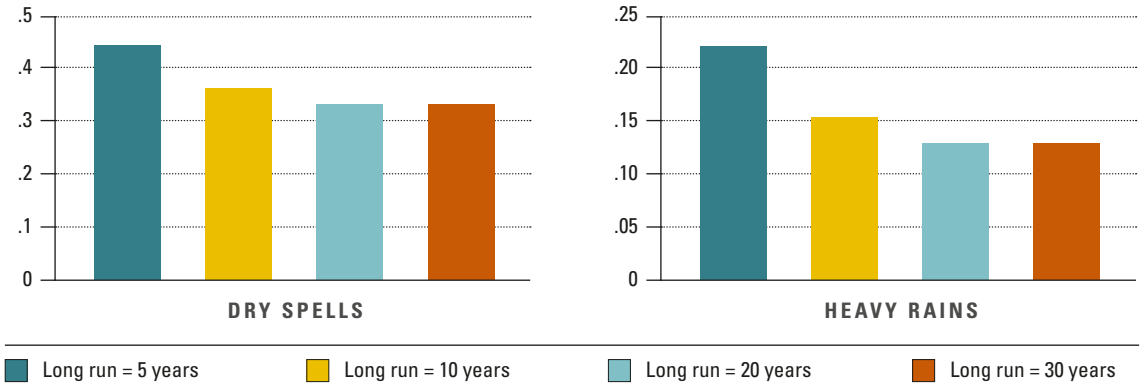
Source: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford.

©FAO/Aurelie Duray

4.4.1.1.2. Extreme weather/climate-related events

Figure 36 show the average number of dry spells and heavy rains over a 12-months period using various long-run definitions for Peru.

Figure 36. **Average number of heavy rains and dry spells over a 12-month period using various definitions of the long run, Peru**



Notes: Rainfall shocks are the difference between observed rainfall in that year and the long-run average for the same location, divided by the long-run standard deviation. Long-run average rainfall is defined over a 5-, 10-, 20- and 30-year period.

Source: ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

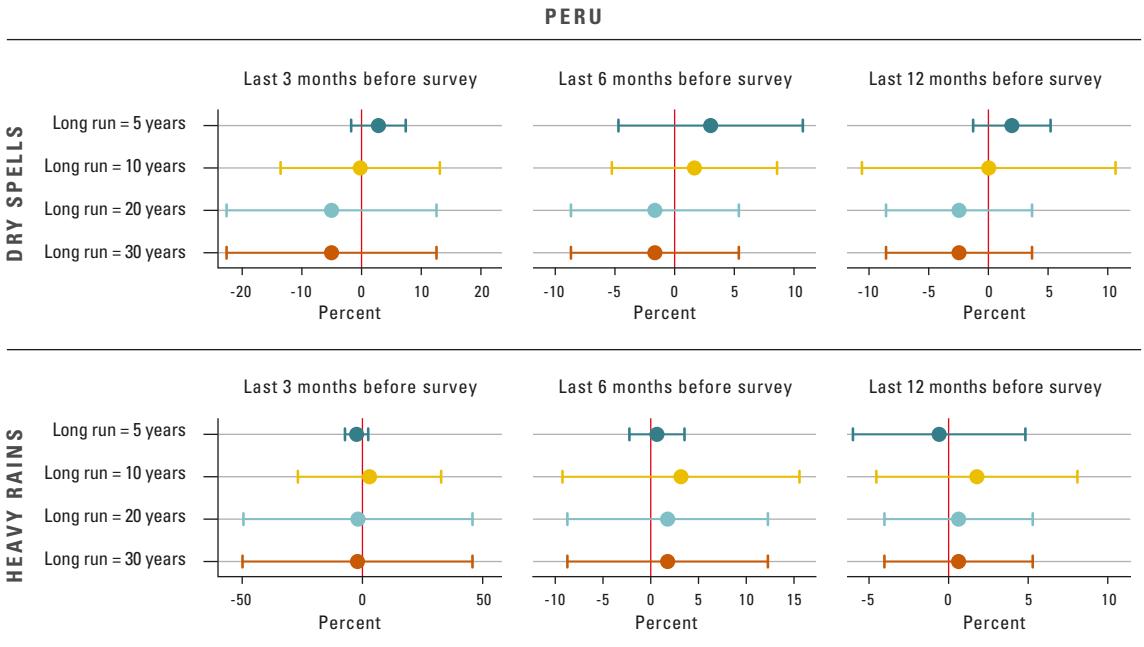
4.4.1.2. Results

Figures 37 has two panels. The top (and bottom) panels show the relationship between child labour and dry spells (and heavy rains) defined over different periods. The left panels calculate shocks over three months relative to a long-run average, the middle panels over six months relative to a long-run average and the right panels over 12 months relative to a long-run average. The long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom). The analysis again reveals statistically insignificant relationships.

We also estimated models that resemble those summarized in Figure 29 but replace the child labour dummy variable with the number of hours children work. Those models again find no overall relationship between dry spell and heavy rains and the amount of time that children work in Peru.

We again undertake analysis by child gender using the ERA5 satellite data. However, we uncover no evidence of a statistically significant association using either the incidence of child labour or time doing child labour as dependent variables.

Figure 37. **Incidence of child labour versus satellite data shocks in Peru**



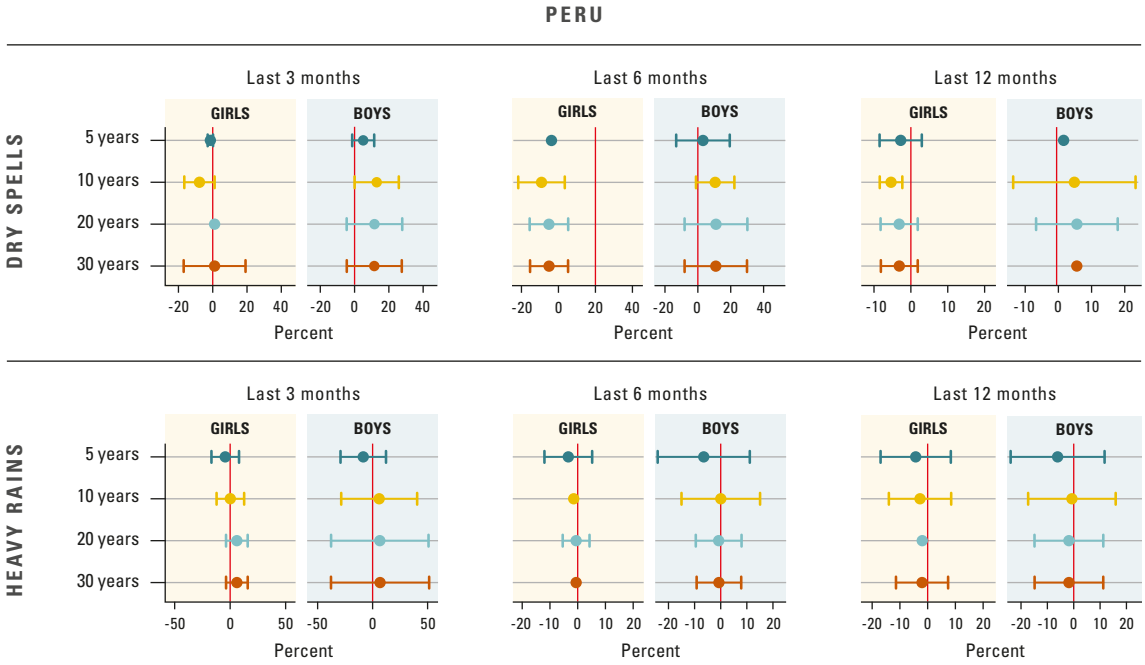
Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the department level. A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. The top (and bottom) panel shows the relationship between child labour and dry spells (and heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.4.1.2.1. Household chores and climate-related events in Peru

Chores are ubiquitous in our Peruvian sample, with approximately 86 percent of children undertaking them. We again re-estimate versions of Equation (1) substituting child labour for chores. The latter variable is measured with a dummy variable equal to one if over the last two weeks the child undertook chores for at least one hour. We present results broken down by child gender for Peru in Figure 38 using the objective shock measures, respectively. We show that shocks are overall not likely to influence the incidence of children undertaking household chores, with the exception of dry spell in the last twelve months (using the ten-year average) for girls.

Figure 38. **Incidence of chores versus satellite data shocks by gender in Peru**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the regional level. The variable chores is measured as a dummy variable equal to one if over the last two weeks the child undertook chores for at least one hour. The top (and bottom) panel shows the relationship between chores and dry spells (and heavy rains). The left, middle and right panels calculate shocks over 3, 6 and 12 months, respectively. Long-run averages are estimated using 5 years (top), 10 years, 20 years and 30 years (bottom).

Sources: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.4.1.2.2. Child labour, social protection programmes and climate-related events in Peru

Our Peruvian dataset allows us to investigate the potential effect of two social protection programmes: *Juntos* ("Together") and *SIS Gratuito*. *Juntos* is a large-scale conditional cash transfer programme implemented in Peru in 2005. It transfers about 30 USD per month to registered eligible households – poor families mainly in the rural highlands. The cash transfer is conditional on all children younger than five years of age being subject to growth monitoring controls and all children and adolescents attending school. Sanchez *et al.* (2016) use Young Lives data from Peru to analyse the effect of this programme on the nutritional and cognitive outcomes of children between 7 and 9 years of age. They document that exposure to the programme is associated with a reduction in severe stunting, with no discernible effect on cognitive development.

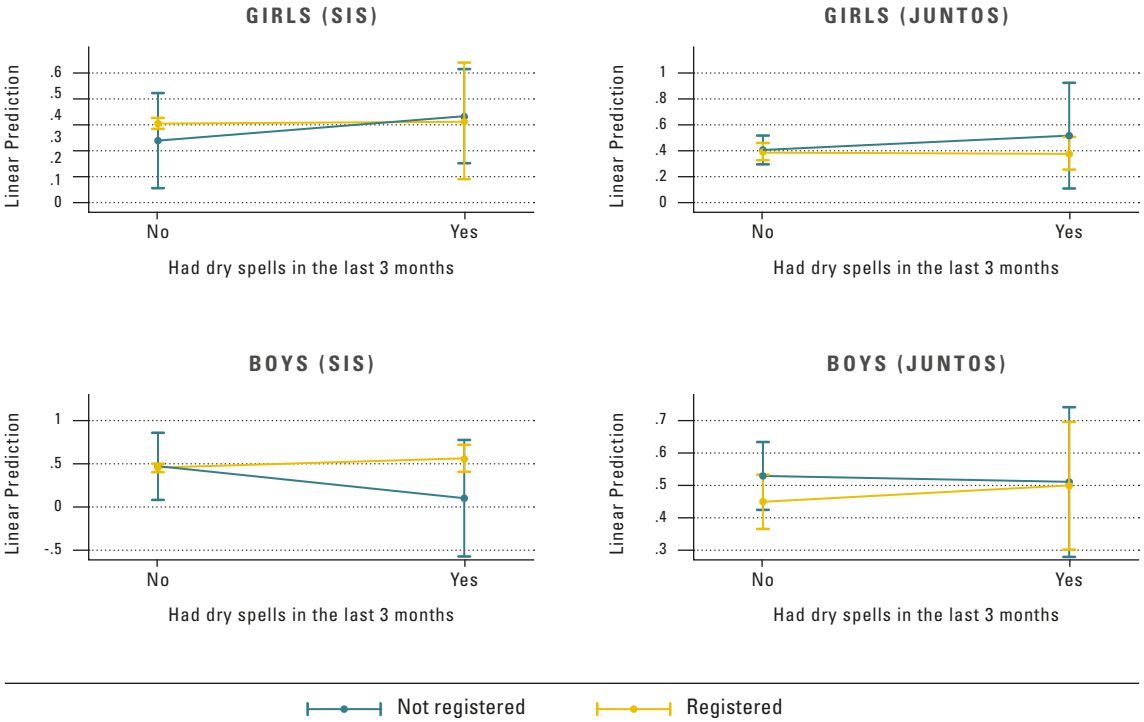
SIS Gratuito is a free health insurance programme provided by the Peruvian Government to any citizen of Peru that does not have other health insurance and is in conditions of poverty, extreme poverty, is pregnant, or is a child under five years old. It provides these individuals with free care in all public health centres and offers comprehensive coverage that covers more than 12 000 health conditions.[19]

[19] More information is available here: https://www.gob.pe/131-afiliarte-al-sis-gratuito.

A total of 54 percent and 88 percent of the children in the sample are enrolled in *Juntos* or *SIS Gratuito*, respectively. We estimate models interacting access to each programme with satellite data on dry spells. The results using satellite data are summarized in Figure 39. Overall, the results are largely statistically insignificant, with the exception of the bottom-left quadrant in Figure 39. Those results suggest that households that suffer a dry spell and are registered with the SIS health programme are more likely to send their boys to work than non-registered shock-affected households. A possible reason behind this finding is that the SIS programme improves child health, and healthier children are better able to work. As households face climate-related events, they cope by sending able-to-work boys into labour. Overall, the Peruvian data suggests that:

- Peruvian households that receive income support or free health insurance and are affected by a dry spell are not significantly less or more likely to engage in child labour than non-registered dry spell-affected households.

Figure 39. **Incidence of child labour versus satellite data dry spell shocks and engagement with social protection programmes by gender in Peru**



Notes: 95 percent confidence intervals. Dot points represent coefficient estimates surrounded by 95 percent confidence intervals. Child fixed effects regressions include all controls as specified in the data section. Standard errors are clustered at the regional level. A child is a labourer when they have undertaken any paid or unpaid activity in agriculture, a family business and/or outside the home for at least one hour in the two weeks prior to the survey. SIS Gratuito is a free health insurance programme. Juntos is a large-scale conditional cash transfer programme.

Sources: Calculations based on Young Lives. Undated. In: Young Lives. Oxford, United Kingdom, Oxford Department of International Development (ODID), University of Oxford; and ECMWF (European Centre for Medium-Range Weather Forecasts). Undated. ECMWF Reanalysis v5 (ERA5) In: ECMWF. Reading, United Kingdom. www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.4.2. Qualitative analysis

Four experts were interviewed separately for Peru: an ILO senior officer, a child labour researcher working for a non-governmental organization (NGO), a labour rights expert employed by the Ministry of Work and a climate specialist employed by the Ministry of Agriculture.

4.4.2.1. Environment and modes of production

The interviewees highlighted that the agricultural sector of Peru is focused primarily on cash crops, including coffee, avocado, cocoa and asparagus. Production generally takes the form of smallholder, family-based farms. Additionally, people in rural areas are engaged in paid work for agro-industries. One interviewee highlighted that agro-industries often fail to provide the right conditions for their workers:

> They have serious social problems with their workers, who already have more urban-like conditions. They work for a company, for a legal entity, but there is an existing labour crisis, which sometimes includes debts, lack of payments … It is a situation that affects all the members of the family … leading them into situations that aggravate their economic conditions even more (Labour rights specialist, government agency, female).

Against this backdrop, land and water were identified as scarce resources with complex ownership and control dynamics, which affect not only the survival of agricultural households but also that of extensive commercial plantations. This has implications for the labourers who work on them:

> In the north of the country, this [water] generated a crisis for the small producers who live in the area, because the water sources end up being administered by the large new owners of these lands, which affects the small owners of much smaller lands. For example, in Olmos, in Lambayeque, there is a hydroelectric project that was the hope of the region. And finally this project was detrimental for the owners of small agricultural land, who had to confront the owners of large properties. For some technical reason small landholders can no longer access water satisfactorily. And this has taken away possibilities for them of being able to cultivate the land (Labour rights specialist, government agency, female).

The interviewees highlighted that water scarcity is driven by climate change, which creates uncertainty in terms of water, especially rain for producing households. Access to water appears to be an ongoing issue for farmers in Peru:

> Water use efficiency is very low here, and we have large yield gaps as well … With so much uncertainty [around] precipitations … we need strategies to improve our water use efficiency. And for that we need storage systems, technically improved irrigation systems [to help us] have complementary water for irrigation and also help us make better use of water resources (Climate specialist, Ministry of Agriculture, female).

4.4.2.2. Child labour in Peru: characteristics, incidence and cultural factors

One interviewee correctly highlighted that although the Peruvian economy had been performing very well before the COVID-19 pandemic, child labour figures remain stubbornly persistent and unchanged:

> It is an incredible contrast, because Peru in recent years has been recognized as one of the countries with the highest GDP growth rates in the region. That is, there have been many years of growth in the last 15–20 years, and yet its child labour rates are among the highest in the region (Child labour researcher, research NGO, male).

Poverty was mentioned as the main predictor of child labour. The interviewees also highlighted the rural dominance of child labour, which tends to occur within the family unit and involve unpaid work – either in agricultural tasks, looking after household animals, or domestic work. Statistics referred to by the interviewees also indicate that boys are more involved than girls in child labour (55 percent of males versus 45 percent of females). However, all interviewees coincided in acknowledging that acquiring accurate data on the incidence of child labour in Peru is difficult. Firstly, domestic work, usually done by girls, is hidden and under-recorded. Secondly, many of the government-led censuses fail to properly identify the presence of child labour in agricultural settings or the risk of it occurring.

One interviewee, an ILO official specialized in child labour, is hopeful that things may improve. Her organization has advocated for the inclusion of the child labour variable in the National Census for Farmers. Moreover, the ILO has collaborated with the government agency responsible for administering the survey to develop the question and integrate it into the forthcoming survey:

> Something important is the inclusion of the child labour variable within the National Census of Farmers because the census has focused on seeing the producing families ... so in family farming these censuses are not going to identify it [child labour]. So ... the director of that agency ... accepted it as one of the topics to be developed ... But that's an important way out, because for any event that may be related today to child labour, we will be able to identify how it is working in the family agrarian economy (Child labour specialist, ILO, female).

This same official also referred to another possible statistical instrument to determine the "risk" of child labour, to develop a better understanding and thus more effective and preventive policies:

> Both in Peru and in other countries of the region, the ILO has been promoting ... an instrument for identifying the risks of child labour, which is a statistical instrument that what it does is [sic] ... identify the [child labour] risk situation in the [specific]

> territories ... So, of course, crossing that information with the information that there is with respect to specific events, we can also [have] ... an intervention of higher quality, more efficient, more effective (Child labour specialist, ILO, female).

A recurrent concern expressed by interviewees is the dangerous nature of most child labour. According to one interviewee, about 7 of every 10 children involved in child labour are engaged in hazardous activities, either because of their long hours or exposure to toxins, heights or carrying heavy weights:

> ... the fertilizers, the insecticides, the use of sharp materials, the work on slopes and the danger of falling from the heights ... the terrain may have some animals such as snakes and scorpions that can definitely affect the lives of children (Labour rights specialist, government body, female).

Child labour in Peru seems to be not only the result of poverty and a way for families to survive in conditions of economic crises but an engrained trait in traditional Peruvian society and part of the socialization of children:

> There is a naturalization and a very high tolerance of child labour, which has to do with the fact that in the rural Andean areas the work of boys and girls is seen as an activity that helps them to become good people or not to be idle ... It has to do with the fact that there is a lot of fear that play or recreation, the use of free time ... turns them into idle people who do not value work. So it is customary for them to be assigned tasks from a very young age, tasks that are distributed according to a sexual division of labour. Then the boys begin to go more to the farm, and the girls to take care of the small animals around the house and the domestic chores, but always busy, always with an activity (Child labour researcher, research NGO, male).

All experts referred to child labour as a way of socialization being engrained in Peruvian traditional culture and explained that this is a challenge when trying to enforce policies to reduce or eliminate the practice:

> [Child labour] is a custom that is often not reflected upon. Even between the institutions and the officials of the institutions that are in charge of enforcing the rules (Child labour researcher, research NGO, male).

> And we also find teachers who were children involved in child labour, and they say, "But look, I'm here. I was a child labourer and [have] worked since I was a child". And then we have to debate the subject, so it becomes a double challenge (Child labour specialist, ILO, female).

According to these experts, child labour in Peru is prevalent and embedded in child-rearing practices. Finally, experts highlighted a limited awareness in the country of the legal framework that regulates the work of children or adolescents. One interviewee discussed legal grey areas regarding what constitutes acceptable work:

> There are many people in the country who do not know that the Code of Children and Adolescents prohibits the employment of minors under the age of 14, and that there are only exceptions for this type of activity at the age of 12 for light work, which is very difficult to specify. It is not known, for example, that an authorization for adolescent work must be requested from the Regional Labour Directorate and that this authorization evaluates whether the activity to be carried out by the child is not on the list of hazardous work (associated with compliance with ILO Convention 182). So people don't know these things, and for that reason we have one of the almost absolute highest rates of informality in adolescent work, close to 99 percent. People have a lack of understanding that these regulations are to protect the life and health, and rights of those young people. ... Also the agrarian labour code, approved a few months ago, stipulated the prohibition of agrarian labour for individuals under 18 who engage with contracts outside the family unit. But how do we make this equivalent and applicable in family units? Which activities can we consider are [applicable] for knowledge transfer (Labour rights specialist, government body, female)?

4.4.2.3. Climate shocks and their effects on agricultural livelihoods

Droughts and floods were identified by interviewees as the most prominent climatic events affecting Peru. The El Niño climatic phenomena, which generates both immense flooding and extreme droughts, is becoming more frequent and results in substantial losses in local economies, including vast crop destruction and loss of cattle. Interviewees also mentioned the huge losses in terms of infrastructure damage and disruption of children's routine activities:

> If we talk about family farming, we talk about subsistence farming activities. Droughts, in the Cajamarca region, in the north right now, and in 2019 and 2020 there was drought or the drought was more prolonged than usual, and this caused crop losses, loss of crops and loss of food. The fodder for the animals ... It is an area that has livestock and all this causes, let's say, a situation of decrease in the family's income. Unfortunately, the strategies that the family has to face these [challenges] are few, because they have no way to cope with these changes (Child labour researcher, research NGO, male).

> [El Niño] causes flooding and we had that very recently. We had to react to that, because families lost their homes, and children, well, they miss out on school (Child labour specialist, ILO, female).

> The drought is already part of a national debate, of a concern about food security that we necessarily have to look at as a country. ... The situation of drought brings difficulties of being able to farm the land which is needed to generate resources for the family ... But these children who are already in a situation of child labour, will have to move to other activities which may not even be within the family framework, but will be outside the family (Labour rights specialist, government body, female).

> What happens a lot in the country, in the southern highlands, are the frosts, which is a cold that extends into the months of June, July and August and causes the death of many livestock, often that of camelids ... And there are not many ways to cope (Child labour researcher, research NGO, male).

Uncertainty was referred to as a feature of climate shocks in recent years. Although Peru's farmers have been accustomed to climate variability and extreme weather events, there is now the added variable of the uncertainty of how destructive these will be and when they will next occur:

> What producers are facing now is more uncertain weather and more climate variability (Climate specialist, Ministry of Agriculture, female).

Climatic shocks in Peru can severely undermine the economic stability of agricultural households, and families may need to draw on all their members to make ends meet during crises. Temporary and long-term migration to cities was mentioned as one of these coping strategies:

> [Climatic crisis] also generate migration, temporary migration, or sometimes definitive migration, of adolescents to urban areas to work ... And what they do is this: men migrate, sometimes women too, but especially adult men and adolescents, they migrate to work in infrastructure works, in road works, in mines, in mining or in construction works in cities in order to gather resources and be able to return and try to cover up and palliate this lack of income. Women migrate a lot to do domestic work. And in this case it is also a generally permanent migration, [but] they continue to extend income for the family. Often that is the reason for migration (Child labour researcher, research NGO, male).

> [Migration] is another issue that is gaining more and more strength ... We still do not have much information, but the mobility of people is already a characteristic of our societies and is already defining us as a society, and it has to do with work, the sustenance of families, the integration of children into schools, social services and rights in general (Child labour specialist, ILO, female).

4.4.2.4. Discussion of the quantitative findings

None of the interviewees had previously worked or reflected on a direct connection between increasing frequency of climatic shocks associated with climate change and an increased incidence of child labour (either in number of children working or number of hours of work per child). However, all interviewees agreed that this connection was likely and were not surprised by the quantitative results.

Given that climatic shocks in Peru are becoming more frequent and severe, significantly affecting agricultural livelihoods, the need for children to contribute more to their families' sustenance during these crises makes sense. Since most child labour occurs in the agricultural sector, it also made sense to interviewees that, faced with climatic events undermining farmers' produce, children in agricultural households have to find alternative modes of income to keep contributing to their families:

> I found that [the connection between climate change and child labour] very interesting, because ... the rural child is going to have to leave her/his family sphere to add to ... the basic needs and to contribute to ensure that. And this will surely imply many more dangerous situations, more difficulties (Labour rights specialist, government body, female).

> [In the face of climatic shocks] ... agricultural work becomes much more intensive. It becomes much stronger and more complex, because in addition to doing all the agricultural work, you have to deal with situations; that is, you find yourself with more flooded land that requires extra tasks. This implies more work time, and therefore all this makes it a heavier and more dangerous job ... Episodes of drought, for example, in Cajamarca, in the Sierra Norte or floods, generate crises in family economies, increase poverty, loss of income, crops are lost ... and this logically generates a possibility of increased child labour (Child labour researcher, research NGO, male).

> What we know about these situations of crisis and shock is that child labour is a consequence because it has to do with the greater vulnerability of the living conditions of families. These crises are undermining the survival of the family. In fact, child labour becomes an alternative, a way out (Child labour specialist, female, ILO).

> We didn't have this topic [the connection between child labour and climate change] mapped out, but it really is a big responsibility for us, the agricultural sector (Climate specialist, Ministry of Agriculture, female).

All interviewees also agreed on the need to generate more awareness about the detrimental effects of children engaged in strenuous work. This was seen as crucial not just for children but also for their families and communities, as child labour implies loss of opportunities and development of capacities, and potential exposure to dangerous environments. All this has implications for children's future economic autonomy and success, and that of their future families and communities, thus reproducing the cycle of poverty:

> [Child labour] doesn't pay off in what's going to happen next. There is a loss of skills to have better jobs in the future, an opportunity lost to develop their abilities to contribute to the development of their own locality … because these are human resources that are going to be lost, and there are going to be families that are going to have needs because they are going to be adults, and they will have more precarious lives. There may be a loss also of coping skills of young people. Adolescents can work, but they have to do it in protected activities and with awareness of what they are doing. And well, already the effects on their health can be pernicious because they can develop chronic diseases that even limit their action in the future. So child labour is not linked to anything positive (Child labour specialist, ILO, female).

4.4.2.5. Community and government-led strategies to mitigate climatic shocks

This section presents the results of a discussion of our policy interventions.

Presented with the question of whether water or crop storage systems could palliate the effects of future climate shocks, two interviewees referred to family-led or community-led strategies that are in place. These strategies could be replicated throughout places of similar topography:

> One of the strategies that the communities have, in an articulated way (not of each family in particular but as a whole) is something called "the sowing and harvesting of water", which is a custom in the high Andean territories. They develop some strategies that allow water not to be totally lost and that can maintain [sic] during the dry season. They clean and protect the water sources and watercourses so that the water can flow in a better way [and] reduce the impact of droughts, and in this way have water for

irrigation and to maintain crops and also for livestock ... There is something else called "infiltration ditches" which are ditches so that the water can hold and drain and come in, recharge. There are also ways to capture rainwater through irrigation ditches and carry it to micro dams or reservoirs. There are various forms in the Andes, and there is much, much experience in water management, precisely because these problems are ancestral; they are not just problems of now, although of course, they are becoming more acute with climate change (Child labour researcher, research NGO, male).

It's a custom in the Andean areas to always separate a part of the crop and store it. Each family has its own storage systems that serve to keep the grain or tuber throughout the non-harvest season. And also for storing seeds. In the old days there was what was called the "tambos". It is a custom that comes from the time of the Inca and pre-Inca cultures, which are like warehouses ... Families always implement what they call the ayni. That is to say, to help each other. For example, if one family is in a more critical situation, because their land has been more affected and their sowing has been more affected, it is very likely that the community as a whole will come forward to try to help and eventually also to help this family with what they have. And families redistribute a little of what they have been able to harvest. This not so much as a preventive measure, but as a way of attending to the disaster itself (Child labour researcher, research NGO, male).

There are also studies that talk about the management of the different Andean floors, or the high Andean floors. In such a way, they move from one space to another, as the communities have lands that are scattered in different altitudinal levels, they move a lot from one level to another depending on the situation. ... It seems to me that it is an important strategy, to deal with the various phenomena that affect production (Child labour researcher, research NGO, male).

[Farmers] also have adaptive strategies. For example, in the southern area of Puno, near Lake Titicaca, potatoes are grown through a special system known as Waruwarus ... in which potatoes are grown on a sort of island surrounded by lake water ... to cushion the effect of low temperatures. They also use a system of crop rotation known as aynocas, and so they rotate the land and do not use it intensively, but rather extensively, [to avoid] deteriorating the quality of the soil. So they have practices that can also be used for adaptation and added to the new knowledge, to the technology that now exists ... we can improve the issue of adaptation [to climate change] (Climate specialist, Ministry of Agriculture, female).

Economic diversification was also mentioned as a mitigation strategy for small farming units, as a way of ensuring their survival during times of hardship:

On the part of the [agricultural] families there is always an effort to diversify. For example, women, apart from [working in] the main production of the agricultural or livestock family, usually raise small animals such as chickens, pigs or rabbits, and

> guinea pigs, which is also a way to save for a moment ... first for self consumption. But it is also a saving to be able to make up for situations like this [extreme events]. They [women] are also often involved in the production of handicrafts (Child labour researcher, research NGO, male).

When discussing gendered aspects, women were also identified as key social actors during situations of crises, something often overlooked by policymakers:

> In the face of disasters or any type of critical event, there is a very particular and very important role on the part of women, who are many times the heads of families and the ones who make decisions. But solutions don't always come in the way of helping or strengthening the capacities of these women ... Policies should enhance the activities that these women may be doing or some alternatives that they may have been identifying to solve, such as very concrete and immediate needs that they have (like finding a roof for their children), which is as important as the productive work that the husband, the partner or the man in the family can have. In the same way, their roles during crises are overlooked, and child labour is overlooked (Child labour specialist, ILO, female).

Interviewees also discussed a range of government-led mitigation strategies against climate shocks. Some of these were classified as "palliative" solutions, such as insurance and social protection schemes, whereas others were classified as "strategic" or "future oriented" when they aimed to anticipate and prepare for a disaster. These mitigation strategies shared by the experts are described below.

In terms of government-led strategies to palliate the consequences of extreme climate events, experts mentioned a range of measures including insurance, state subsidies, short-term employment schemes, setting prices of crops to avoid prices plummeting, or implementing technification plans:

> [Catastrophe] insurance ... is contracted by the state. Since 2008 ... [this insurance scheme] has been progressively extended to more regions. It started with eight and then 14 and now we have 24 regions covered with agricultural insurance ... to mitigate the effects of the losses ... due to climatic factors, natural disasters (Climate specialist, Ministry of Agriculture, female).

> There is one very interesting scheme that exists in the agriculture sector, which is the "Catastrophe Insurance" ... It is the allocation of insurance payment for farmers who were in a region where some kind of natural disaster occurred. There is an evaluation of the land and the product, and there are some economic and productive variables so that the regional government assists the producers who are within that group (Child labour specialist, ILO, female).

> There are actions such as the purchase of products by the state. When there are situations that affect the supply chain, such as roads being destroyed, and there is no way to get around ... one of the actions of the state is to buy the products at a price, trying to maintain a price that can be appropriate, because one of the other things that sometimes happens is that prices collapse. ... [The state] also generates projects for temporary employment, not necessarily in agriculture itself, but road construction, infrastructure construction, construction of reservoirs or cleaning of canals. That is, how to try to generate a job that can allow an income during an emergency situation (Child labour researcher, research NGO, male).

> ... to coexist with the effects of climate shocks ... I was thinking of the Ministry of Agriculture, which develops agricultural policies, [it] has been strengthening the technification ... [it] even has a plan for family farming. It has plans for large-scale and medium-scale agriculture (Labour rights specialist, government body, female).

Access to any of these government schemes, however, is dependent on farmers being registered with the relevant government agencies. In a country where farmers generally operate in the informal economy, this can be challenging:

> The producers who are registered would have better access [to government support] than those who have a valid registration of their land tenure and their agricultural activity ... For other producers, access [to government support] is more difficult (Climate specialist, Ministry of Agriculture, female).

When discussing the provision of information about forthcoming weather patterns, the interviewees highlighted a lack of proper future-oriented or prevention policies and strategies that can help agricultural households prepare in advance for climate shocks. In most cases, whatever mitigation strategies are available often provide limited urgent assistance rather than prevention, and in some cases, that help comes too late:

> At the moment, we are helping them survive. How can the person or child who is isolated by the great flood survive? So we bring them water, a blanket, and we take them to the centre of town where there is a school, and we seat them there (Labour rights specialist, government body, female).

> But I also believe that the authorities or the local governments, which are the ones that should have a greater understanding of this, do not have the capacity to plan, to anticipate, to have any contingency plan for this type of event. I think that's where it's missing, because ultimately the citizens, the families, act on the basis of their most immediate needs (Child labour specialist, ILO, female).

> Unfortunately, the poorest families do not manage without help that often comes late or not at all from the state (Child labour researcher, research NGO, male).

However, Peru is developing promising climate-related policy measures. One respondent highlighted the recent "Agroclimatic Management Platform", an initiative aimed at developing the mechanisms for implementing climate governance across the country:

> We are currently implementing a policy measure ... approved in 2019 within the National Competitiveness and Productivity Plan ... It is called the Agroclimatic Management Platforms and [its] objective is to develop climate governance in order to improve the adaptive capacity [of farmers] ... so they can better face the climate risks in agriculture ... Twelve agroclimatic platforms are going to be implemented between now until 2030 ... Within them we want to incorporate ... both the governance ... and technical innovation [components] to be able to improve [the] process of adaptation and transformation of agriculture (Climate specialist, Ministry of Agriculture, female).

This same interviewee emphasized the importance of building farming communities' capacities and participatory strategies whereby innovations can be combined with farmers' practical and traditional knowledge to achieve the best results:

> Capacity building also [needs to target] the training of young students from agricultural institutes ... [We need to implement] a participatory "extension to farmers" methodology [and share] agroclimatic information tools that can be generated within the platform and ... can also be adopted by them. There is a lot of research on participatory development and joint development of tools [so that we] incorporate the traditional knowledge that exists in each region, in each territory. We work on this issue in partnership with the National Service of Meteorology and Hydrology (Senami) (Climate specialist, Ministry of Agriculture, female).

An example of incorporating traditional, local knowledge was the reference to how some farming communities in Peru have for centuries relied on the behaviour of insects and birds as signs of future weather events:

> We could consider early warning systems for certain extreme events such as droughts and floods that allow us to improve our response ... Agricultural producers definitely have ancestral knowledge ... For example, they use biological indicators to make their climate predictions ... certain behaviours of some birds or insects are useful for them to predict a little bit the behaviour of the climate (Climate specialist, Ministry of Agriculture, female).

Weather forecasting for farmers as a future-oriented adaptation strategy was also mentioned by the climate specialist of an area the government is working on:

> [The National Meteorology service] is [working to] address the information needs of farmers, [to] close a bit the information gap that exists [between] the supply and demand of climate information ... They publish risk bulletins, agroclimate information on their website but also deliver information via radio [to reach] the

> most distant ... other proposals that exist are through text messaging. It is precisely with their [farmers'] help in different participatory workshops that we were able to understand ... how information can arrive in a more timely manner (Climate specialist, Ministry of Agriculture, female).

Talking specifically about the relationship between climate-related events and child labour, anticipating how extreme climate-related events may negatively affect child labour was mentioned as an important area of intervention and policy development. The interviewees referred to the need for government agencies to work in a more articulated and coordinated matter so that the different dimensions of the problems generated by extreme climate-related events can be dealt with as a whole and not through single-pronged strategies. One interviewee gave an example of a Ministry of Agriculture programme that sends technical experts to assist small farmers and how there is a lost opportunity there to identify and address child labour:

> Peru has a national strategy of family farming, especially subsistence family farming, which consists of technical experts who visit the families. They assist them to improve their crops, to innovate. It seems to me that this should be a key element to be incorporated into the strategy [to address child labour] and that it is not really sufficiently incorporated ... Child labour is an issue that is very common in family subsistence agriculture but is not included as part of these strategies, despite the fact that there is also a state policy in this regard ... In other words, the agricultural extension policy is divorced from the national policy of confronting climate change and also divorced from the national policy for the prevention and eradication of child labour (Child labour researcher, research NGO, male).

The imperative of decentralizing policies and making them more context and culture specific, as well as gender sensitive, was also a key area of concern:

> We are a very varied society, very varied culturally and with different ways of reproducing our own culture and ... we have not yet managed to make that clearly expressed in policies. The policies are still very general policies. I'm not going to be so tyrannical about saying they're desk policies ... I've been part of that effort then as well, but they're still very, very general. The next step should be for these policies for implementation to be more decentralized. You have to consider these cultural or ethnic variables, those of gender, definitely, and immigration (Child labour specialist, ILO, female).

> Something that I would very much like to see raised ... is that we always need to look at social policies as part of a whole, from an intercultural approach, from a rights-guarantee approach and, above all, from a gender and intersectionality approach in which we can look at all the vulnerabilities that converge in a family, and that the effects of climate change are added to these vulnerabilities (Labour rights specialist, government body, female).

One interviewee mentioned some ongoing important and promising initiatives in relation to incorporating some common child labour indicators for interventions and in generating awareness about the loss of future capacity when child labour becomes endemic:

> The National Plan for Family Farming has incorporated some indicators related to child labour interventions. The same indicators are being used by the National Plan of Action for Children. The same [child labour] indicators are used to evaluate both plans ... it is an urgent task for the different national plans to be able to integrate this data (Child labour specialist, ILO, female).

There were references to other possible strategic measures (some already being implemented) to generate awareness of the incidence and effect of child labour in agricultural households. There was also mention of a manual for implementation for adolescent work, so that employers have clear guidelines on what are "hazardous jobs" that should be prohibited for children of legal working age.

Increasing efficiency in the use of resources and increasing productivity are undoubtedly the ultimate goal of the government in terms of assisting producers who are vulnerable to climate-related events:

> We need to improve in the intensification of production in general, generate more food and have better yields in a sustainable way, and for that we need to work on the efficient management of resources, for example, efficient water management, efficient soil management and efficient management of biodiversity (Climate specialist, Ministry of Agriculture, female).

4.4.2.6. Other important issues for consideration

Other important themes emerged during the data analysis that should be considered when developing a more holistic understanding of agrarian family units and the involvement of children in labour. Agricultural work in Peru remains primarily informal. Policies or strategies to improve the livelihoods and economic security of small farming units, to alleviate child labour, should therefore attend to this:

> In other words, they [policies] should not only focus on large companies but should also focus a lot of attention on those that provide jobs to the broadest sectors of the population, which are the micro and small companies, as well as look at self-employment. We must strengthen the fight against poverty and extend social protection services to the most vulnerable families (Child labour researcher, research NGO, male).

Secondly, there were several references to the need to coordinate strategies with educational institutions, on different fronts, both as allies in promoting the value of education against children's productive work and in delivering more pertinent

curricula for rural populations that would be of interest to students and their families, and that would have a direct link to their futures in the contexts in which they live. For many families, schools are not accessible and the time cost of children attending school (sometimes having to walk one hour each way) is not worth the investment:

> So what happens is that the family ends up valuing primary school because it teaches them to read, to write, to speak Spanish, especially in areas where the native language is Quechua or Aymara, and, let's say, to do mathematical operations ... But when this has been learned, the school begins to make little sense because the type of teaching is not articulated to reality, and secondary education in their area can be distant (Child labour researcher, research NGO, male).

Finally, there was frequent mention of the effects of the COVID-19 pandemic. Although this issue goes beyond the scope of this study, interviewees remarked how the pandemic deepened the effects of climate-related events on agricultural households by further impoverishing families who lost alternative sources of income. It also further disadvantaged their children's education, given their lack of access to school or to technologies to join remote education, which in turn pushed children into productive activities to assist with the survival of their households.

As a mode of conclusion, the following quote encapsulates the core of child labour in Peru, suggesting how research and policy initiatives can best approach the problem:

> Rural child labour is represented in families. They [children] work in the family, and it [child labour] is due to this great need that exists, to be able to take advantage of the maximum time of the resources so that they [the families] can somehow subsist adequately in the face of all these variables of situations that families and people in general face in rural areas. So I would be interested [in knowing] if the study can include this view for our country: recognizing the characterization of child labour, that it is family work through agricultural family units, and [recognizing] the importance of being able to improve technification, to give them concrete solutions to coexist with the climate-related events that we are facing and that we are surely going to continue to face. This will also help in a collateral way and allow us to ensure that the policies of guaranteeing rights linked to the protection of children will allow us to permeate the family, because if there are no adequate living conditions, these issues [rights], which are very important, will not be considered [by families] because these are not part of their subsistence (Child labour researcher, research NGO, male).

4.5. General discussion of the quantitative data

Our analysis shows that not all climate-related events studies are associated with child labour. However, when an effect is found, it is more likely to increase aspects of child labour than decrease them. Our results are summarized in Table 4.

We find that different shocks affect child labour in different countries: pests and heavy rains can lead to increased child labour in Ethiopia and dry spells and heavy rains can lead to increased child labour in Peru. Gendered effects can be important. The Ethiopian findings are driven by boys.

While dry spells lead to increases in child labour in Nepal, this is only for girls and the incidence of child labour for boys actually falls in response to this shock. Similarly, while heavy rains increase child labour for girls and reduce it for boys in Côte d'Ivoire, dry spells increase the incidence of child labour for boys only.

These results suggest that one-size-fits-all policy prescriptions are unlikely to work. We discuss the policy implications of this work in the last chapter of the report.

Table 4. **Summary of the effects of climate–related events on the incidence and intensity of child labour**

Event/change in child labour	Ethiopia	Peru	Nepal	Côte d'Ivoire
ERA 5 Heavy rain				
Overall incidence	Increase			Decrease
Overall intensity				
Incidence for boys	Increase	Increase		Decrease
Intensity for boys	Increase	Increase		
Incidence for girls				Increase
Intensity for girls				
ERA 5 Dry spell				
Overall incidence				
Overall intensity				
Incidence for boys			Decrease	Increase
Intensity for boys			Decrease	Increase
Incidence for girls			Increase	
Intensity for girls				

Source: Authors' own elaboration based on ERA5 www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5.

4.6. Generalized discussion of the qualitative data

This section provides an appraisal of the key issues highlighted in the qualitative section of the report. The aim is to show how the countries covered in this report compare in relation to how experts perceive a connection between climate-related events and child labour. A series of critical topics are explored.

4.6.1. The context for child labour during climate-related extremes

There are general patterns in the narratives that refer to the context in which child labour occurs in the four countries. Child labour occurs within the informal or marginal components of the economy and within family settings and is unpaid work. In the four examined countries, child labour is endorsed by families and communities as part of children's socialization. This endorsement goes hand in hand with the lack of awareness about legislation related to children's work, shortcomings in enforcement of this legislation and lack of understanding about the potential detrimental consequences for children, including being exposed to dangerous environments and negative effects on their physical development and schooling.

©FAO/Giulio Napolitano

There is also a common pattern in the data regarding the structure of land tenure (small plots associated with subsistence agriculture) and limited or lack of mechanization and technification of agriculture, especially in terms of irrigation. Children are therefore key pieces in agricultural production, especially for those crops that are labour intensive. Subsistence agriculture also relates to low productivity, lack of surplus and inability to exchange produce in markets. For all countries, there were references to difficult or no access to credit, as well as informal and sometimes usurious systems of loans and dangerous acquisition of debt, especially when facing climate-related events.

Difficult access to schooling in terms of distance or cost (i.e. the need to buy uniforms or books) and curricula that can be irrelevant to farming families were other points of convergence in the four countries' narratives. When parents do not find school relevant or accessible, it is very likely children will be asked to quit beyond the first years of primary education and occupy most of their time to assist in the survival of the household.

©Chris Steele-Perkins/Magnum Photos for FAO

Experts from Ethiopia, Peru and Nepal agreed that in situations of a climate extreme, there is an aggravation of poverty due to loss of produce and damaged land, and thus more pressure for children to assist in agrarian work. Experts from Côte d'Ivoire, however, did not identify a very clear path between climate-related events, poverty or child labour. This is most likely because our Côte d'Ivoire sample did not include any climate-change specialists.

Child labour during a climate extreme can take many forms. Besides an intensification of farming-related activities, there can also be an intensification of household chores and child care. In extreme cases, child labour during a climate extreme can be associated with displacement and migration, where children may need to become involved in paid work outside the family unit.

The role of women during a climate-related event was mentioned as critical in Peru and Côte d'Ivoire in terms of devising emergency strategies, including diversification, for the household's survival. In Nepal, the issue of gender was addressed in relation to differential pay for agrarian tasks when it is women or girls that perform them.

Government-induced schemes to alleviate farming families when faced with the stress of a climate extreme were mentioned in all four countries. Any such strategies would assist with the economic survival of households and thus deter children from engaging in more work. Agricultural insurance schemes seem to be in operation in Peru and Ethiopia, and in a more incipient way in Nepal. All four countries seem to have some social protection assistance for farmers or temporary employment programmes and some cash transfer or incipient credit programmes to promote increased productivity and access to markets. However, the reach of these schemes is dependent on farmers being closer to the formal sectors of the economy or being registered with the government. With large proportions of farmers in the four countries living in remote, inaccessible areas, and many being illiterate, these schemes may not assist those who most need the help.

However, farmers in all four countries seem to be adaptable in terms of introducing new crop varieties, using the topography efficiently and sustainably, devising water conservation or storage systems, drying food for preservation and other strategies. One of the interesting findings is the wealth of traditional and adaptive knowledge that farming communities in all four countries devise when faced with climate-related events. However, mechanization of agriculture, improved water and grain storage techniques, and weather forecasting were mentioned as prime strategies for further assisting farmers to cope with and anticipate climate extremes. Capacity building, training and bidirectional knowledge transfer (from government to farmers and vice versa) were also themes that came up for the four

countries, and initiatives along these lines would significantly improve farmers' coping capacity and thus alleviate the need for increased child labour during extreme climate events.

However, interviewees suggested that for any such strategies to succeed, there needs to be better coordination between different government bodies. This is another salient theme for all countries. Coordination, for example, between ministries of agriculture, work, health and education seems to be pivotal when preparing farming communities for future climate-related events. For example, the role of schools was mentioned as key in providing refuge and meals during crises to retain enrolments but also in improving education around climate change and sustainable farming. But this needs to be coordinated with schemes from agriculture ministries to ensure farmers are supported technically during crises, or with work ministries to ensure they can engage in alternative sources of income to avoid displacement or migration. Importantly, for the focus of this study, all these are needed to avoid increased child labour. As a follow-up to this government intervention approach, the interviewees for Peru and Nepal referred to the need to improve government decentralization strategies to allow for local governments to have more power and capacity to work within their regions and implement policies. Experts mentioned much activity and achievement at the policy development level, with most countries having properly framed climate-change adaptation plans, but implementation is poor due to lack of coordination, investment and resources.

©FAO/Peru

Chapter 5
Conclusions and policy recommendations

5.1. Summary

Globally, 70 percent of child labour occurs in the agricultural sector. This sector is understood to be significantly more vulnerable to climate change. The purpose of this study is to assess if this potential vulnerability and resulting climate-related events are also likely to result in an increased incidence of child labour. Using a subset of potential climate-related events, this report shows that while not all events associated with climate affect child labour, when an effect is found it is likely to increase aspects of child labour. The shocks studied include dry spells and heavy rain.

The report shows that climate shocks affect child labour in different countries. For example, heavy rains can lead to increased child labour in Ethiopia, while dry spells can lead to increased child labour in Peru. Dry spells can lead to an increase in child labour in Nepal, driven by an increase in the incidence of child labour for girls. There is some evidence that dry spells reduce child labour for boys in Nepal. In Côte d'Ivoire, dry spells can lead to increased child labour for boys, while heavy rains reduce the incidence of child labour for boys but increase the incidence of child labour for girls. With the exception of the experts from Côte d'Ivoire, these quantitative findings largely resonated with the views of interviewees.

5.2. Policy recommendations

The results suggest that one-size-fits-all policy prescriptions are unlikely to work. Policies must be tailored to different communities based on their characteristics. However, drawing on its findings from both the quantitative and qualitative analyses, this study proposes the following groups of policy recommendations to tackle child labour in the countries studied:

- Social protection policies should be strengthened, inclusive and ensure households have adequate income and access to basic services to mitigate the need to use children in work. This can be done through the introduction or upscaling of universal child benefit and cash transfers aimed at reducing child poverty, and increasing school attendance, and access to health care. (It can also provide incentives for birth registration to make the whereabouts of children more visible to the state and institutions and contribute to social and child protection systems.)

- Education policies should include educating households on the detrimental effects of child labour and ensuring the availability of fee free, adequately staffed schools that provide children with relevant high-quality education.

  - It is necessary to improve access to schools in rural areas and prevent premature dropouts.

  - It is key to remove fees and other economic obstacles in free education systems and generate incentives for school attendance and retention for both girls and boys.

  - These campaigns must recognize that boys are more likely to enter work than girls. This does not mean that girls are not affected by shocks; rather, shocks affect boys and girls differently. Gendered campaigns that teach households some of the well known costs of child labour (e.g. lower educational attainment and lower future earnings) may be effective.

- Education and training should also be provided to farmers to improve productivity, adaptability, and reduce the need for child labour.

- Resilience to climate change and climate-related events with climate adaptation strategies should be improved, such as the introduction of new drought- and flood-resistant varieties of seeds, the development of infrastructure to collect water and prevent flooding, and land-use policies to reduce deforestation and degradation, while increasing restoration.

- Increased severity of climate-change impacts will manifest also as an increase in crop pests. So, integrated pest management should be adopted to address the increasing climate change-driven increase in crop pests and diseases.

- Farm infrastructure should be improved, including mechanization of agriculture to act as a substitute for child labour and increase agricultural productivity, and ensuring farmers have adequate storage facilities for their crops. Private companies could play a key role, by ensuring corporate sustainability due diligence to prevent and eliminate child labour all along their agrifood value chains.

- The capacity of households to absorb and cope with climate-related events and other shocks with evidence-based risk-mitigation coping mechanisms should be improved, such as improving access to insurance, credit and other financial services to provide households with resilience to shocks and other difficult times.

- Better data should be collected to capture the incidence and intensity of child labour and how they are changing over time. This includes collection of better data on changing weather patterns and implementation of early alert systems for significant climate-related events. In this sense, national systems of child labour statistics must be developed, maintained and undertaken on an annual basis.

- Finding innovative ways of changing cultural and social norms regarding child labour in the countries will also be important in making long-term sustainable progress towards the achievement of SDG Target 8.7 on eliminating child labour in all its forms by 2025. Collaboration between public, private and community-level actors will be decisive in this regard.

More generally, while ultimately reducing the frequency of floods and droughts requires cohesive national and international policies, community-level mitigation strategies to minimize the damage caused by droughts and floods will be important to minimize these shocks' effects on child labour.

- Information about forthcoming weather patterns may allow farmers to better diversify and adapt their strategies to minimize the effect of these shocks.

- Dredging waterways in flood-affected areas may also be important.

- Finally, effective storage facilities and post-harvest management to reduce post-harvest losses and reduce children's involvement in child labour as a coping strategy should be found.

5.3. Country-specific policy recommendations

5.3.1. Côte d'Ivoire

The data analysed for Côte d'Ivoire reveal important gendered impacts of climate-related events on child labour. Dry spells increase child labour for boys. However, heavy rains reduce child labour for boys while increasing it for girls. Without access to additional data, it is not possible to identify the mechanisms underlying these impacts. However, we conjecture that heavy rains negatively affect activities more commonly undertaken by boys. It is likely, therefore, that boys work predominantly in farms and heavy rains prevent them from undertaking their usual tasks. Households can potentially compensate for the lost output by asking girls to work in other activities, predominantly non-farm work or household enterprises.

These gendered findings potentially highlight deep-seeded social norms that govern the division of labour in rural communities from a young age. Changing social norms and attitudes towards child labour and the gendered division of labour in Côte d'Ivoire is required starting with educating households about the dangers of child work and the value of obtaining an education for both girls and boys.

5.3.2. Ethiopia

Our analysis reveals that girls from households registered in the PSNP Public Works programme are significantly more likely to enter child labour after a heavy rain. We argue that this stems from the possibility that adult and child labour are substitutes. In the aftermath of heavy rains, agricultural households may require additional labour for clean-up and maintenance work. Households that rely on the PSNP-PW programme may have less flexibility regarding available hours of work. Under this constraint, it is likely that children work. The programme could, therefore, benefit from in-built flexibility mechanisms that grant workers paid leave in times of crisis.

5.3.3. Nepal

Data highlighted the role that water scarcity and dry spells play in placing stress on households in the context of Nepal. The quantitative data revealed that dry spells are associated with an increase in child labour for girls, possibly reflecting a greater role for them in agriculture in the country. As in Côte d'Ivoire programmatic interventions based on changing social norms may be important.

Qualitative data collection through the key informant interviews highlighted a number of strategies to reduce child labour in Nepal. Firstly, water-saving strategies such as collecting water in the rainy season will assist in mitigating droughts. This could be achieved through irrigation systems and plastic ponds. Further, flood barriers should be erected in flood-prone areas.

Secondly, providing farmers with information and weather forecasts was noted as being important. Poor literacy and a lack of access to mobile phones and/or connectivity imply that radio broadcasts would benefit households in remote areas to prepare for and mitigate the impact of shocks, possibly leading to reductions in child labour.

A need to enforce existing national policies to reduce child labour was also noted. Moreover, strengthening access to schools and a quality education will provide additional incentives for households to reduce child labour. Access to loans, insurance, climate-resilient seeds and markets will assist and protect households from climate-related events.

5.3.4. Peru

Our Peruvian dataset allows us to investigate the potential effect of two social protection programmes: *Juntos* ("Together") and *SIS Gratuito*. The econometric results suggest that households that suffer a dry spell and are registered with the SIS *Gratuito* programme are more likely to send their boys to work than non-registered shock-affected households. *SIS Gratuito* is a free-health programme, and a well-understood by-product of improved health in economics is that healthier people, including children, are better able to work.

What seems to be happening is that as households face dry spells, they cope by sending able-to-work boys into labour. This unintended consequence of the programme could be addressed with educational campaigns teaching households about the costs (hazardous) of child labour. Indeed, low-cost telehealth interventions explaining the health consequences of child labour to rural households may be useful. This is particularly important in a country where, according to our qualitative data, there is a cultural bias in favour of child labour.

References

Alcaraz, C., Chiquiar, D. & Salcedo, A. 2012. Remittances, schooling, and child labor in Mexico. *Journal of Development Economics*, 97(1): 156–165. https://doi.org/10.1016/j.jdeveco.2010.11.004

Amnesty International. 2016. This is what we die for: human rights abuses in the Democratic Republic of the Congo power the global trade in cobalt. In: *Amnesty International.* London. www.amnesty.org/download/Documents/AFR6231832016ENGLISH.PDF

Baland, J.-M. & Robinson, J. A. 2000. Is child labor inefficient? *Journal of Political Ecology*, 108(4): 663–679.

Bar, T. & Basu, K. 2009. Children, education, labor, and land: in the long run and short run. *Journal of the European Economic Association*, 7(2–3): 487–497. https://doi.org/10.1162/JEEA.2009.7.2-3.487

Barcellos, S. H., Carvalho, L. S. & Lleras-Muney, A. 2014. Child gender and parental investments in India: Are boys and girls treated differently ? *American Economic Journal: Applied Economics*, 6(1): 157–189.

Basu, K., Das, S. & Dutta, B. 2010. Child labor and household wealth: theory and empirical evidence of an inverted-U. *Journal of Development Economics*, 91(1): 8–14. https://doi.org/10.1016/j.jdeveco.2009.01.006

Basu, K. & Van, P. H. 1998. The economics of child labor. *The American Economic Review*, 88(3): 412–427. www.jstor.org/stable/116842

Beegle, K., Dehejia, R. H. & Gatti, R. 2006. Child labor and agricultural shocks. *Journal of Development Economics*, 81(1): 80–96. https://doi.org/10.1016/j.jdeveco.2005.05.003

Bhalotra, S. 2007. Is child work necessary? *Oxford Bulletin of Economics and Statistics*, 69(1): 29–55. https://doi.org/10.1111/j.1468-0084.2006.00435.x

Bhalotra, S. & Heady, C. 2003. Child farm labor: the wealth paradox. *World Bank Economic Review*, 17(2): 197–227. https://doi.org/10.1093/wber/lhg017

Björkman-Nyqvist, M. 2013. Income shocks and gender gaps in education: evidence from Uganda. *Journal of Development Economics*, 105: 237–253. https://doi.org/10.1016/j.jdeveco.2013.07.013

Congdon Fors, H. 2012. Child labour: a review of recent theory and evidence with policy implications. *Journal of Economic Surveys*, 26(4): 570–593. https://doi.org/10.1111/j.1467-6419.2010.00663.x

Coon, M. 2016. Remittances and child labor in Bolivia. *IZA Journal of Migration*, 5(1). https://doi.org/10.1186/s40176-016-0050-6

CSA, UNICEF Ethiopia & C4ED. 2020. *Child labour analysis in Ethiopia.* Addis Ababa, UNICEF Ethiopia. www.unicef.org/ethiopia/media/3776/file/Report%20.pdf

Currie, J. & Deschênes, O. 2016. Children and climate change: introducing the issue. *Future of Children*, 26(1): 3–9. https://doi.org/10.1353/foc.2016.0000

De Haan, M., Plug, E. & Rosero, J. 2014. Birth order and human capital development: evidence from Ecuador. *Journal of Human Resources*, 49(2): 359–392. https://doi.org/10.3368/jhr.49.2.359

de Hoop, J. & Rosati, F. C. 2014. Cash transfers and child labor. *The World Bank Research Observer*, 29(2): 202–234. https://doi.org/10.1093/wbro/lku003

Dell, M., Jones, B. F. & Olken, B. A. 2012. Temperature shocks and economic growth: evidence from the last half century. *American Economic Journal: Macroeconomics*, 4(3): 66-95.

Edmonds, E. V. 2006. Understanding sibling differences in child labor. *Journal of Population Economics*, 19(4): 795–821. https://doi.org/10.1007/s00148-005-0013-3

Edmonds, E. V. & Pavcnik, N. 2005. The effect of trade liberalization on child labor. *Journal of International Economics*, 65(2): 401–419. https://doi.org/10.1016/j.jinteco.2004.04.001

Edmonds, E. V. & Pavcnik, N. 2006. International trade and child labor: cross-country evidence. *Journal of International Economics*, 68(1): 115–140. https://doi.org/10.1016/j.jinteco.2005.01.003

Emerson, P. M. & Knabb, S. D. 2006. Opportunity, inequality and the intergenerational transmission of child labour. *Economica*, 73(291): 413–434. https://doi.org/10.1111/j.1468-0335.2006.00507.x

FAO. 2020. *FAO framework on ending child labour in agriculture.* Rome. https://doi.org/10.4060/ca9502en

FAO. 2021. *The impact of disasters and crises on agriculture and food security: 2021*. Rome. https://doi.org/10.4060/cb3673en

FAO, IFAD (International Fund for Agricultural Development), UNICEF (United Nations Children's Fund), WFP (World Food Programme) & WHO (World Health Organization). 2018. *The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition.* Rome, FAO.

Feeny, S., Posso, A., Skali, A., Jyotishi, A., Nath, S. & Viswanathan, P. K. 2021. Child labor and psychosocial wellbeing: findings from India. *Health Economics*: 1–27. https://doi.org/10.1002/hec.4224

Grootaert, C. & Kanbur, R. 1995. Child labour: an economic perspective. *International Labour Review*, 134(2): 187–203.

Guarcello, L., Mealli, F. & Rosati, F. C. 2009. Household vulnerability and child labor: the effect of shocks, credit rationing, and insurance. *Journal of Population Economics*, 23(1): 169–198. https://doi.org/10.1007/s00148-008-0233-4

Gubert, F. & Robilliard, A. S. 2008. Risk and schooling decisions in rural madagascar: a panel data-analysis. *Journal of African Economies*, 17(2): 207–238. https://doi.org/10.1093/jae/ejm010

Hazarika, G. & Sarangi, S. 2008. Household access to microcredit and child work in rural Malawi. *World Development*, 36(5): 843–859. https://doi.org/10.1016/j.worlddev.2007.05.008

Helldén, D., Andersson, C., Nilsson, M., Ebi, K. L., Friberg, P. & Alfvén, T. 2021. Climate change and child health: a scoping review and an expanded conceptual framework. *The Lancet Planetary Health*, 5(3): 164–175. https://doi.org/10.1016/S2542-5196(20)30274-6

IFPRI (International Food Policy Institute). 2009. *Climate change: impact on agriculture and costs of adaptation*. Washington, DC. https://doi.org/10.2499/0896295354

ILO (International Labour Organization). 2006. The end of child labour: within reach. Global Report under the follow-up to the ILO Declaration on Fundamental Principles and Rights at Work. Geneva. www.ilo.org/ipec/Informationresources/WCMS_IPEC_PUB_2419/lang--en/index.htm

ILO. 2008. *Resolution I: Resolution concerning statistics of work, employment and labour underutilization.* Geneva. www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_112455.pdf

ILO. 2011a. *Children in hazardous work: what we know, what we need to do.* Geneva. www.ilo.org/moscow/information-resources/publications/ WCMS_347005/lang--en/index.htm

ILO. 2011b. *Eliminating child labour in rural areas through decent work.* ILO Rural Policy Briefs. Geneva.

ILO. 2017a. *Global estimates of child labour: Results and trends, 2012–2016.* Geneva. www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/ publication/wcms_575499.pdf

ILO. 2017b. *Ending child labour by 2025: a review of policies and programmes.* Geneva.

ILO. 2017c. *Global estimates of child labour: results and trends, 2012-2016.* Geneva. www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_575499.pdf%0Ahttps://www.ilo.org/global/publications/books/WCMS_575499/lang--en/index.htm

ILO. 2019. *Ending child labour, forced labour and human trafficking in global supply chains.* Geneva.

ILO. 2020. *L'abolition effective du travail des enfants en Côte d'Ivoire.* Geneva. www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---multi/documents/briefingnote/wcms_762229.pdf

ILO. 2021. *Nepal child labour report 2021.* Geneva.

ILO, OECD (Organisation for Economic Co-operation and Development), IOM (International Office of Migration) & UNICEF (United Nations Children's Fund). 2019. *Ending child labour, forced labour and human trafficking in global supply chains.* Geneva, International Labour Organization. https://publications.iom.int/books/ending-child-labour-forced-labour-and-human-trafficking-global-supply-chains

ILO & UNICEF. 2020. *Covid-19 and child labour: a time of crisis, a time to act.* Geneva, International Labour Organization and New York, USA, United Nations Children's Fund.

ILO & UNICEF. 2021. *International Labour Office and United Nations Children's Fund, Child Labour: Global estimates 2020, trends and the road forward.* New York, ILO and UNICEF. www.ilo.org/wcmsp5/groups/public/---ed_norm/---ipec/documents/publication/wcms_797515.pdf

Islam, A. & Choe, C. 2013. Child labor and schooling responses to access to microcredit in rural bangladesh. *Economic Inquiry*, 51(1): 46–61. https://doi.org/10.1111/j.1465-7295.2011.00400.x

Josefsson, J. & Wall, J. 2020. Empowered inclusion: theorizing global justice for children and youth. *Globalizations*, 17(6): 1043–1060. https://doi.org/10.1080/14747731.2020.1736853

Landmann, A. & Frölich, M. 2015. Can health-insurance help prevent child labor? An impact evaluation from Pakistan. *Journal of Health Economics*, 39: 51–59. https://doi.org/10.1016/j.jhealeco.2014.10.003

Maccini, S. & Yang, D. 2009. Under the weather: health, schooling, and economic consequences of early-life rainfall. *The American Economic Review*, 99(3): 1006–1026.

Maldonado, J. H. & González-Vega, C. 2008. Impact of microfinance on schooling: evidence from poor rural households in Bolivia. *World Development*, 36(11): 2440–2455. https://doi.org/10.1016/j.worlddev.2008.04.004

Pham, T. T. T. & Nguyen, K. S. 2019. Does microcredit influence parent's decision to send a child to school or to work? Evidence from Vietnamese rural households. *The Journal of Developing Areas*, 53(3). https://doi.org/10.1353/jda.2019.0047

Posso, A. 2012. Remittances and aggregate labor supply: evidence from sixty-six developing nations. *Developing Economies*, 50(1). https://doi.org/10.1111/j.1746-1049.2011.00153.x

Posso, A. 2017. Child labour's effect on long-run earnings: an analysis of cohorts. *Economic Modelling*, 64. https://doi.org/10.1016/j.econmod.2017.02.027

Posso, A. 2020. Introduction. In: Alberto Posso, ed. *Child Labor in the Developing World Theory, Practice and Policy,* pp. 1–13. Singapore, Palgrave Macmillan.

Rocha, R. & Soares, R. R. 2015. Water scarcity and birth outcomes in the Brazilian semiarid. *Journal of Development Economics*, 112: 72–91. https://doi.org/10.1016/j.jdeveco.2014.10.003

Rohlman, D.S., Ismail, A.A., Rasoul, G.A., Bonner, M.R., Hendy, O., Mara, K., Wang, K. & Olson, J.R. 2015. A 10-month prospective study of organophosphorus pesticide exposure and neurobehavioral performance among adolescents in Egypt. *Cortex*, 74: 383–395.

Sadhu, S., Kysia, K., Onyango, L., Zinnes, C., Lord, S., Monnard, A. & Arellano, I. R. 2020. *NORC final report: assessing progress in reducing child labor in cocoa production in cocoa growing areas of Côte d'Ivoire and Ghana*. October, 2020. Chicago, Illinois, USA, NORC at the University of Chicago.

Sanchez, A., Melendez, G. & Behrman, J. 2016. The impact of the Juntos Conditional Cash Transfer Programme in Peru on nutritional and cognitive outcomes: Does the age of exposure matter ? *Young Lives Working Paper*, July: 5–28.

Save the Children. 2012. *One year after catastrophe: still saving lives in East Africa.*

Schultz, P. T. 2002. Why governments should invest more to educate girls. *World Development*, 30(2): 207–225. https://doi.org/10.1016/S0305-750X(01)00107-3

Tirado, M. C., Crahay, P., Mahy, L., Zanev, C., Neira, M., Msangi, S., Brown, R., Scaramella, C., Coitinho, D. C. & Müller, A. 2013. Climate change and nutrition: creating a climate for nutrition security. *Food and Nutrition Bulletin*, 34(4): 533–547. https://doi.org/10.1177/156482651303400415

Trinh, T. A., Posso, A. & Feeny, S. 2020. Child labor and rainfall deviation: panel data evidence from rural Vietnam. *Developing Economies*, 58(1): 63–76. https://doi.org/10.1111/deve.12215

UNICEF. 2013. *Climate change: children's challenge*. London, UK, United Nation's Children's Fund.

UNICEF. 2021. Child labour. In: *UNICEF*. New York, USA. https://data.unicef.org/topic/child-protection/child-labour/

World Bank. 2010. Economics and adaptation to climate change - synthesis report. *Climate Change Policies: Global Challenges and Future Prospects*, 104. Washington, DC.

World Bank. 2021. *Poverty & equity brief Ethiopia.* Washington, DC. https://databankfiles.worldbank.org/public/ddpext_download/poverty/987B9C90-CB9F-4D93-AE8C-750588BF00QA/AM2020/Global_POVEQ_ETH.pdf

©FAO/Michael Tewelde

Appendix A
Quantitative analysis background

The quantitative chapter studies the relationship between shocks associated with climate change and child labour. This appendix describes a quantitative analysis background, reviewing data sources and variable construction.

Household surveys

We use four different household surveys to inform our analysis.

Côte d'Ivoire
National Survey on the Situation of Child Labour

Data for Côte d'Ivoire come from the National Survey on the Situation of Child Labour in Côte d'Ivoire (Enquête nationale sur la situation de l'emploi et du travail des enfants/ENSETE, 2013). The survey was developed by the National Institute of Statistics of Côte d'Ivoire for the International Programme on the Elimination of Child Labour (IPEC) and coordinated by members of the ILO Office. It was funded by the United States Department of Labor.

The survey was conducted in order to provide information on child labour as well as the quality of employment. The population is made up of all the households counted in the population and housing census of 1998. The sampling frame was made up of approximately 16 000 census districts. The sample is stratified into 12 administrative districts before a total of 24 substrata were defined to which the city of Abidjan was added. The sample was then drawn at two levels in each of the 25 sub-strata. At the first level, 600 enumeration districts were chosen as primary sampling units. At the second level, a household draw took place, without replacement of 20 households in each primary sampling unit. A total of 12 000 households were drawn in the second stage and 11 977 households were actually surveyed with a response rate of 99 percent. The sample was constructed so that the results of the analysis can be extrapolated both by place of residence and by administrative district (ENSETE, 2015).

Data collection was supervised at different levels. At the national level, there was a technical department made up of executives from the Institut National de la Statistique (INS), Agence Emploi Jeaine (AGEPE) and the Directorate for the Fight against Child Labour. The technical team ensured data collection was coordinated effectively. Supervisors were based in the regions as Regional Directors of Statistics. They were responsible for facilitating the work of the teams by addressing difficulties in the field and for raising awareness among administrative authorities undertaking daily debriefs with the teams to develop and monitor the quality of their work. The teams were made up of three data collectors and a team leader to administer the household questionnaire and individual questionnaires to people who met the conditions (ENSETE, 2015).

Ethiopia & Peru
The Young Lives Project

Data for Ethiopia and Peru are captured using survey answers from the Young Lives project. Young Lives is a longitudinal study of poverty and inequality that followed the lives of 12 000 children in Ethiopia, India, Peru and Vietnam from 2001 to 2015. The project is administered by the University of Oxford. Survey rounds were held every 3–4 years. The Young Lives datasets from each round of household and child surveys are publicly archived and available to download from the UK Data Archive.

The overall objective of Young Lives research is to produce long-term panel data about the causes and consequences of childhood poverty, the impact of pro-poor policies, and the means by which poverty is transmitted across generations.[20] As a result of its poverty and inequality focus, the Young Lives sampling method is not nationally representative of children of a specific age but aims to generate a large enough sample for general statistical analysis of poor children. To avoid a sample comprised exclusively of poor children, the Young Lives Project surveyors aim to capture information about poorer children and adequate comparison groups. To do so they developed a multistage sampling procedure, adapted from sentinel site monitoring methods. The concept of sentinel site monitoring comes from public health studies and involves the purposive sampling of a small number of settings, deemed to represent a certain type of population or area, which are then studied in a consistent way at relatively long intervals. Under the sentinel site monitoring system adopted by Young Lives, sentinel sites in each study country were selected non-randomly, with rich areas excluded from the sample and poor areas purposively oversampled. Within the sites, children in the right age group were sampled randomly.

[20] Further information on sampling is available via this link: https://www.younglives.org.uk/sites/www.younglives.org.uk/files/GuidetoYLResearch-S5-Sampling.pdf.

Sentinel sites were selected differently in each location. In Ethiopia, poor sites were selected based on food availability. First, five regions were selected out of a total of nine, accounting for 96 percent of the national population. Three to five districts were selected in each region, with a balanced representation of food-deficient rural and urban districts. Where official statistics were not available, the food-deficient classification was made through consultation with local officials.

Since districts in Ethiopia are too large, in terms of both area and population, to be considered as sentinel sites. At least one kebele (the lowest level of administration in rural and urban areas respectively) per district was selected as a sentinel site, with the key criterion being the possibility of finding at least 100 households with a one-year-old child and 50 households with an eight-year-old child. A village was then randomly selected within each sentinel site and all the households on the periphery were interviewed until 150 eligible households were located.

In Peru, the sentinel sites were selected using a national poverty map developed in the year 2000 by the *Fondo Nacional de Compensación y Desarrollo Social*. This map ranked all districts (1 818) according to a poverty index calculated from variables which included infant mortality rates, housing, schooling, roads and access to services. To achieve oversampling of poor areas, the 5 percent highest-ranking districts were excluded from the sampling process. The remaining districts were listed in rank order with their population sizes and divided into equal population groups. Then, a random starting point was selected, and a systematic sample of districts was chosen using the population list. Selection runs were made by computer, and the resulting samples of districts were examined for their coverage of rural, urban, peri-urban and Amazonian areas, and for logistical feasibility. After selecting 20 sentinel sites in poor areas, households containing children in the right age groups were randomly selected.

Although the Young Lives sample was not intended to be nationally representative, their samples are comparable to other data sets. The Ethiopian sample was compared with the 2000 Demographic and Health Survey (DHS) and the 2000 Welfare Monitoring Survey. The analyses showed that households in the Young Lives sample were slightly better off and had better access to basic services than the average household in Ethiopia but that they held less land, owned less livestock, and were less likely to own a house.

The Peru sample was compared with the 2000 DHS, the 2001 Peru Living Standard Measurement Survey (LSMS) and the 2005 National Census. The analysis showed that the poverty rates of the Young Lives sample were similar to the urban and rural averages derived from the LSMS and slightly wealthier than households in the DHS. Young Lives households owned more assets and had better access to public services such as electricity and drinking water than households in the other surveys.

The above suggests that findings from Young Lives data are likely to be similar to those using other data sets.

Nepal
Household Risk and Vulnerability Survey

The Nepal Household Risk and Vulnerability Survey is a three-year panel survey that had the objective of providing the Government of Nepal with empirical evidence on household level shocks and on the vulnerability of households' welfare to these shocks. The survey was funded by the United Kingdom of Great Britain and Northern Ireland's Department for International Development and covers 6 000 households and 400 communities in non-metropolitan areas of Nepal (World Bank, 2021).

The survey is based on a random sample of all non-metropolitan areas in Nepal. All households in the Kathmandu valley (Kathmandu, Lalitpur and Bhaktapur districts) were excluded from the sampling frame.

Nepal's districts were allocated across 11 analytical rural strata. Fifty of the 75 districts in Nepal were selected with a probability of selection proportional to their size (based on the number of households). Administrative wards were then selected as the primary sampling units. Survey teams then compiled a list of households in the ward based on existing administrative records and cross-checked with local leaders. Fifteen households were selected at random, each ward list for interviewing, and a further five households were selected as potential replacements (World Bank, 2021).

For household and community data collection, teams comprised 4–6 members which were led by one supervisor. The teams were assigned to a given cluster of districts and provincial support units (PSUs). The supervisors and the interviewers were trained for 12 days relating to basic skills and understanding of the concepts used in the questionnaires. A separate 3-day training session was held for supervisors to address skills required for household listing, supervision, and administering community questionnaires. Data collection was carried out over a period of 9 weeks beginning June to August for each wave (World Bank, 2021).

Climate change-related shocks

Heavy rains and dry spells

Heavy rains and dry spells are calculated using rainfall data by studying short-run deviations from long-term averages.

We use monthly precipitation data at the local level based on the ERA5 satellite reanalysis. These data come from the European Centre for Medium-Range Weather Forecasts (ECMWF). The ERA5 data combine information from weather balloons, satellites, ground stations and other input sources with climate models to estimate various weather variables across grids (Dell, Jones and Olken, 2012). ERA5 provides hourly estimates of several atmospheric, land and oceanic climate-related variables, including precipitation, which we use for this study. The data cover the Earth on a 30 km grid and resolve the atmosphere using 137 levels from the surface up to a height of 80 km. Quality-assured monthly updates of ERA5 (1979 to present) are published within three months of real time.

We measure rainfall shocks consistent with the literature, defining shocks for a local level (i.e. region) in a given year as the difference between observed rainfall in that year and the long-run average for the same location, divided by the long-run standard deviation (Björkman-Nyqvist, 2013; Maccini & Yang, 2009; Rocha & Soares, 2015). Most studies define the long run to be around 40 years. We adopt a less rigid definition and use data capturing deviations within 3, 6 and 12 months prior to the survey. We also use different periods to identify long-run average rainfall – 5, 10, 20 and 30 years. We identify a heavy rain if the deviation is greater than two standard deviations and a dry spell if the deviation is less than two standard deviations.

Child labour

Côte d'Ivoire

Child labour law in Côte d'Ivoire is reinforced at the national level by the Code of work, specifically in its Article 23-84, Decree No. 96-204 of 7 March 1996 regulating working hours and Order No. 009 MEMEASS/CAB of 19 January 2012 revising the Order 2250 of 14 March 2005 determining the list of work prohibited for children of under eighteen years of age. As it is commonly accepted that a child under 5 years old is too young to work or to start school, the analysis focuses on children 5 to 17 years of age as recommended by the resolution concerning statistics on the work of children (ENSETE, 2015).

In Côte d'Ivoire, child labour refers to any person between the ages of 5 and 17 who over a given period of time has exercised one or more of the following activities:

1. worst forms of child labour
2. economic activity before the minimum age for admission to employment, namely 14 years

Some forms of work do not fall into the category of child labour. This includes household or family tasks carried out in family businesses or activities carried out outside school hours and during holidays with a view to earn pocket money. This type of work contributes to the development of children and the welfare of their family; it allows them to acquire skills, habits and experiences that will enhance their profitability and productivity as adults (ENSETE, 2015).

Hazardous work refers to any activity or occupation which, by virtue of its nature or type, results directly or indirectly in harmful effects to the safety, health (physical or mental) and moral development of the child. The danger can also be induced by an excessive workload, by the rigors associated with the task, or by the intensity of the work – duration or number of hours – even when the activity or occupation is deemed non-hazardous or "safe". The list of these forms of work has been established at the national level following tripartite consultations (government, employers and workers) (ENSETE, 2015).

Ethiopia and Peru

We use data from the Young Lives Project to measure child labour in Ethiopia and Peru. Child labour questions are only introduced in the second round (2006). The questionnaire asked respondents to answer the following question: typically how many hours did the child (between 5 and 17 years of age) spend on the following activities during a typical day (from Monday to Friday) in the last week? The available list of activities include:

- Sleeping
- Caring for others (younger siblings, ill household members)
- Domestic tasks (fetching water, firewood, cleaning, cooking, washing, shopping, etc.)
- Tasks on family farm, cattle herding, other family business, shepherding (not just farming)
- Activities for pay/sale outside of household or for someone not in the household

- At school (including travelling time to school)
- Studying outside of school time (at home, extra tuition)
- Play time/general leisure (including time taken for eating, drinking and bathing)

We classify a child as working using a dummy variable equal to one if the child has undertaken any paid or unpaid activity in agriculture (such as working on a family farm, cattle herding or shepherding), in a family business (such as making and selling handicrafts) and/or outside the home in other sectors for at least one hour in the two weeks prior to the survey. We also use a continuous variable looking at the number of hours that a child has been engaged in these activities.

Nepal

The Household Risk and Vulnerability Survey for Nepal did have an explicit focus (and therefore definition) relating to child labour. For the purposes of this report, in Nepal, a child is a labourer if they are between 6 and 17 years of age inclusive and are reported to have worked in the past 12 months. According to this definition, between 7 percent and 9.4 percent of children worked across the three years.

References

Björkman-Nyqvist, M. 2013. Income shocks and gender gaps in education: evidence from Uganda. *Journal of Development Economics*, 105: 237–253. https://doi.org/10.1016/j.jdeveco.2013.07.013

Dell, M., Jones, B. F. & Olken, B. A. 2012. Temperature shocks and economic growth: evidence from the last half century. *American Economic Journal: Macroeconomics*, 4(3): 66-95.

ENSETE. 2015. *Enquête nationale sur la situation de l'emploi et du travail des enfants*. International Labor Organisation, Geneva.

Maccini, S. & Yang, D. 2009. Under the weather: health, schooling, and economic consequences of early-life rainfall. *The American Economic Review*, 99(3): 1006–1026.

Rocha, R. & Soares, R. R. 2015. Water scarcity and birth outcomes in the Brazilian semiarid. *Journal of Development Economics*, 112: 72–91. https://doi.org/10.1016/j.jdeveco.2014.10.003

World Bank. 2021. *Household risk and vulnerability survey, full panel 2016-2018*. Washington, DC.

©FAO/Sia Kambou

Appendix B
Open-ended questionnaire for qualitative data collection

Target participants: international NGO stakeholders working on issues around child labour and/or agriculture

Estimated time: 45 minutes

Before the interview:

1. Introduce researchers and research assistant.
2. Thank participants for their time to participate in the study.
3. Ask whether they agree to the interview being audio-recorded (offer a copy of the file for their records).
4. Provide a 2-min background to the study and purpose of the data collection instance.
5. Ask whether they have any questions or concerns before the interview starts.

Background

Based on household survey data provided by [relevant dataset], this study has looked at the potential link between child labour and climate change-related environmental events (drought, floods, soil erosion, frosts and pests). Although the study found that not all climate change-related environmental events affect the incidence or quantity of child labour, for some of these events, the impact on child labour is significant.

In [country], the data analysed indicates that [summary of findings].

We are interested in your views around policies and strategies that can alleviate the impact of environmental shocks on agricultural households. Beyond any international and national policies to reduce the frequency and impact of droughts and floods, we believe that strategies that can mitigate the economic effects of these at the local or community level are paramount in lessening their effect on child labour. For example, information on future climate patterns could help farmers diversify their crops and prepare in advance for droughts by developing water storage systems. We are interested in understanding the relevance of these or other mitigation strategies in the [country] context, with a focus on deterring child labour.

Questions

1. Do these findings about the impact of droughts and floods on child labour resonate with what you know about the [country] context?
2. Can you share with us your views around climate shocks such as the ones mentioned and their relation to agricultural households' financial stress in [country]?
3. Can you share with us any knowledge you may have about mitigation strategies that agricultural households implement on their own when faced with climate shocks such as droughts or floods?
4. In connection with the mitigation strategies we are suggesting – such as climate forecasts for farmers or water storage solutions – can you mention any such recent policies that your organization has developed and/or implemented to help mitigate the effect of climate shocks on agricultural households?
   a. In what ways are these policies relevant to the [country] context?
   b. If they have already been implemented, were they successful? If not, how could they be enhanced?
   c. In what ways were children or other members of households (such as women) considered in these policies?

   (If pertinent and suitable, ask whether there is any evaluation data on these policies or strategies.)
5. Can you think of any other strategies or policies that could help mitigate the impact of climate shocks on agricultural households in [country]?

   Prompts:

   i. Cooperatives
   ii. Insurance
   iii. Economic/income diversification.
6. Now, talking specifically about child labour, can you provide a brief overview of the situation of child labour in [country]?

   Prompts:

   i. Incidence
   ii. Rural/urban dimension
   iii. Gender
   iv. Affected industries
   v. Agriculture-specific traits
   vi. Cultural aspects including parental enforcement, age and concept of adulthood in specific communities

vii. Relation to children's consumption/purchasing power

viii. Relation to schooling and work as opportunity cost/aspirations and missed opportunities

ix. Hazardous work.

7. Going back to the connection between climate change, climate shocks and incidence/increase in child labour:
   a. What are your personal views on this?
   b. Can you see any connection to hazardous child work?
   c. Has this been a topic of discussion at all within your organization?
   d. (If relevant to the particular organization) If not, can you mention any work your organization is doing around climate shocks due to climate change and its effect on agricultural households?
8. Can you please share your suggestions in relation to the most appropriate and effective strategies to address the problem of child labour in [country]?
9. Is there anything else you would like to mention in relation to child labour, climate change/shocks and/or policies to improve the livelihoods of agricultural households in [country]?

Thank you for your time

The relations between **climate change and child labour** in agriculture

Inclusive Rural Transformation and Gender Equality (ESP) Division
Economic and Social Development

End-Child-Labour@fao.org
www.fao.org/rural-employment
www.fao.org/childlabouragriculture

Social-Protection@fao.org
www.fao.org/social-protection/en

Office of Climate Change, Biodiversity and Environment (OCB)

OCB-Director@fao.org
www.fao.org/climate-change/en

Food and Agriculture Organization of the United Nations
Rome, Italy

ISBN 978-92-5-137911-0

9 789251 379110

CC6244EN/1/06.23